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# Price Setting Behaviour and Price Setting Regulations at the Euro Changeover

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## Abstract

This paper documents that the impact of the euro changeover in January 2002 on prices was not uniform across the 12 participating countries. There are countries where prices increased significantly, but there are also countries where price-setting behaviour during the changeover does not appear to be very different from other points in time. This paper argues that the above difference can be explained by looking at the way countries regulated price setting during the changeover, and that any impact of the changeover could have been avoided with appropriate regulations. The gap between the actual and the perceived impact is addressed and policy recommendations for future changeovers are provided.

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The views expressed are those of the author and do not necessarily represent the official views of Eesti Pank.

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## **Non-technical summary**

The first goal of this paper is to document that the impact of the euro changeover in January 2002 on prices was not uniform across the 12 participating countries. There some countries in which prices increased significantly but there are also countries in which the changeover does not appear to have had an effect on prices.

The second goal is normative. There seems to be a relationship between the impact and the way in which the countries regulated price setting at the changeover. For example, all countries with a significant impact dispensed with making dual pricing mandatory. The paper argues that any impact on prices could have been avoided with appropriate price setting regulations. Policy recommendations for future changeovers are provided.

Given its relevance for economic policy making, the paper also addresses the perceived impact. People in Europe perceived the changeover to have had a profound impact on prices. This phenomenon also occurred in countries where the actual impact on prices was low or even absent. In the literature, the gap between perceived and actual inflation is often considered something policy makers cannot do much about — an unavoidable side effect of a currency changeover. This paper argues that instead of an unavoidable side effect, this was caused by the inexperience of the authorities to cope with such a phenomenon. As with the actual impact, the perceived impact can be avoided with good economic policy.

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## **1. Introduction**

This paper documents that the impact of the euro changeover in January 2002 was not uniform across countries. The impact of the changeover on the aggregate price level is negligible, but at a lower level of aggregation an effect on prices is noticeable. Prices in some sectors increased significantly in some countries, but there are also countries where the impact appears absent. There seems to be a relationship between the impact and the way the countries regulated price setting during the changeover. I argue that the impact could have been avoided with appropriate regulations.

Given its relevance for policy making, I also address the perceived impact. Even in countries where the actual impact was low or absent, people perceived the changeover to have had a profound impact on prices. This phenomenon is sometimes considered something policy makers cannot do much about. I argue that instead of an unavoidable side effect, this is actually caused by the inexperience of the authorities to cope with such a phenomenon. As with the actual impact, the perceived impact can be avoided with good economic policy.

The paper is organized as follows. The next section provides an overview of related literature and points out how this paper intends to contribute to the discussion. Then in Section 3, I will discuss the theoretical factors that may affect price setting during a currency changeover. Section 4 is where I present the data and the estimation method, and where I discuss the sensitivity of the findings. In Section 5, I discuss the findings and policy implications. The perceived impact is discussed in Section 6 and a summary in Section 7 concludes the paper.

## **2. Literature review**

Several papers have been written on the impact of the euro changeover on prices. Most studies are national or euro-area wide and only a few are cross-country studies. Ercolani and Dutta (2006) and Ehrmann (2006) are two cross-country studies. The following is a selection of country or euro-area studies. Gallot (2002) and Banque de France (2002) cover France. For Germany, see Buchwald et al. (2002b), Chlumsky and Engelhardt (2003) and Bundesbank (2002a, 2002b, 2004). A very detailed study for Finland can be found in Aalto-Setälä et al. (2003). Coimbra et al. (2002) document the impact on Portuguese prices and for the Netherlands, Folkertsma et al. (2002) is a good source. The European national central banks discuss the impact in their monthly bulletins in 2002. For euro-area studies see Eurostat (2003) and the monthly bulletins

of the European Central Bank.

The impact of the changeover on prices was rather surprising, especially for economists, and it is not easy to come up with sound explanations for the price movements. As the impact was most evident in the restaurant sector, several papers appeared arguing that menu costs are the driving factor behind the movements, at least in the restaurant sector. See for example Gaiotti and Lippi (2005) and Hobijn et al. (2006). An interesting feature of the paper by Gaiotti and Lippi (2005) is that the authors do not rely on official statistics. Instead, they use data on prices for restaurant meals from the Michelin Red Guide. Adriani et al. (2003), relying on data from the Michelin Red Guide as well, argue that the changeover worked as a coordination device for the restaurant sector to shift to a higher price equilibrium. The Bundesbank (2004) finds that even two years after the changeover, the price increases in the restaurant sector are in excess of those predicted by the development of the relevant cost factors. This might be read as a sign in favour of a multiple equilibria story because the effect of menu costs is only transitory.

Attractive prices (such as 1.99 or 24.90) received a lot of attention already before the changeover. When converted into euros these prices often lose their attractiveness so that firms are forced to round up or down to the next attractive price. The question was what would happen if firms, rather than rounding both up and down, used the changeover to round prices upwards to the higher attractive price only. This question was analyzed by Folkertsma (2001) and Aucremanne and Cornille (2001). See also Fengler and Winter (2001). Folkertsma (2001) estimates for the Netherlands that in the “worst case”, that is, if prices were only rounded up to the next higher attractive price, the impact on Dutch CPI inflation would be an increase of 0.7 percent. The studies by the national statistical offices and the national central banks cited above confirm the importance of attractive prices in many sectors. It appears however, that in practice, retailers were very careful when converting prices, which explains why most studies by the national statistical offices report no impact on retail prices.

Two books are worth mentioning — a recent book with several interesting papers on the euro changeover and its effect on inflation was edited by Del Giovane, Lippi and Sabbatini (2005). The second book is about the decimalisation of the British currency in 1971 and was written by Moore (1973). Moore’s description of people’s perception of the impact of the decimalisation on prices reveals a surprising similarity to the discussion in Europe after the changeover in 2002.

Ehrmann (2006) also presents an interesting paper — one of the few cross-country studies — that tries to come up with an explanation for the impact that

is not restricted to specific sub-sectors (like restaurants). Ehrmann argues that given that converting prices is costly, consumers will rely on rules of thumb and ignore small price changes. Retailers might try to take advantage of this behaviour and increase prices. Ehrmann calls this behaviour “rational inattention” arguing that given that it is costly to convert prices it is rational to ignore small price changes. This “rational inattention” is related to what I call “changeover confusion” in the next section. Ehrmann finds some evidence for his hypothesis and also reports that the legal requirements to dual price have helped to control the impact on prices. In an earlier study, Mastrobuoni (2004) followed an idea similar to Ehrmann’s.

The last set of papers I would like to mention, before showing how this paper intends to contribute to the literature, is about the perceived impact. The euro changeover triggered an intense discussion among the European public about its effect on prices and on inflation. Even though we can find some impact on prices in some countries, the perception that the changeover had a profound impact cannot be supported by the data. An article by the European Central Bank (2005) provides a good overview of people’s perception of the impact. Several explanations have been brought up for this phenomenon. Fluch and Stix (2005) is a good source. More literature on this issue is presented in Section 6 below.

With this paper I would like to contribute to the literature above in several ways. First, I will describe in detail the forces that affect price setting behaviour during a currency changeover. Second, I will show that the impact of the euro changeover was not uniform across countries. There are countries where prices increased significantly, but there are also countries where price-setting behaviour at the changeover does not appear to be very different from other points in time. Third, based on the theoretical discussion and on the findings of a cross-country analysis, I will give specific policy recommendations for avoiding the impact in future changeovers. The main emphasis of the paper will be on normative aspects.

Given the relevance for economic policy-making I will also address the perceived impact. In the literature, this phenomenon is often viewed as something policy makers cannot do much about — an unavoidable side effect of a changeover. I argue that, as with the actual impact, the perceived impact can be avoided with good economic policy.

### **3. Factors affecting prices during a changeover**

A currency changeover is not necessarily a “neutral” event that keeps relative prices unchanged. There are several factors or forces that may have an

effect on prices<sup>1</sup>. In this section I will identify these factors and show that any impact is not likely to be uniform across sectors. There are sectors where an impact is more likely.

Two forces are central to understanding the price movements we will see in the next section. The first one may be called “changeover confusion” and the second “changeover awareness”. Besides these two forces, there are other factors that may affect prices. These are competition or firms’ market power, “attractive” prices, and menu costs. The reason why I do not consider them central is explained below.

### **3.1. Two central forces**

The introduction of unfamiliar coins and banknotes and the changing of all nominal prices lead to some confusion among consumers, and firms might try to take advantage of this. This is the same kind of confusion tourists experience when travelling to countries with a different currency. I will refer to this phenomenon as “changeover confusion”.

In the next section we will see that prices in many sectors increased with the introduction of euro coins and banknotes. The standard explanation for this is that firms tried to take advantage of the changeover. This explanation seems reasonable. Note that this explanation does not require households to actually be confused. All that is needed for prices to increase is that firms believe that households are confused.

It is common in the literature to talk about “confusion” though different names for this phenomenon can be found as well. Ehrmann (2006) calls it “rational inattention”, arguing that given the costs of calculating the exact conversion it is rational for consumers to ignore small price changes.

The changeover confusion exerts an upward pressure on prices. There is however, a second force that exerts a downward pressure on prices — “changeover awareness”. At the time of the euro changeover, the public was quite concerned about increasing prices and the media showed many reports about how firms converted prices. This increased awareness made it difficult for firms to take advantage of the changeover and in some cases it appears to have induced firms to lower prices.

It is important to understand that this second factor affects small and larger firms differently. If, for example, a small, independent shoe repair shop increases prices at the changeover by a few percent it is not likely that a newspaper would write about this. If, however, a large company like McDonalds or a

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<sup>1</sup>This discussion is based on Eife (2006).

large retail chain increases prices at the changeover, it would not be surprising to find the media reporting on this. The risk of damaging their reputation is higher for larger firms. Larger firms, however, can use this increased coverage in the media to their advantage and make good publicity by lowering prices if margins permit<sup>2</sup>.

From a policy maker's perspective the changeover awareness is interesting. It is this awareness of both consumers and the media that can be used to assure that the changeover remains a "neutral" event without affecting relative prices. The regulations available to policy makers make use of the increased awareness during the changeover.

### **3.2. Predicting the impact on prices**

With the two central factors in mind, we can now try to predict in which markets or sectors we might see some effect on prices. Following the line of argument above, we are likely to find an increase in sectors that are dominated by smaller firms such as the restaurant sector, or the services sector in general. Unlike the services sector, retailing is generally dominated by larger chains so that we will probably not observe price increases in this sector. There are, however, items where even larger retailers can take advantage of the changeover without risking damaging their reputation. When prices are very volatile, because of seasonality for example, consumers lack a reference price. Increases in fruit and vegetable prices will be observed by consumers and the media, but lacking a reference price they will have difficulties understanding whether the increase was due to the changeover or because of, say, bad weather.

Prices of fruit and vegetables increased sharply at the changeover. This increase is usually explained by bad weather conditions (European Central Bank, 2002b). This is a possible explanation. When we look at the data in the next section we should, however, keep in mind that seasonal products belong to the kind of items where a price increase caused by the changeover is more likely than for other items.

One more comment about prices of fruit and vegetables is necessary. In January 2002, non-euro countries like Sweden or the United Kingdom observed an increase in fruit and vegetable prices as well and this is sometimes used as an argument in favour of the "weather-story". This argument is not stringent. Suppose vegetable sellers view the changeover as an opportunity to make extra profits. Assume further that the supply of vegetables is price inelastic in the short run because of fixed production capacities or because the good cannot easily be stored. Then, the transitory profit opportunities created

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<sup>2</sup>Price reductions in the fast food sector are reported by Setälä (2003) and Eife (2006).

by the changeover (even if only presumed) may negatively affect supply in neighbouring countries leading to higher prices there. Stated differently, from a theoretical point of view it is possible that the euro changeover in Germany raised vegetable prices in Denmark.

I would like to emphasize that the impact of the changeover on prices is not necessary. We will see in the next section that there are countries that were able to avoid the impact. My point here in predicting the impact is only to show that if an impact does occur, it is likely to follow the pattern just described.

### **3.3. Other factors affecting prices**

When trying to find an explanation of why a firm increases its prices at the changeover, it is tempting to argue with competition or market power in general. It is correct that a firm is only able to take advantage of the changeover, if it has some degree of market power. It is, however, not correct to reverse the argument. Observing that only small restaurants increase prices does not imply that small restaurants have more market power than larger restaurant chains in general. It is only because of the particular way the changeover awareness (temporarily) affects price setters that small and large firms display different price setting behaviour.

One reason why a currency changeover may affect real prices is pricing points, also called “attractive prices”. Two types of attractive prices are distinguished, psychological and round prices. Psychological prices typically have a 9-ending such as 1.99 or 24.90. This type of price is often found in the retail sector. In the services sector round prices, such as 1.60 for a cup of coffee, are more common (Bundesbank, 2004; Aalto-Setälä, 2003). Converting these prices at the official exchange rate often makes them less attractive so that sellers will round prices up or down to the next pricing point. This rounding leads to intense adjustments during the changeover, but given the large number of prices that enter an index, movements of price indices cannot be attributed to rounding alone.

An interesting factor that may affect pricing behaviour during a changeover is menu costs, that is, the costs of printing new price tags or menus in the case of restaurants (Gaiotti and Lippi, 2005; Hobijn et al., 2006). The reason why menu costs have received so much attention in the literature is probably because the impact of the changeover was especially evident in the restaurant sector. Menu costs may induce firms to either postpone price adjustment that they would otherwise have made prior to the changeover or bring forward some anticipated price rises so that the price changes coincided with the changeover. This postponing and anticipating will cause an upward trending

index to jump up at the point of the changeover.

The particular step-like pattern implied by menu costs is rarely found in the data. Only in the case of services such as restaurants does the actual shape bear some similarity with the shape implied by menu costs (see Figure 1 in the next section). There are, however, several reasons why I do not find the menu cost argument very convincing — not even for the restaurant sector. First, if menu costs were the driving force behind the increases in restaurant prices we should observe an upward jump in all twelve euro countries. There are, however, countries like Austria where the restaurant sector was not affected by the changeover. Second, the effect of menu costs on an index is only temporary, but in the data the impact appears to be lasting (Bundesbank, 2004). A third difficulty in the menu cost story is that prices of smaller restaurants increased while prices of larger chains remained constant or decreased. This is also difficult to reconcile with menu costs.

## 4. Estimating the impact of the changeover

In this section I will first present the data. In Subsection 4.1 the impact of the changeover is estimated. Subsection 4.2 presents the estimation results, and 4.3 discusses in detail my measure of the impact and provides a sensitivity analysis.

The data I am using are the individual series of the HICP basket (Harmonised Index of Consumer Prices). This data are published by Eurostat, the statistical office of the European Union. For each country a separate basket is available and the sample ranges from January 1996 to December 2005 (monthly data). Sixteen countries are included in the study, all twelve euro countries plus the three European Union members Denmark, Sweden, and the United Kingdom, and the non-member Norway. These four non-euro countries serve as a reference. Each basket contains 94 items ranging from bread and cereals to various services.

There are some items in the basket where prices reflect administrative acts rather than decisions by the firms. Examples are medical services, public transport, sewage and refuse collection, and education. The indices for these “regulated items” will be dropped from the analysis. The European Central Bank (2004) identifies nine “regulated items”. I have also dropped the index for “tobacco”, so that each of the 16 baskets contains 84 items<sup>3</sup>. Examples of two price indices are shown in Figures 1 and 2.

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<sup>3</sup>Germany, Spain and the Netherlands increased taxes on tobacco at the time of the changeover (January 2002) leading to a pointed increase of the index.

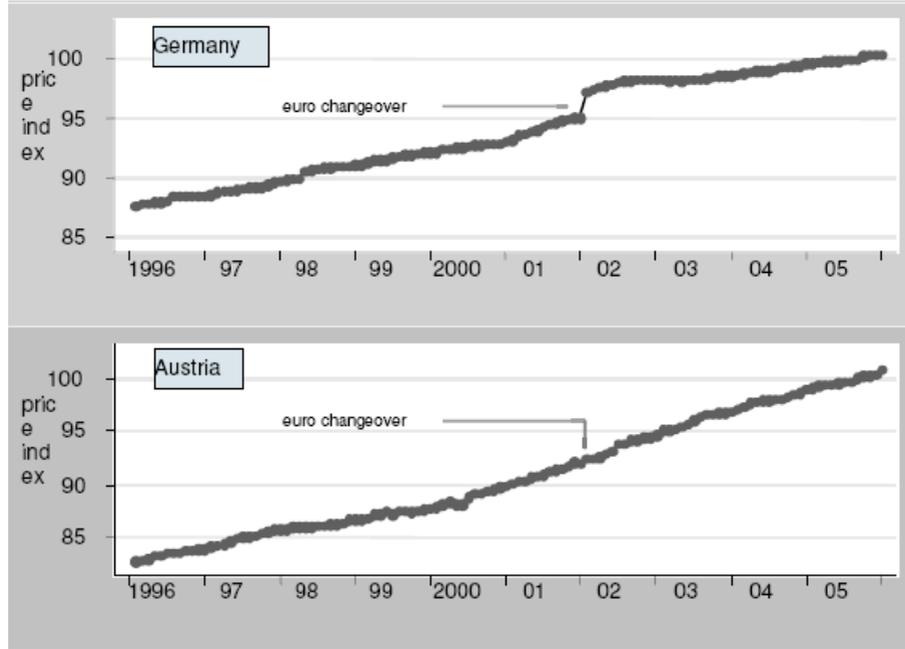


Figure 1: Restaurant Prices in Germany and Austria

Figure 1 shows the index of restaurant prices in Germany and Austria from January 1996 to December 2005. In Germany the impact of the changeover is noticeable. In Austria, restaurant prices appear unaffected by the changeover.

Figure 2 shows how the index of vegetable prices in the twelve euro countries developed over the sample period. The upper panel shows the index, the lower panel the inflation rate. A seasonal pattern is clearly visible. Note that both the highest level and the highest inflation rate coincide with the changeover.

#### 4.1. Measuring the impact

I estimate whether the changeover had a significant impact on one of the 84 indices in a country's basket with the following model.

$$\pi_{i,t} = b_{i,0} + b_{i,1}d_{euro} + b_{i,2}\pi_{i,t-1} + \sum_{m=1}^{11} \delta_{i,m}M_m, \quad (1)$$

where  $\pi_{i,t}$  is inflation of item  $i$ ,  $d_{euro}$  is a changeover dummy that equals 1 in January 2002 and zero otherwise. Seasonality is captured by using eleven monthly dummies  $M_m$ . Equations are estimated separately using OLS. I call the impact of the changeover on a given series significant if the estimate for  $b_{i,1}$

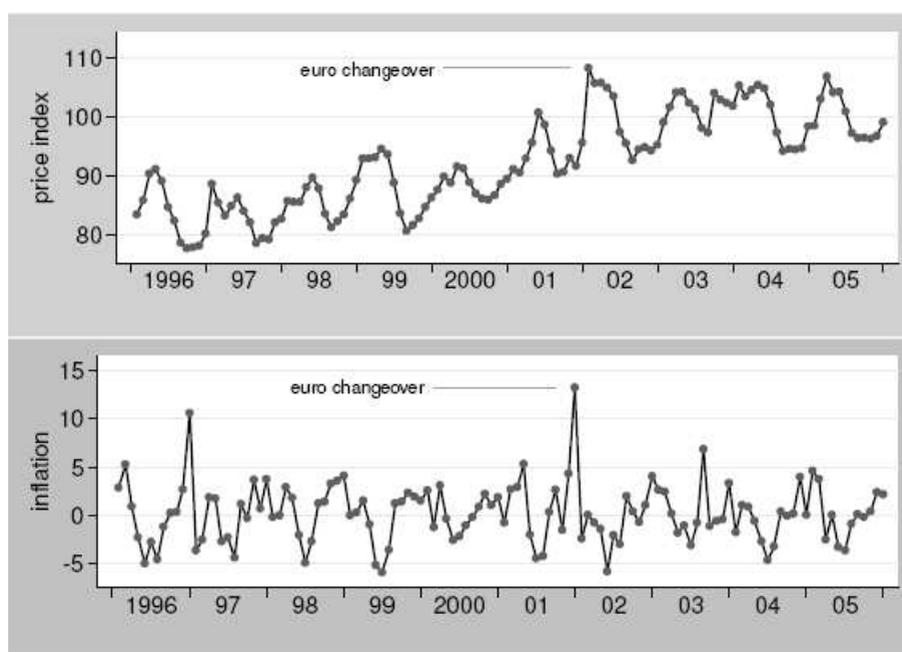


Figure 2: Vegetable Prices in EU12

is positive and significant at 5 percent. Some prices decrease at the changeover, but only a few and no pattern emerges.

In order to make the impact comparable across countries, I count the number of indices for which I find a significant and positive  $b_{i,1}$  for each country. My measure of the impact is then the percentage of the series in the HICP basket with a significant increase at the changeover. Table 1 below displays the measure for all 16 countries.

## 4.2. Estimation results

Table 1 shows that the impact measure ranges from 3.8 in Norway to 28.9 in Germany. The non-euro countries are denoted by an asterisk. Note that by construction, the measure is bounded between 0 and 100 and if the data were normally distributed, an estimate of around 5 percent should be expected for purely statistical reasons. The mean impact of 6.2 percent in the non-euro countries should not be understood as a “euro-effect”, but simply reflects the volatility of the data.

The table shows that there is a considerable difference between the countries. The impact in the four non-euro countries is smaller than in most euro countries. There are some euro countries like Greece, Luxembourg or Ireland

Table 1: The Impact of the Euro Changeover on the HICP Basket

country	impact	country	impact
Germany	28.9	Austria	8.7
Netherlands	24.4	Ireland	8.5
France	17.1	United Kingdom*	8.1
Spain	16.7	Luxembourg	7.5
Finland	11.6	Denmark*	7.3
Portugal	11.6	Greece	5.1
Italy	10.3	Sweden*	5.1
Belgium	8.9	Norway*	3.8

where — by confronting the impact with the non-euro countries — it is probably safe to claim that the changeover had no effect on prices. The impact measure for the Netherlands and Germany is considerable. I will try to show how we can explain these differences in the next section.

The restaurant sector is the most heavily affected one. Only three of the twelve euro countries were able to avoid a significant increase in this sector (Austria, Greece, and Ireland). The items where I find a significant increase in at least three euro countries can be classified into two groups. The first group contains services such as restaurants, repair of household appliances, repair of transport equipment, cinema tickets or hair dressing. The second group contains seasonal items such as fruit, vegetables and garden plants and flowers. Only three series cannot be assigned to the two groups above. These are insurance connected with dwelling, insurance connected with transport, and recording media. In the case of the two insurance series, I doubt that the increase is related to the euro changeover. In many countries insurance series exhibit a step-like pattern with increases at the beginning of the year and insurance policies do not have to be rewritten at a changeover. In the case of recording media, the increase appears to be related to the changeover.

The prices of these items increased by around 10 percent in the case of seasonal products and by around 3 percent in the case of services. The total weight of the items in the overall basket is relatively small at around 5 percent, which explains why the impact is barely noticeable on the overall price level and on HICP inflation.

### 4.3. Discussion of the impact measure and sensitivity analysis

At this point it is useful to discuss the impact measure and report on the sensitivity of the estimates above. The estimation results and explanations of the pattern are discussed in Section 5.

The goal of this estimation exercise is to reveal how the impact of the changeover differs across countries. Using the same model for all countries is necessary to make sure that the differences between countries are not generated by different model specifications. The only exception to this rule is that for the Netherlands I include an additional dummy that captures the VAT increase in January 2001. For all other 15 countries the model is that shown in Equation 1.

Here I am not interested in the absolute size of the price increases. I am interested more in whether or not an increase occurred. My measure of the impact should, therefore, be understood as a qualitative measure, not a quantitative measure. Also, the measure is an unweighted measure and does not take into account that the different series enter the overall basket with different weights. This point should be remembered when comparing the measure shown in Table 1 with estimates of the impact on the overall basket and or on inflation.

A nice feature of the measure is that it reveals differences between countries. There are some countries where the changeover had a significant impact, but there are also countries where the impact appears absent. Comparing weighted measures, such as the impact on the overall inflation rate, does not expose these country differences.

The statistics in Table 1 are robust to different model specifications. Not including lagged inflation or adding up to 12 lags of inflation barely affects the estimates and in particular does not affect the ranking. The first lag of inflation is significant in many series, and adding lagged inflation improves residual behaviour. Adding higher order lags of inflation does not appear to improve the estimations.

In Equation 1, I implicitly assumed that any impact of the changeover would occur right when the euro coins and banknotes were introduced (January 2002). It is, however, possible that in some countries the impact spread over several months. The important question that arises here is whether the differences between countries highlighted in Table 1 can be explained by the fact that in some countries (e.g. Netherlands and Germany) the impact was more concentrated and that in other countries the impact spread over several months. This hypothesis can be tested by widening the impact “window” from

one month (as in Equation 1) to several months around the changeover. Technically, in the case of a five-month window, the euro-dummy ( $d_{euro}$ ) takes the value 1 in the 5 month period from October 2001 until February 2002 and zero otherwise. If the impact in, say, Greece or Luxembourg is spread over several months then by widening the window the measure should rise significantly above the measure for the non-euro countries and converge to the estimates of Netherlands and Germany. This is, however, not the case. By widening the window from one up to seven months I do not find significant differences between the four non-euro countries and the countries for which Table 1 reports a low or absent impact.

## 5. Discussion and policy implications

In this section I will discuss how we can explain the findings of the previous section and give specific policy advice. The impact estimates in Table 1 show that the impact of the changeover was not uniform across countries. There are countries where the impact seems to be quite significant and other countries where the impact appears to be absent. I will argue (1) that this difference can be explained by the way in which the countries regulated price setting, and (2) that any impact on prices can be avoided with appropriate regulations.

The predictions we made in Section 3 are nicely confirmed. We predicted that the impact would be most visible in the case of seasonal items and in sectors dominated by smaller firms, such as the restaurant sector. Only in the case of recording media do I not have an explanation. My impression is that the increase in this series was caused by the changeover. In the case of vegetables and other seasonal products it might be that bad weather had played a role. Considering, however, the sizeable impact shown in Figure 2, I tend to view the increase as related to the changeover.

### 5.1. Making dual pricing mandatory

The interesting question raised by the previous section is how we can explain the numbers in Table 1. Why are there countries where the changeover had a significant impact on prices and why are there countries where the changeover appears not to have had any effect? As mentioned above, I argue that this difference can be explained by the way in which countries regulated price setting. There are several instruments a country can use to regulate prices during a changeover. One of the more effective instruments is dual pricing.

Figure 3 shows how an obligation to dual price affects price setting behaviour. To construct this figure, I split the 16 countries into three groups. The

first group (left column) dispensed with making dual pricing mandatory. In the second group (centre) dual display of prices was mandatory and the third group are non-euro countries. The vertical axis of Figure 3 shows the impact measure from Table 1. The non-euro countries in the right hand column have a mean “impact” of slightly more than 6 percent. Again, the impact in the non-euro countries should not be understood as a “euro-effect”, but simply as a reflection of the volatility of the data. The horizontal line is the upper bound of the 95 percent confidence interval around the four non-euro countries. One way to interpret this line is that countries below it were able to avoid an impact and countries above the line experienced an impact.

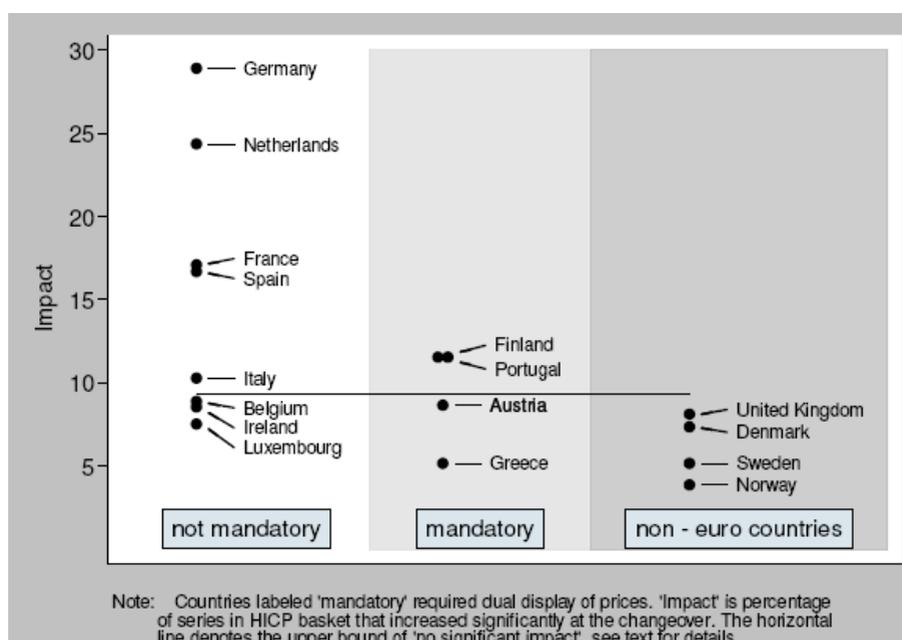


Figure 3: Dual Display of Prices

The interesting pattern that emerges is that all countries with a significant impact dispensed with making dual pricing mandatory and countries with a dual pricing obligation experienced either no (Austria and Greece) or only a moderate impact (Finland and Portugal). The figure also shows that making dual pricing mandatory is not necessary to avoid an impact. Countries like Belgium, Ireland, and Luxembourg experienced no impact without having a dual pricing obligation.

Austria and Portugal required dual pricing for five months starting in October 2001. Greece obliged firms to dual price for eleven months starting already in March 2001. In Finland, the dual pricing obligation started right with the changeover in January 2002 and ended two months later. In the eight countries where dual pricing was not mandatory, covenants or “best practice”

agreements recommended that retailers dual price. The pressure on retailers to do so differed, however. Belgium provides a nice example of how pressure to dual price can be applied without making it mandatory. Belgian regulations provided that dual pricing would become mandatory if dual pricing practices were not taken up on a widespread basis by firms. Belgium firms met the pre-specified benchmarks so that dual pricing remained “voluntary”. Belgium did not experience a significant impact.

In order to further test the effectiveness of dual pricing it would be nice to have data showing the extent to which dual pricing was practiced. For many countries, survey data on dual pricing are available but there are two problems. The first is that the surveys are country specific and often do not look at the same sectors. Especially for the services sector data are often not available. The second problem is that the survey results “always tend to be overstated” (European Commission, 2000). In many countries, firms were interested in making dual pricing appear widely practised so that the survey data is not reliable.

An important question raised by Figure 3 is why Germany experienced such a large impact. Like most countries in the left hand column, German regulations did not foresee any implicit threat of regulatory actions if retailers did not meet minimum benchmarks concerning dual pricing. Reading the German regulations, it is difficult to find great differences between them and the regulations of the other countries in the left hand column. There is, however, one important detail that makes the German regulations different from that of any of the other eleven countries. While in all other countries (voluntary) dual pricing was possible for many months and sometimes years after the changeover, the German regulations barred dual pricing two months after the changeover. From 1 March 2002 onwards, retailers had to denote prices only in euro. Having such a regulation means that in Germany within the two months following the changeover all price tags had to be replaced. I felt it important to note this here, but I have to admit that I am not sure how we can theoretically explain that this collective changing of price tags affects firms’ price setting behaviour.

In the literature on this subject, there seems to be general agreement that dual pricing should only be considered a temporary measure to encourage consumers to adopt the new scale of values (Burgoyne et al., 1999). The German authorities were right in restricting the period in which dual pricing was possible, but probably should have allowed some more time to avoid this collective changing of price tags within such a short time span. In France, the regulations originally prohibited dual pricing from July 2002, but this directive was later amended so that in the French retail sector dual pricing was not uncommon even three years after the changeover. In most euro countries dual price tags

could be found two or three years after the changeover. In the section on the perceived impact I will come back to the question whether dual pricing should be restricted at some point.

## **5.2. Policy implications**

Before discussing the policy implications it is useful to recall the forces that affect price setting during a currency changeover. The forces relevant for this discussion are the two central forces of Section 3.1, the changeover confusion that exerts an upward pressure on prices, and the changeover awareness that exerts a downward pressure on prices. Also, remember that small and large firms are affected differently by the changeover awareness. Larger supermarket chains, department stores or restaurant chains will be particularly careful in converting prices accurately or may round prices off to a lower amount. Taking advantage of the increased media coverage, larger firms have an opportunity to obtain good publicity by rounding prices down.

When I started studying the regulations of the different countries, I first thought that countries that did not experience any impact used regulatory instruments that the other countries did not have. It should, however, be clear from the discussion so far, that the absence of one instrument can easily be compensated by other instruments. Belgium that dispensed with mandatory dual pricing, provides a nice example. Another aspect emphasized by Deloitte and Touche (1999) is that in some countries the tendency to comply with the rules might be stronger than in others. These points explain why it is not easy to find empirical evidence for or against the effectiveness of specific policy instruments and many of the policy implications below will be based on theoretical considerations.

From a theoretical point of view, there is no reason why a currency changeover should affect price indices. If we observe that an index — like vegetables — increased, it is likely that many firms in this sector considered the changeover a profit opportunity. The challenge for policy makers is to create an environment where this “profiteering” is costly. Viewed somewhat more positively, the challenge is to convince (especially the smaller) firms that it is to their advantage to keep prices constant or reduce them.

In order to get an idea of the types of instruments available to policy makers, I will present in some detail the Austrian regulations. Austria was able to avoid an impact and is one of the few countries where even restaurant prices appear unaffected. There are some shortcomings that I will point out, but in general the Austrian regulations can serve as a model for future changeovers. In what follows, I will only document the most relevant parts of the regula-

tions. More information can be found in BMWA (2001).

Austria was the first country in Europe to introduce a generalized dual pricing obligation. The law required dual pricing in principle for all goods and services. This not only covered goods displayed in shop windows, showrooms or vending machines, but also advertising material, cost estimates, tenders, bills and receipts. Some exemptions were foreseen to lower the burden on smaller firms.

The dual pricing obligation started three months before the changeover and was in force as long as the Austrian Schilling (the legacy currency) was accepted as legal tender (28 February 2002), but the law foresaw an option to extend this period until the end of 2002. This option was not exercised. Technical infringements of the dual pricing obligation carried fines of around 1400.– euros. Failing to use proper conversion rates and thereby disguising price increases was considered “excessive pricing” and could be fined with around 7000.– euros. In cases of repeated infractions, fines of more than 14 000.– euros could have been imposed.

A nice feature of the Austrian regulation is the clarity about the location of the Schilling and euro price indications on price labels. Schilling prices must be at the top or to the left and euro prices below or to the right. This provision reduces the risk of different retailers adopting different practices, leaving consumers potentially confused about which price is which.

A problem with dual pricing in general is that people, when faced with two equivalent prices, one of which is known and the other new, will simply read the price in the national currency which is more familiar and will not pay attention to the new price in euros (Servet, 1998). The advantage of a relatively short period of 5 months, as in Austria, is that it concentrates the attention of consumers at the critical time around the changeover.

A short comment about the Finnish regulations is necessary. Finland made dual pricing mandatory, but the impact on prices is higher than the impact in Austria, for example. In Finland, fruit and vegetable prices and prices for restaurants and a few other services increased during the changeover. With only two months, the period of mandatory dual pricing is relatively short, but the main difference between the Finnish and the Austrian regulations is probably that in Finland the period of dual pricing started right with the introduction of the euro coins and banknotes (January 2002). The beginning of such a period is often a time of intense replacing of price tags, and combining this with the changeover might be the reason why the impact in Finland was not as low as in Austria.

A possible shortcoming of the Austrian regulation is that dual pricing was not considered an only temporary measure. Even years after the changeover,

it was not uncommon to find dual price tags in retail outlets. This might have contributed to the fact that Austrians perceived the changeover to have had a significant impact on prices (see Section 6). It might have been better to restrict voluntary dual pricing after, say, six months in order to “fade out” the use of dual price tags and encourage consumers to adopt the new scale of values more rapidly.

Monitoring the dual pricing obligation and adherence to the regulations in general, was the responsibility of the district authorities. On site checking and controlling was carried out by existing inspectors. The Federal Ministry of Economy, who headed the “euro-price commission”, evaluated the inspectors’ reports and organized any necessary amendments. In addition to these official inspections, several other initiatives were started. Newspapers (even local) and TV stations monitored price setting independently from the official monitoring.

Consumer councils lobbied to obtain “fair play guarantees” from retailers. One retailer (30% market share) pledged to always round down when converting and another retailer guaranteed not to raise prices of its products during the five-month period of compulsory dual pricing (excluding seasonal products). I doubt, however, that these “fair play guarantees” changed in any way the price setting behaviour of these large retailers. The increased media coverage forces large retailers anyway to be careful when converting prices. Nonetheless, the lobbying of consumer councils might be helpful because such lobbying increases the pressure on firms and there is a chance that smaller firms will notice this pressure as well.

Several telephone hotlines (“euro hotlines”) were set up where consumers could ask for information, convey violations of the dual pricing obligation and report price increases. One consumer council set up a black list on its homepage where consumers could name firms that took advantage of the changeover and raised prices. This black list, however, was controversial.

An instrument unique to Austria was an explicit ban on profiteering from the changeover. The directive stated that price increases above an “economically justified” level at the changeover were not permitted. This ban is sometimes wrongly considered an outright prohibition of any price increase. The term “economically justified” was not specified so that the regulation is fairly vague on this point. The vagueness is deliberate and made to assure that firms could flexibly react to market fluctuations. From a purely legal point of view, this ban is too weak to be enforceable, but its psychological effect should not be underestimated. Instruments of this kind help in creating an environment where firms are less inclined to view the changeover as a profit opportunity.

## 6. Digression: the perceived impact

The main subject of this article is the actual impact and how it can be avoided, but given its relevance for economic policy-making, I would like to spend some time on the perceived impact.

Figure 4 plots the actual impact against the perceived impact. The numbers for the actual impact are taken from Table 1. The perceived impact is the percentage of people that had the impression that prices increased with the changeover<sup>4</sup>. This survey was conducted by Gallup (2002) on behalf of the European Commission four weeks after the changeover.

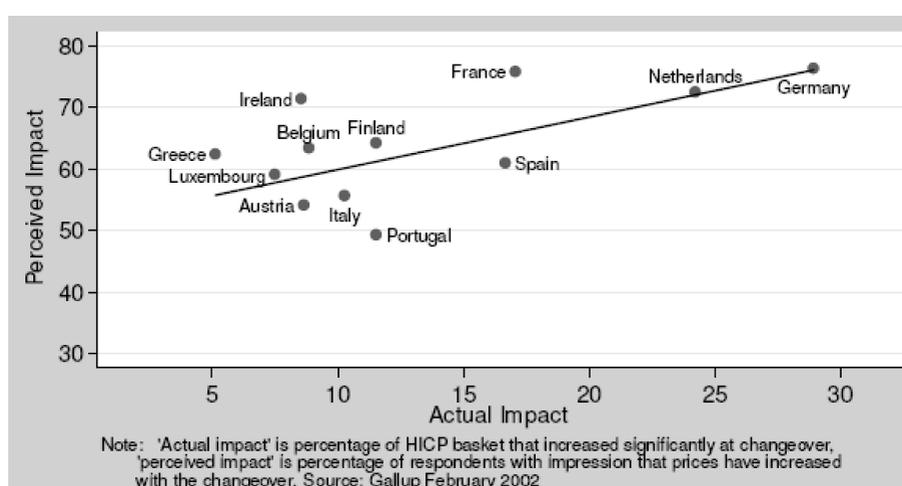


Figure 4: Perceived versus Actual Impact

People's perception of the impact is higher, the higher the actual impact in the country (slope coefficient 0.75 with p-value 0.033). But note the high y-intercept. Even in countries where prices appear unaffected, people had the impression that prices had increased.

The positive correlation between actual and perceived impact is not robust and can only be found in the weeks after the changeover. Whereas in the survey shown in figure 4 the average perceived impact is around 63 percent, this percentage increased to around 90 percent in later surveys (e.g. European Commission, 2003). A possible explanation for the disappearance of the positive correlation between actual and perceived impact is that in later surveys the perceived impact approached its upper bound of 100 percent.

<sup>4</sup>The question was: "Do you have the feeling that, when converted into euros, prices have been: more often rounded off to a higher amount." The other two possible answers were: "more often rounded off to a lower amount" and "increases and decreases balance".

## **6.1. Literature**

The perceived impact and the related issue of perceived inflation are well documented, and several explanations have been suggested for this phenomenon (e.g. European Commission, 2005; European Central Bank, 2005; Fluch and Stix, 2005). One explanation is that people continue to use reference prices in the old currency. When comparing new euro prices with old reference prices, people tend to hold the changeover responsible for any price increase they observe and tend to ignore that prices have increased in the years before the changeover as well. The tendency to use outdated reference prices is the reason why it is often recommended to restrict the period of dual pricing.

A different explanation for this phenomenon starts with the observation that most of the items that increased significantly are frequently bought items. It is argued that consumers have a greater perception of price changes for goods they buy more frequently than for goods they buy less frequently. Also, price increases are perceived more powerfully than price reductions (Brachinger, 2005). Traut-Mattausch et al. (2004) argue that before the changeover people held firm expectations that the euro would bring about price increases and that these expectations influenced people's opinion and judgement of the impact after the changeover.

A salient feature of the discussions about the perceived impact — and this is the reason why I decided to add this section — is that they barely address the question of how a strong perceived impact can be avoided. The discussions on this subject give the impression that the perceived impact is something that policy makers cannot do much about — an unavoidable side effect of a changeover.

## **6.2. A communication crisis**

Whatever the reason for the strong perceived impact, people are making a mistake when they perceive the changeover to have had a strong impact and a good policy should be able to prevent people from getting such false impressions. Rather than an unavoidable side effect, this phenomenon is an example of a severe communication crisis caused by the inability of the authorities to properly communicate with the public.

In order to illustrate the point I want to make here, I will describe and comment on the situation in Germany. There are many lessons to be learned and with respect to the perceived impact, Germany is representative. I will have to point out where I believe that mistakes have been made, but it is important to remember that the perceived impact was unexpected and surprising for all parties concerned, and that sometimes it is only possible with hindsight to

understand that a mistake has been made.

We saw in the previous section that the actual impact in Germany was larger than in any of the other twelve countries. The impact was, however, restricted to certain services and possibly seasonal products. With around 5 percent, their weight in the HICP basket is quite small and in percentage terms the increases are not great (around 3 percent in the case of restaurants, for example). Retail prices in general remained unaffected by the changeover. The data do not support people's impression of a strong impact.

In the second half of 2001, a few months before the changeover, there was an extensive discussion in the German public and the media about how firms might take advantage of the changeover and increase prices. Many people feared that they would be worse off after the changeover. With the introduction of euro coins and banknotes the discussion resurfaced and within a few days after the changeover almost everyone had a story about a restaurant or hairdresser that had doubled its prices when converting into euros. Fuelled to some extent by media reports, the impression that the changeover led to considerable price increases became widespread. The increases in prices for tobacco, insurance, electricity and gasoline — all due to tax increases — and higher administrative prices (parking fees, public transportation) in many municipalities contributed to this impression.

In a joint study, the German statistical office and the Bundesbank (Bundesbank, 2002a; Buchwald et al., 2002a) already documented the impact in March 2002. This document is part of a project both institutions started nearly two years earlier to explore the effects of the euro changeover on price setting behaviour. Considering that the document was published only a few weeks after the changeover, it is remarkably detailed.

In May 2002, the German minister of finance was reported to “admit” that prices in some sectors have increased (Economist, 2002). In light of the earlier publication by the German statistical office and the Bundesbank, the word “admit” is surprising but it nicely illustrates people's sentiment that the authorities initially tried to cover up the price increases and that it was only after the public outcry that they started to admit “failures”. The media heavily criticized the German statistical office for producing insufficient price statistics that downplayed the true cost of living (Focus, 2002). The euro was renamed “teuro” which is a play on the German word “teuer” meaning dear or expensive and politicians were quick to join the discussion. The German chancellor openly supported the protest and the Minister of Consumer Protection invited the media and representatives from the retailing sector for an “Anti-Teuro-Summit”. The minister also started a web site where people could file complaints (Engels, 2003).

In early summer, a chain letter started circulating calling for consumers to stay home on 1 July 2002 to boycott retailers and service providers. This call for a strike was also taken up by some parts of the media. The interesting aspect of this event is that the German Association of Consumer Councils criticized the boycott on the grounds that it is not helpful to discredit entire industries for the wrongdoings of some of its members (Verbrauchernews, 2002).

In the months following the changeover, domestic demand declined. Revenues in the restaurant sector dropped by around 14 percent (in real terms). The German Restaurant and Hotel Association called 2002 the “worst year in decades” (Engels, 2003). It would be interesting to estimate the costs of the changeover in terms of lost GDP growth.

### **6.3. Lessons for future changeovers**

The situation just described offers several lessons for future changeovers. Here, I will highlight just three: the lack of “euro observatories”, the communication before and the communication after the changeover. It goes without saying that the actual impact, tax increases and increases in administered prices such as parking fees or prices for public transport are not helpful and should be avoided.

#### **6.3.1. Euro observatories**

From a public relations viewpoint, the general problem in Germany was that there was no institution that assumed the leadership role in communicating with the public. A few years before the changeover, Servet (1998) proposed the creation of “euro-observatories”.

The observatories’ role will be to monitor price conversions; spot any difficulties, collect information, operate as a point of reference, [and] distribute information [...].

[The observatories] should thus promote transparency of the changeover by guaranteeing to consumers that the conversion of national currencies into the euro will not be accompanied by underhand price increases.

[The observatories] must not be regarded as simple “message-bearers” of governments and administrations, which would totally undermine their credibility.

In Germany, no institution was assigned or was able to grow into the role proposed by Servet (1998), and the institution involved in this part of the changeover (ministries, central bank(s), statistical office, and consumer councils) barely coordinated their actions. When in May 2002, the Minister of Finance admitted that some prices had increased with the changeover, he was apparently unaware that the Bundesbank and the statistical office had already shown this a few months earlier.

A euro-observatory as proposed by Servet cannot work miracles, but having an organisation that is able to make credible statements about what happened and did not happen to prices would have made communication before and after the changeover easier and many problems could have been avoided.

### **6.3.2. Pre-changeover communication**

Probably the biggest mistake before the changeover was that the authorities did not take people's fears that the changeover would lead to significant price increases seriously. In such a situation it is helpful to have an organization responsible for (and experienced in) communicating with the public. If, in addition, consumers consider this organization credible, their fears can be confronted.

When such fears arise, a good way to respond is to assure people that their fears are taken seriously, that it is possible that some firms might try to take advantage of the changeover, that consumers have the right to complain and that they should do so, and that firms that increase prices will be contacted and will have to justify their price setting.

At that point, it is also important (and possible) to remind people that they should be fair in their criticisms — that when they observe one restaurant increasing its prices they should not discredit the whole sector, they should also appreciate if some lower their prices, that not all price increases are changeover related, that these are the signs of a healthy economy where prices change over time, that especially in the services sector prices tend to increase (Do you remember how much you paid for your first hair cut?) and that services prices will continue to rise after the changeover just as they did before.

These “reminders” should be provided before the changeover. After the changeover, when people have already formed their opinion, they might sound didactic and might not serve their purpose.

Besides preparing the public, it is also important to inform retailers and service providers that there is the danger that price increases of a few firms might discredit the whole industry. Firms should also know that if complaints occur, the firms concerned will be contacted and asked to justify their price

setting. Since this policy is for the benefit of the whole sector it should be possible to win support for it from retail associations.

### **6.3.3. Post-changeover communication**

The joint report by the German statistical office and the Bundesbank on the impact of the changeover was presented to the press on 8 March 2002, and shortly afterwards several other official reports appeared (e.g. Bundesbank, 2002b; Buchwald et al., 2002b). These reports apparently did not reach a wide audience and in spring and summer the media were able to provide “new evidence” of the impact even though the reports already documented the impact comprehensively. It is irrelevant whether journalists were truly unaware of the reports or whether they deliberately ignored them. Letting the media assume the role of the institution informing the public of the “truth” about the impact was a serious mistake. First, because media reports are often unbalanced or even biased, and second, because in the eyes of consumers the authorities appeared unprepared and confused. If the media do not show any interest in informing the public about the official reports, communicating directly with the public via advertisements or infomercials is an option.

The fact that the German statistical office and the Bundesbank started their joint study nearly two years before the changeover shows how serious both institutions considered this issue. With 18,000 individual price series for 35 separate items, this study is far more detailed than any study presented in the media. I believe that it would not have been very difficult for these two institutions to influence the discussion and assume the leadership role in communicating with the public on this issue.

Another example of a somewhat unfortunate post-changeover communication is provided by the European Central Bank (ECB). Commenting on price developments at the changeover in 2002, the ECB published the following three statements in its monthly bulletin.

February 2002 (p 20): As regards any pressure on prices stemming from the euro cash changeover, taking the above factors [weather and taxes] into account, there remains no evidence of a significant upward impact.

March 2002 (p 32): For certain individual components at the disaggregate level Ç in particular within the services sector — price increases were observed in January 2002, which could be associated with the introduction of euro banknotes and coins.

July 2002 (p 22): Another factor behind the recent rise in the annual rate of change in services prices appears to be some impact from the cash changeover. This impact seems to be most evident in a number of specific sectors, including restaurants, hairdressing, and dry cleaning.

From the very beginning, the ECB took the rumours that the changeover might have had an impact on prices seriously and addressed this subject in almost every issue of its monthly bulletin in 2002. The three statements above have, however, a serious weakness. In particular for non-specialists (such as journalists) it appears that the ECB keeps correcting itself. Reading the February bulletin, a journalist would quote the ECB as saying that there was no “significant upward impact”. In March, the ECB’s position appears to be that there “could” have been an impact and in July, the ECB’s view about what caused the impact is clear.

It has to be noted that for the February publication, the January HICP data were not available, which is clearly stated in the Bank’s bulletin. The statement that there was no “significant upward impact” is based on a rough estimate (called a flash estimate) of overall HICP inflation. No detailed breakdown into subcomponents is available for the flash estimate. The ECB should be credited for responding as early as February on the impact of the changeover, but without available detailed data it might have been better to provide an open response leaving room to react to later developments.

The March statement that there “could” have been an impact is surprising. At that time the sizeable increase in restaurant prices shown in Figure 1 was already known. The Bank’s cautious wording can, however, be explained by its practice of thoroughly investigating price developments before making statements about causality.

The three statements above, taken individually, are made with the appropriate cautiousness and taking into account all the information available at the time of writing. Looking, however, at the whole sequence they give the impression that previous statements had to be corrected. Even if not intended, this somewhat unfortunate practice undermines an organization’s credibility and might have contributed to people’s impression that the authorities initially tried to cover up the price increases and “admitted” their existence only after the public outcry.

#### **6.4. Final remarks on the perceived impact**

I would like to emphasize again that people’s perception of the impact was unexpected and surprising for all parties concerned. I had to point out where

I believe mistakes have been made, but it is clear that it is often only possible with hindsight to understand that a mistake has been made.

The people are making a mistake if they perceive the euro changeover to have had a significant impact on prices and a good policy should be able to prevent people from such false impressions. Rather than an unavoidable side effect of a currency changeover, the perceived impact is caused by the inability of the authorities to communicate appropriately with the public.

The mistakes made in communicating with consumers and, in general, in public relations issues are fairly obvious and serious. Letting the media assume the role of the institution informing the public about the “truth” of the impact and communicating in a way that gives consumers the impression that the authorities admitted the impact only after the public outcry are just two examples. However, even being aware of the mistakes made, it will not be easy to avoid the perceived impact in future changeovers. This is ultimately a matter of trust. There will always be fears that such an event will bring disadvantages, and statements by retailers or politicians are likely to be met with suspicion. The challenge is to establish an institution with sufficient integrity, that when reporting on the impact, appears credible.

## **7. Summary**

The main proposition of this paper is that the impact of the euro changeover in January 2002 could have been avoided with appropriate price setting regulations. In order to support this hypothesis I show that the impact was not uniform across euro-countries. There are countries with a significant impact, but there are also countries where the impact appears to be absent. This difference can be explained by the way the countries regulated price setting during the changeover. For example, all countries with obligatory dual pricing experienced either no or only a moderate impact and all countries with a sizeable impact dispensed with making dual pricing mandatory.

Support for this hypothesis also comes from theoretical considerations. There are two factors or forces that affect price setting during a currency changeover — changeover confusion and changeover awareness. The introduction of unfamiliar coins and banknotes and the changing of all nominal prices lead to some confusion among consumers and firms might try to take advantage of this to increase prices. This confusion exerts an upward pressure on prices. There is, however, a second force that exerts a downward pressure on prices, the changeover awareness. At the time of the euro changeover, the public was quite concerned about increasing prices and the media showed many reports about how firms converted prices. This increased awareness

makes it difficult for firms to take advantage of the changeover and in some cases it appears to have induced firms to lower prices.

An important point is that small and larger firms are affected differently by these two forces. Because of the media coverage, large firms such as retail or restaurant chains have a much greater chance of damaging their reputation by increasing prices at the changeover. Larger firms can, however, use the increased coverage in the media to obtain good publicity by lowering prices. These two forces explain almost all the price movements we observed at the euro changeover. The two forces also explain how price setting regulations can affect price setting behaviour during a changeover. For example, dual pricing makes the conversion more transparent and thus reduces the upward pressure on prices by mitigating the changeover confusion. Based on the empirical analysis and the theoretical considerations, specific policy recommendations for future changeovers are provided.

Another issue I address in the paper is the perceived impact. In all twelve euro-countries, people perceived the changeover to have had a profound impact on prices. This phenomenon is sometimes considered something policy makers cannot do much about. I argue that instead of an unavoidable side effect, these perceptions are caused by the inexperience of the authorities to cope with such a phenomenon. People are making a mistake when they believe that the changeover had a profound impact on prices and a good policy should be able to prevent people from getting such false impressions. As with the actual impact, the perceived impact can be avoided with good economic policy.

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