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EUROSYSTEM



THE IMPACT OF EURO ADOPTION ON INFLATION IN THE SLOVAK REPUBLIC IN JANUARY 2009

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SUMMARY

On the basis of the following document it is possible to conclude that the euro introduction effect to HICP overall inflation reached the level of 0.15 of a percentage point; the middle of the interval 0.12 – 0.19 of a percentage point when the lowest and the highest value from the results of individual methods are used.

This is comparable to the estimates of the euro introduction effect in other countries also.

If in the calculation of the euro introduction effect on price development those items where the price could decrease by the euro introduction effect were also taken into consideration, then the thus quantified changeover would be in the interval -0.12 – 0.12 of a percentage point (contribution to inflation development in January 2009), or 0.0 of a percentage point as the middle of the interval.

In general we can conclude that none of the methods used identified that an unjustified increase in consumer prices occurred because of the euro introduction..

In January 2009, as the 16th member of the euro area, the Slovak Republic adopted the euro. During the introduction of the new currency, the effort was, as in other countries, to enable the changeover to proceed smoothly and to prevent inadequate price level increases. These were reflected in the General Code and also in further regulations as well as in the Ethical Code for the euro introduction. One of the accepted provisions was the introduction of the obligatory dual display of prices 5 months before the euro introduction and for 1 year after its introduction and a regular decadal monitoring of the selected goods by the Statistical Office of the SR from August 2008.

Conversion of prices into the euro may be associated with the rising prices of some goods and services (not only for the rounding effect of prices). This is the so-called changeover effect, which has been present in each country introducing the euro. On the basis of the analyses of the price development of individual countries which entered the euro area in 2002, this effect was estimated by Eurostat at the level of 0.09 to 0.28 of a percentage point to overall inflation (published in 2003), 0.3 of a percentage point for Slovenia (published in March 2007) and 0.2 to 0.3 of a percentage point for Malta and Cyprus (published in April 2008).

The purpose of this document has been the analysis and calculation of the euro introduction effect in the Slovakia conditions: in other words, the response to the question whether the January inflation in the SR was affected by the conversion of the prices of consumer basket items into the new currency, the euro.¹

In the current member countries of the euro area the influence of euro introduction was shown in the group comprising restaurants, hotels, coffee bars and personal services. Approaches to the calculation of euro introduction effect and its contribution to the overall inflation in the euro area member countries were applied in 2002 under conditions of a long-term stable and slight inflation (inflation moved in the level of inflation criterion of 2% for a longer period of time). The current macroeconomic conditions of evident gradual attenuation of economic activity (deepening of the negative output gap), decrease in the prices of commodities, whether that of energy or agro-commodities, when slowing the demand for goods of medium-term and long-term consumption, worsen the application of this procedure in the calculation of the euro introduction effect.

For the purposes of the analysis undertaken the influence of euro introduction was defined as the effect of determination of a new (higher price as a consequence of euro changeover, i.e. a more considerable increase which is different than the last development would indicate (in conditions of the non-existence of a new currency) or the development in neighbouring countries. The first month after the euro introduction, i.e. January 2009, is considered to be the period of euro introduction effect in this analysis.

The findings of this analysis arise from five methods which have been used for the purpose of ensuring the greatest possible objectivity: each of the methods regarding the calculation of this effect has its shortcomings and price development is subject to the above-mentioned

¹ *In the analyses of the changeover effect influence in other countries, the assumption was made that for the reason of the euro introduction the price increases could arise as early as in December. When reviewing such effect in the Slovak Republic, on the basis of application of selected methods (e.g. 3 sigma), no changeover effect was identified in December 2008.*



various heterogeneous effects, which are mutually combined and it is not possible to quantify them clearly and to eliminate the effect of seasons, economic cycle, fluctuations in commodity prices).

At first sight no increase was reported in the inflation development in the first month of the new currency's existence which might considerably differ from the long-term trends. Inflation, measured by the HICP, reached the level of 0.3% in January 2009. Despite the fact that due to the global factors the month-on-month HICP increase in January 2009 represented the the lowest January increase in the history of the Slovak Republic in consumer prices, some items or groups of goods reported more considerable price increases. For this reason in particular, the new currency introduction effect could appear in these items.

On the basis of the above-mentioned, and in the further part of the document in more detailed description of various approaches, the National Bank of Slovakia came to the conclusion that the euro introduction effect to the HICP overall inflation reached the level of **under 0.2 of a percentage point** (or 0.15 of a percentage point as the middle of the interval **0.12 to 0.19 of a percentage point** (application of the lowest and the highest value of the results of individual methods **which is also comparable** to the estimates of the influence of the euro introduction effect in other countries.

When analyzing the development of all items of the consumer basket, only those were taken into consideration which increased in price.

By the effect of rounding, a decrease in prices may occur. This kind of development was seen mainly in the foodstuffs sector, which may be a consequence of the ongoing campaign of some retail chains. The decisions of price makers could be affected (toward lower prices) by the principles of the general Euro Act and related provisions (e.g. Criminal Code sanctioning traders for unauthorized price increases, by intensification of the activities of consumer organizations in Slovakia, by the controlling authorities and by establishment of the Price Council of the SR government). Also in the event of fees to the state, a downward trend in prices was shown because of prices-rounding. For the reason of the above-stated it is possible to expect that when considering the new currency introduction effect on the decrease of prices, this effect (changeover effect) could be minimal in the Slovak Republic.

If in the calculation of the euro introduction effect on price development in January those items were taken into consideration which also reported a price decrease, then this effect would be quantified in the interval -0.12 – 0.12 of a percentage point (contribution to inflation development in January 2009 or 0.0 of a percentage point as the middle of the interval. In sum we can conclude that none of the methods used identified an unjustified increase in prices owing to the euro introduction.



INFLATION IN JANUARY 2009

Before the euro introduction, inflation showed a decreasing tendency and also recorded slowdown in January after the euro introduction. Inflation, measured by the HICP, reported a month-on-month growth rate of 0.3% in January 2009, and the year-on-year growth rate decelerated to 2.7% in January 2009 (from 3.5% in December 2008). Due to the global factors the month-on-month HICP increase in January 2009 represented the lowest January increase in the history of the Slovak Republic (an average price increase in the first month of the previous years 2005-2008 reached 1.3%). Deceleration of the growth rate in foodstuffs and tradeable goods prices had an impact on this development of inflation. (see chart No. 1)

When looking at the structure of the price change (chart 2), in December the share in prices which increased, decreased or remained unchanged was stable and comparable to the previous months'. In January, however, the changes in the structure were more considerable, when the share in prices which increased or decreased was one of the highest in the period under review and the share in prices which remained unchanged, was considerably slighter.

This change indicates that by the effect of euro introduction, also the other than common market factors reflected in prices.

Chart 1 Structure of the year-on-year inflation (p.p.)

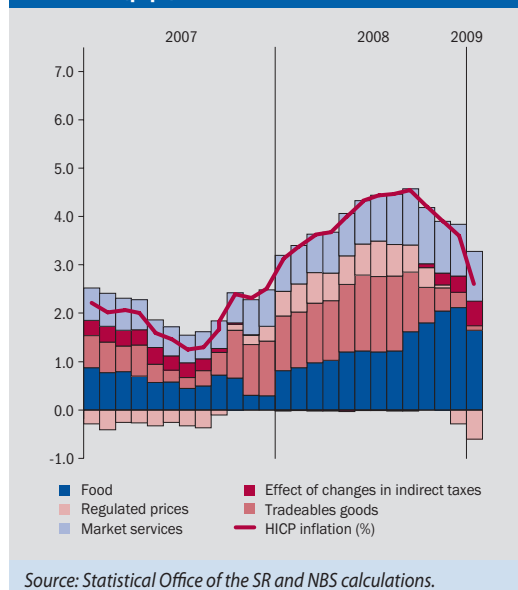
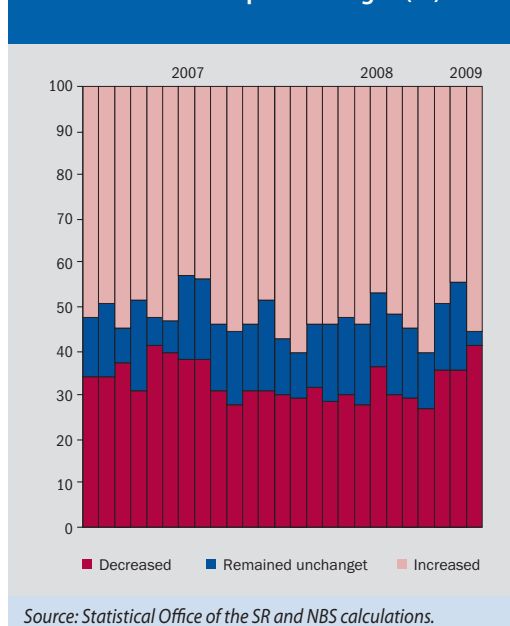


Chart 2 Structure of price changes (%)





METHODS OF CALCULATION, APPROACHES TO THE ANALYSIS OF THE EURO ADOPTION EFFECT IN THE SLOVAK REPUBLIC

From 2005 a time-series of data was used for the analysis (the period when we can more or less consider the development on the retail market to be standard.) A further, already in mentioned and important, assumption is that the euro introduction will cause only an increase in prices, not a decrease in them.

The following approaches were used in the calculation:

1. Approach based on the 3 sigma² rule
2. Approach on the basis of international comparison
3. Approach on the basis of shifts comparison by individual representative items, their medians and averages (only services) in January, when compared to December
4. Approach comparing January month-on-month change of individual representative items in 2009 and in the previous years
5. Approach based on comparison of assumptions arising from ARMA models and from real development

1. APPROACH BASED ON THE 3 SIGMA RULE

On the basis of monthly data for the period January 2005 – December 2008, an average month-on-month change and a standard deviation were calculated for all representative items of the consumer basket. These values were compared for all items with the development in January 2009. The result was that 49 items (of more than 700) of the consumer basket HICP recorded a month-on-month growth rate higher than the triple of its standard deviation. Those of the representatives were eliminated which recorded negative results, regulated prices (they are determined to 4 decimal places and therefore a rounding influence is

not present) and these in which a considerable seasonal increase or decrease could occur. Thus the adjusted sample contained 23 representatives. After calculating through the scales, their contribution – euro introduction effect into inflation- represented **0.12 of a percentage point.**

2. APPROACH ON THE BASIS OF INTERNATIONAL COMPARISON

Within this method the January month-on-month changes of the development of consumer basket items were compared with the average month-on-month price increase in neighbouring countries (the Czech Republic, Poland, Hungary, Austria) at the level of four-figure COICOP (source: Eurostat).

The euro introduction effect was considered a contribution to overall inflation, calculated from the growth rate higher than the average increase in the above-stated countries.

The method chosen this way has identified 41 subaggregates from consumer basket (out of 87), the growth of which in January was higher in Slovakia than in the neighbour countries. Items excluded from the basket (garments, footwear), were influenced by seasonality, as this may vary from country to country and also, each country may calculate it differently. Equally, prices affected by regulation were not taken into account (cigarettes, electricity, gas, heat) owing to the fact that each country uses a different way of regulation or, there may occur a change in excise duty that may cause differences in the price development. The final sample was formed of 31 items. In compliance with this approach the impact of the euro introduction would represent **0.19 of a percentage point.**

² 3 sigma rule anticipates that in normal division of the variable, 99% of all values of the variable is in the interval of ± 3 sigma, whilst sigma represents a standard deviation of the respective variable from its middle value.



3. APPROACH ON THE BASIS OF SHIFTS COMPARISON BY INDIVIDUAL REPRESENTATIVE ITEMS, THEIR MEDIAN VALUES AND AVERAGES (ONLY SERVICES) IN JANUARY WHEN COMPARED TO DECEMBER

In this approach a division of prices by individual representatives, their median values and averages was compared for December 2008 and January 2009. If the growth (dynamics) of **averages** was more distinctive than the growth of **median values**, we may assume that in January measurements with a major increase in prices occurred within given representatives („outliers“ – entities that increase a price of the given representative in a smaller way than other entities). This means that the impact of the euro introduction may have had some effect on these representatives. This method was applied to representatives in the services sector. Prices in restaurants, hotels and coffee bars are characterized by local competition and a low rate/frequency of price changes. The number of prices ending with 5 and 10 cents stood at close to 28% in December and in January rose to approximately 38%.

From the above, it is possible to consider the increased motivation of pricemakers to round prices to attractive ones, and so the effect of the euro introduction in this subaggregate of the consumer basket is possible.

The reason why other items of the consumer basket basic structure were not analysed is that foodstuffs are characterised by the average low nominal price of item and strong competition. Prices ending with 5 and 10 cents (attractive prices) was below 20% both in December and January and their proportion increased only moderately. Therefore, it is possible to consider the decreased motivation of pricemakers to round prices to attractive ones and thus the effect of the euro introduction in this subaggregate of the consumer basket should be minimal. In the case of regulated prices, there is usually one price set for the whole of Slovakia. Prices of tradable goods excluding fuel are exposed to international competition and it can be assumed that there will be a zero impact of the introduction of the euro.

A positive change of the relationship – average minus median, outweighed by the weight of the item (i.e. only a different price development in case of „outliers“) was included in the calculation. The contribution of these representatives to headline inflation was on the level of **0.12 of a percentage point**, which could be considered the impact of the introduction of the euro into core inflation. The advantage of this approach is that it estimates the impact of the introduction of the euro also with items with a declining price. The disadvantage of this approach is that it can be used only for prices of items without a significant price concentration or, for prices that are not affected by administrative interference.

4. APPROACH COMPARING JANUARY MONTH-ON-MONTH CHANGE OF INDIVIDUAL REPRESENTATIVE ITEMS IN 2009 AND IN THE PREVIOUS YEARS

Approaches to the calculation of the euro introduction effect on inflation in the past in the countries introducing the euro arose mainly from monitoring of real, higher month-on-month increases than those of the assumptions, or than was shown in the long-term average of month-on-month growth rate of individual subaggregates and groups of representative items within the consumer basket.

The January month-on-month development of all comparable representative items of the HICP consumer basket was compared in January 2009 to the development in January 2005-2008. A comparison was made on comparable representative items: those were eliminated where changes occurred (replacement of one representative item by another) in the course of the stated period (e.g. cars), also regulated prices were eliminated from the sample (another regulation) except transport. At the same time the seasonal foodstuffs were also eliminated (fruit and vegetables) and products where change of indirect taxation occurred (cigarettes). In the calculation of the euro introduction effect only those items were taken into consideration which showed in January 2009 a more considerable increase than the average January increase in the previous years.



The final middle value of the contribution of the euro introduction effect would represent **0.18 of a percentage point** on the basis of the above-stated approach.

5. APPROACH BASED ON COMPARISON OF ASSUMPTIONS ARISING FROM ARMA MODELS AND FROM REAL DEVELOPMENT

The most likely forecast for January was compared in this approach, based on simple ARMA models for individual groups of four-figure COICOP, and also after considering the standard

failure (a maximum and a minimum January index was calculated) and real development. For calculation of the euro introduction effect those items of the consumer basket were not taken into consideration, the January index of which was within the anticipated interval (between anticipated maximum and minimum index), or which was under the anticipated interval. Seasonal products (fruit) and regulated prices (energy and heating) were eliminated at the same time (as in the previous approaches).

Thus the calculated euro introduction effect would be approx. **0.15 of a percentage point**.



CONCLUSION

On the basis of the various approaches in the analysis of the euro introduction effect on inflation, we can conclude that this influence was in the interval **0.12 – 0.19** of a percentage point (use of the lowest and the highest value from the results undertaken in all methods), or **0.15** of a percentage point (as the middle of the interval to which the results stated in the table in the form of contributions of individual groups of four-figure COICOP also refer).

The most frequent representative items or groups and, at the same time, the greatest contribution

to overall inflation in all the approaches was transport, veterinary services, services connected with housing maintenance (painting, glazier's services, waste collection and chimney sweeping) and restaurant services (coffee).

If in the calculation of the euro introduction effect on price development in January also those items were taken into consideration where the price decrease could be shown by the euro introduction effect, then this effect would be quantified in the interval **-0.12 – 0.12** of a percentage point (contribution to inflation development in January

Table 1 Impact of euro adoption on inflation in the SR in January 2009 (p. p.)

| | |
|--|------------------|
| Approach based on the 3 sigma rule | 0.12 |
| Approach on the basis of international comparison | 0.19 |
| Approach on the basis of shifts comparison by individual representative items, their medians and averages (only services) in January when compared to December | 0.12 |
| Approach comparing January month-on-month change of individual representative items in 2009 and in the previous years | 0.18 |
| Approach based on comparison of assumptions arising from ARMA models and from real development | 0.15 |
| Interval | 0.12–0.19 |

Source: NBS.

Table 2 Contribution of individual Groups of COICOP to overall inflation in January 2009 (p. p.)

| COICOP | Contribution to overall month-on-month change |
|---|---|
| 01 Food and non-alcoholic beverages | 0.020 |
| 02 Alcoholic beverages, tobacco and narcotics | 0.002 |
| 03 Clothing and footwear | 0.003 |
| 04 Housing, water, electricity, gas and other fuels | 0.018 |
| 05 Furnishing, household equipment and routine maintenance of the house | 0.005 |
| 06 Health | 0.016 |
| 07 Transport | 0.033 |
| 08 Communication | 0.001 |
| 09 Recreation and culture | 0.024 |
| 10 Education | 0.001 |
| 11 Restaurants and hotels | 0.016 |
| 12 Miscellaneous goods and services | 0.012 |
| Total | 0.152 |

Source: Statistical Office of the SR and NBS calculations.



Table 3 Impact of euro adoption on inflation in the SR in January 2009 including items where the price decrease could be shown (p. p.)

| | |
|--|-------------------|
| Approach based on the 3 sigma rule | 0.09 |
| Approach on the basis of international comparison | -0.12 |
| Approach on the basis of shifts comparison by individual representative items, their medians and averages (only services) in January when compared to December | 0.06 |
| Approach comparing January month-on-month change of individual representative items in 2009 and in the previous years | -0.12 |
| Approach based on comparison of assumptions arising from ARMA models and from real development | 0.12 |
| Interval | -0.12–0.12 |

Source: NBS.

Table 4 Contribution of individual Groups of COICOP to overall inflation in January 2009 including items where the price decrease could be shown (p. p.)

| COICOP | Contribution to overall month-on-month change |
|---|---|
| 01 Food and non-alcoholic beverages | -0.011 |
| 02 Alcoholic beverages, tobacco and narcotics | -0.001 |
| 03 Clothing and footwear | -0.003 |
| 04 Housing, water, electricity, gas and other fuels | -0.002 |
| 05 Furnishing, household equipment and routine maintenance of the house | 0.000 |
| 06 Health | 0.025 |
| 07 Transport | 0.006 |
| 08 Communication | -0.002 |
| 09 Recreation and culture | -0.005 |
| 10 Education | -0.006 |
| 11 Restaurants and hotels | 0.008 |
| 12 Miscellaneous goods and services | -0.006 |
| Total | 0.003 |

Source: Statistical Office of the SR and NBS calculations.

2009) or **0.0** of a percentage point (as the middle of the interval to which refer also the results stated in the table in the form of contributions of individual groups of four-figure COICOP).

