



# Analysis of the influence of the exchange rate on consumer prices

## A disaggregated view

Ing. Michal Doliak, Ing. Branislav Karmažin  
The National Bank of Slovakia

*The fear of a sudden increase in prices often appears in connection with the adoption of the euro. The exchange of korunas for euros, i.e. the currency conversion, however, is only a technical change, within which all financial data is converted at a precisely set exchange rate (the so-called conversion rate). The conversion of korunas to euros is thus no reason for price increases. However, opinions occur, according to which the absence of appreciation of the exchange rate will have a quite considerable influence on price increases, or alternatively, that the appreciation of the exchange rate will not have a favorable influence on consumer prices and inflation anymore by means of cheaper imported goods. But what is the real influence of the exchange rate on the prices of goods and services? Is the influence of the exchange rate so big that after its fixation and after the introduction of the euro, there will be a considerable price increase for that reason?*

The importance of an exchange rate is determined by, among other things, the high level of openness of Slovakia's economy. The influence of the exchange rate change should theoretically manifest itself the most in the tradable sector, i.e. in the prices of industrial goods excluding energy (tradable goods excluding fuels), but also in food prices. The development of the exchange rate can also manifest itself in fuel prices and in the prices of other energies, where it affects the koruna value of energy commodities. Prices of services are rather influenced by cost factors.

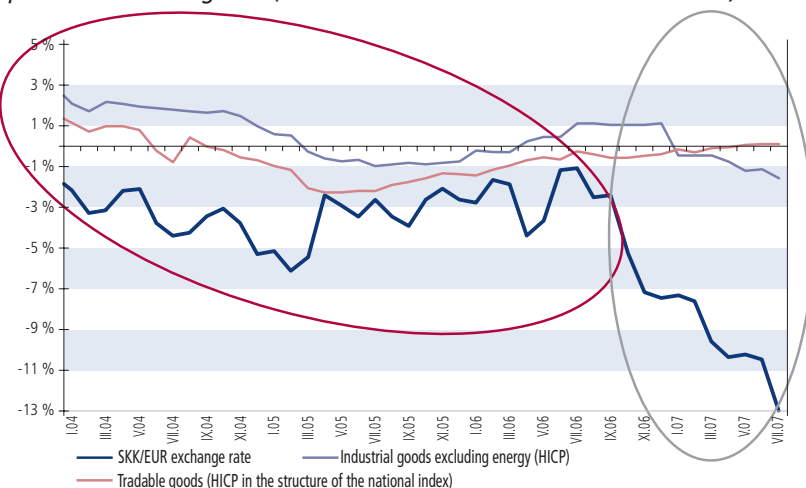
Under the disaggregated view of the exchange rate influence on consumer prices in partial components of the consumption basket, simple regressions have been used and the variables have been non-stationary and mutually cointegrated.

### INDUSTRIAL GOODS EXCLUDING ENERGY (TRADABLE GOODS EXCLUDING FUELS)

The influence of the development of the exchange rate on the prices of industrial goods excluding energy (tradable goods excluding fuel) can be divided into several periods. The fixed exchange rate regime created favorable conditions for a relatively low growth of the price level in the years 1995-1997. The exchange rate depreciation after the introduction of a floating exchange rate regime, on the other hand, has contributed to an acceleration of the price growth in the first half of 1999, especially in the sector of industrial goods excluding energy (or tradable goods excluding fuels). The relatively stable development of the koruna exchange rate compared to the reference currency euro in the years 2000 and 2001 had a favorable impact on the prices of in-

dustrial goods excluding energy (tradable goods excluding fuels), when their year-on-year growth decreased to approximately 2% in 2001. The year 2002 has been a period of stable development of the prices of industrial goods excluding energy (tradable goods excluding fuels) at a relatively unstable exchange rate development. The influence of the development of the exchange rate on the prices of tradable goods can be observed in the period from 2003 to the end of 2006. That development, however, is likely to be related to the arrival of large retail chains to the Slovak market and to the competition that has arisen here. The development is completely different from the end of 2006 to the present – while tradable goods have slowed down their year-on-year

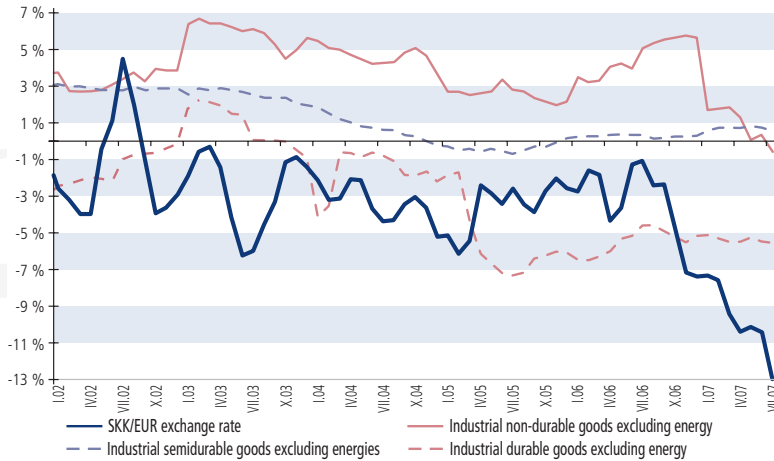
**Chart 1 Comparison of the year-on-year exchange rate development and the prices of industrial goods excluding energy (HICP) and the prices of tradable goods (HICP in the structure of the national index)**



Source: Eurostat, Statistical Office of the Slovak Republic and NBS.

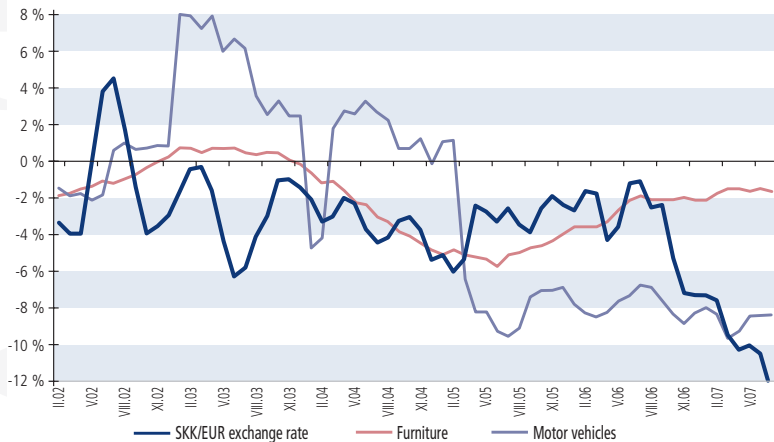


**Chart 2 Development of the prices of industrial durable, semidurable and non-durable goods excluding energies on a year-on-year basis**



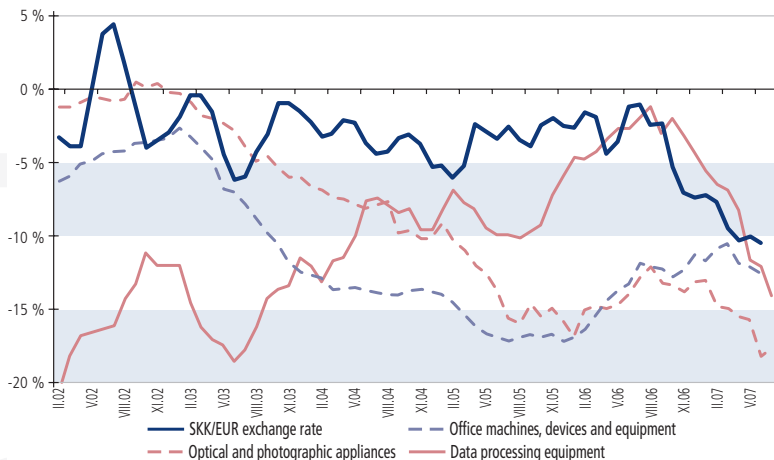
Source: Eurostat, Statistical Office of the Slovak Republic and NBS.

**Chart 3 Industrial durable goods excluding energy and the exchange rate on a year-on-year basis**



Source: Eurostat, Statistical Office of the Slovak Republic and NBS.

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Source: Eurostat, Statistical Office of the Slovak Republic and NBS.

did not fully appear itself in the prices of tradable goods. During that period, the influence of the exchange rate probably did not affect the development of industrial goods prices excluding energy to the extent prevailing in the 2003 to 2006 period. It is probable that the trade industry based its price adjustments on the long-term appreciation trend (amounting to some 3% year-on-year from 2000 to the present) and did not take into account the considerable appreciation of the exchange rate in the last quarter of 2006 and in the first half of 2007.

The development in the prices of industrial goods excluding energy (tradable goods excluding fuels) in each further month of 2007 confirms the decreasing influence of the exchange rate on prices, and the elasticity computed for the analyzed 2003-2007 period reached approximately the level of 0.23 from the approximate level of 0.4 in the longer 1998-2007 period. During the short period from 2006 to the present, the exchange rate pass-through based on the tested simple model (containing the variables: SKK/EUR exchange rate, prices of industrial goods excluding energy in euro-area countries, prices of tradable goods excluding fuels SR) has reached the approximate level of 0.05, the exchange rate being a statistically insignificant variable.

In the currently used model for a short-term prediction of the development of inflation, a 1-percent exchange rate change caused a change in the price level of industrial goods excluding energy of some 0.23 percentage points, on a one-year horizon, and considering the weight of industrial goods excluding energy (tradable goods) this would mean an impact of 0.06 percentage points on headline inflation.

When looking at the structure of industrial goods excluding energy, it can be stated that the influence of the exchange rate manifested itself in virtually all sectors (durables, semidurables, as well as non-durables), especially however in the prices of durable industrial goods, till mid-2006. From that period onwards, the development of prices differs from that of the exchange rate. In the case of non-durable industrial goods, the development in the years 2006 and 2007 was influenced by changes to the regulated prices of pharmaceutical products, as well as a decrease in the VAT on drugs from 19% to 10% from January 2007.

Within the prices of industrial goods, which had reacted most strongly to an appreciation in the past, the prices of furniture and motor vehicles showed the greatest correlation with the exchange rate development.

It is probably the preparations for the introduction of the euro and the associated costs that cause the retail not to decrease the prices in line with the development of the exchange rate development to the extent it did in the previous period, but it generates a higher profit, as well as sales margins. It is possible that this behavior of the retail is influenced by the end of the market

growth, the year-on-year appreciation reached two-digit levels during this period.

From mid-2006 to the present (mid-2007), the considerable appreciation of the exchange rate

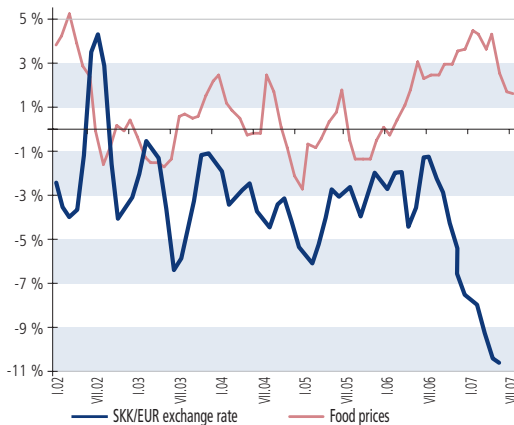


entry of new chains (associated with greater competition and fight for the customer), since a reallocation of the market occurred.

### Food

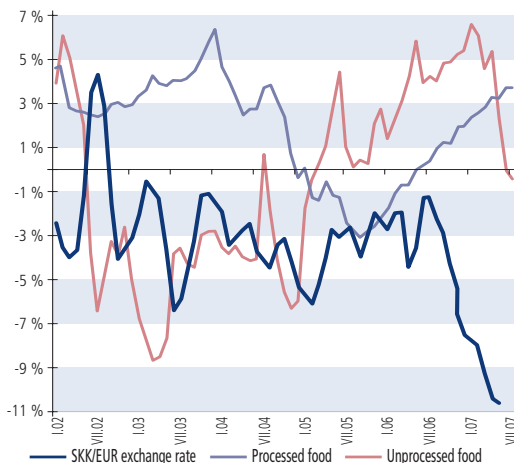
The prices of food have stopped reacting to the exchange rate development since the second half of 2006 and their correlation reaches considerably negative values. When looking at the structure (processed and unprocessed food) this trend in the food prices appears to have been caused primarily by the prices of processed food, where the cost factors are likely to have been transmitted to the prices (bread and other bakery products). The simple regression is based on the assumption that food prices react to the SKK/EUR exchange rate and, simultaneously, to the price development in the euro-area countries and in the Czech Republic. In the period under review (from 1998 to the present), the elasticity of the exchange rate influence on the development of food prices was approximately 0.25. That means that a 1-percent change of the exchange rate should increase/decrease the food

**Chart 5 Development of food prices on a year-on-year basis in the years 2002 – 2007**



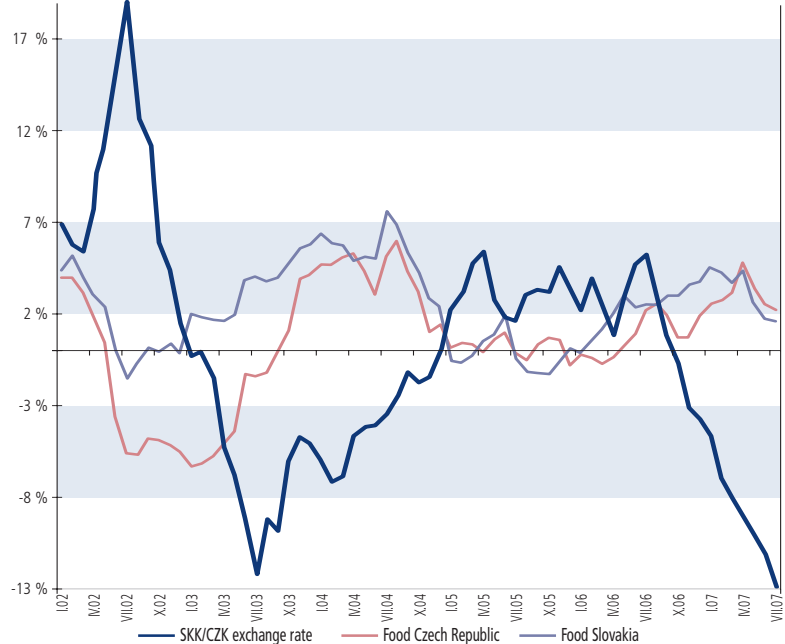
Source: Statistical Office of the Slovak Republic and NBS.

**Chart 6 Development of prices of processed and unprocessed food on a year-on-year basis in the years 2002 – 2007**



Source: Statistical Office of the Slovak Republic and NBS.

**Chart 7 Development of food prices in Slovakia and the Czech Republic on a year-on-year basis in 2002 – 2007**



Source: Eurostat, Statistical Office of the Slovak Republic and NBS.

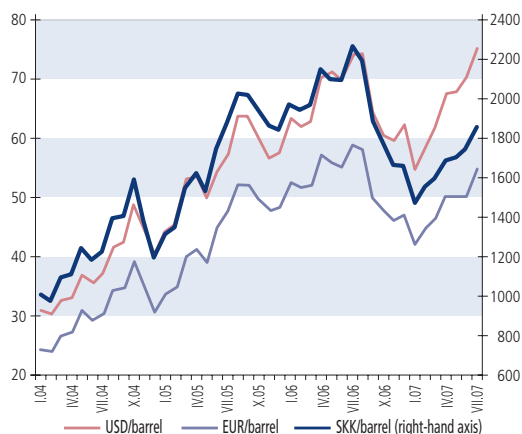
prices by some 0.25 percentage points with an impact of 0.03 percentage points on headline inflation.

### REGULATED ENERGY PRICES AND FUEL PRICES

The exchange rate is passed through to fuel prices almost immediately. Fuel prices change depending on the current situation, when the Slovak koruna/US dollar exchange rate level is also being taken into account. The appreciation of the Slovak koruna exchange rate to the euro and the simultaneous appreciation of the euro to the US dollar lead to a more positive influence on fuel prices than in the countries of the euro-area.

The regression has considered for the impact of the development of the US dollar-to-Slovak koruna cross exchange rate, the SKK/EUR exchange rate, and the dollar price of Brent oil.

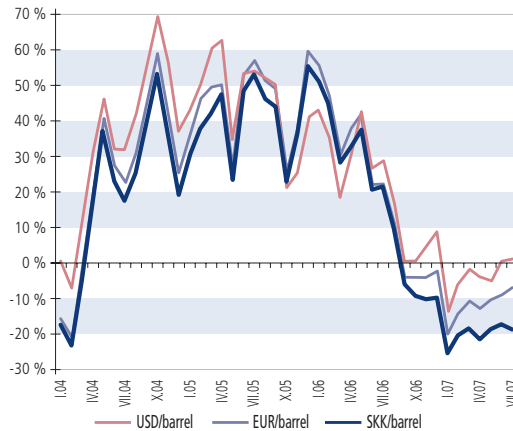
**Chart 8 Development of Brent oil prices**



Source: Bloomberg and NBS calculations.



Chart 9 Year-on-year change of Brent oil prices



Source: Bloomberg and NBS calculations.

The fuel prices elasticity to an exchange rate change lies approximately in the interval from 0.2 to 0.3, meaning that fuel prices decrease by some 0.25% if the SKK/EUR exchange rate appreciates by e.g. 1%. Because the weight of fu-

els in the consumption basket is about 3%, the impact on inflation would be about 0.01 percentage points.

It is evident from the above mentioned data that both in the long run and in the short run the development of Brent oil prices in Slovak korunas is positively influenced by the development of the exchange rate of the Slovak koruna, but, on the other hand, a considerable part of the oil price change is primarily affected by the development of the commodity in US dollars per barrel.

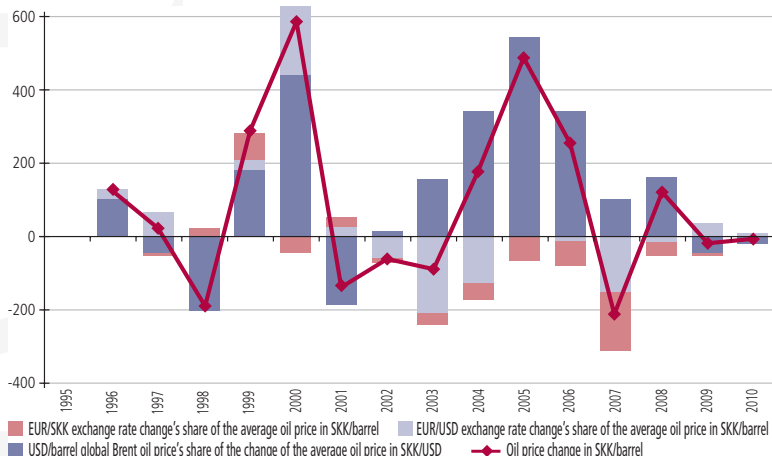
The situation is more complicated for the regulated energy prices due to the way they are regulated, which is once during a certain time period (usually once a year, in extraordinary cases even several times). The influence of the exchange rate thus manifests itself with a certain time lag and mainly in prices that depend on commodity prices on world markets (natural gas and heat prices, as well as electricity prices). However, since the commodities make up a significant part of the final energy prices for households, an exchange rate change of 1% could ceteris paribus

Table 1 Average annual values of the indicators

	USD/barrel	SKK/USD	SKK/barrel	SKK/EUR	EUR/USD	EUR/barrel
1995	17.20	29.74	511.61	38.45	1.29	13.31
1996	20.79	30.66	637.58	38.41	1.25	16.60
1997	19.31	33.62	649.18	38.02	1.13	17.08
1998	13.14	35.24	462.99	39.58	1.12	11.70
1999	18.15	41.41	751.47	44.10	1.06	17.04
2000	28.88	46.30	1,336.87	42.59	0.92	31.39
2001	24.79	48.38	1,199.07	43.31	0.90	27.69
2002	25.15	45.26	1,138.16	42.69	0.94	26.66
2003	28.60	36.79	1,051.93	41.49	1.13	25.30
2004	38.04	32.25	1,227.01	40.05	1.24	30.60
2005	55.06	31.02	1,707.70	38.59	1.25	44.19
2006	66.18	29.71	1,966.19	37.23	1.26	52.73

Source: Bloomberg and NBS calculations.

Chart 10 Contributions of changes in the USD/barrel oil price, USD/EUR and SKK/EUR cross exchange rate to the final change in the Brent oil price in SKK/barrel against the previous year



Source: Bloomberg and NBS calculations.

Table 2 Average contribution of the individual components of Brent oil prices in SKK per barrel to its year-on-year growth

	USD/barrel	EUR/USD	EUR/SKK	SKK/barrel
1996	20.88	3.88	-0.13	24.62
1997	-7.15	10.01	-1.04	1.82
1998	-31.96	0.46	2.82	-28.68
1999	38.12	7.57	16.62	62.31
2000	59.14	25.06	-6.30	77.90
2001	-14.16	2.37	1.48	-10.31
2002	1.45	-5.16	-1.37	-5.08
2003	13.72	-18.83	-2.67	-7.78
2004	33.03	-12.07	-4.19	16.78
2005	44.73	-0.35	-5.27	39.11
2006	20.21	-0.87	-4.21	15.13

Source: Bloomberg and NBS calculations.



*Table 3 Development of long-term contributions of the components of Brent oil price in SKK per barrel*

	USD/barrel	EUR/USD	EUR/SKK	SKK/barrel
1996 – 2006	16.18	1.10	-0.39	16.89
1997 – 2006	15.71	0.82	-0.41	16.12
1998 – 2006	18.25	-0.20	-0.34	17.71
1999 – 2006	24.53	-0.28	-0.74	23.51
2000 – 2006	22.59	-1.41	-3.22	17.96
2001 – 2006	16.50	-5.82	-2.70	7.98
2002 – 2006	22.63	-7.45	-3.54	11.63
2003 – 2006	27.92	-8.03	-4.08	15.81
2004 – 2006	32.66	-4.43	-4.55	23.67
2005 – 2006	32.47	-0.61	-4.74	27.12
2006	20.21	-0.87	-4.21	15.13

Source: Bloomberg and NBS calculations.

represent an impact of approximately 0.34 percentage points on the energy prices for households, with an impact of about 0.05 percentage points on headline inflation.

## CONCLUSION

On the basis of the expert analysis, an exchange rate change should be passed through to inflation by means of prices of industrial goods excluding energy (with a contribution of 0.06 percentage points to headline inflation), indirect influence on the prices of market services (0.02), food prices (0.03), regulated energy prices (0.05), as well as by means of fuel prices (0.01). The additional inflation/deflation contribution to headline inflation could be about 0.16 percentage points at a 1% appreciation/depreciation.

It has to be noted in this connection, however, that in the medium run the introduction of the euro will have a dampening impact on the price development in that it simplifies the comparison of prices between countries. That will improve the functioning of international markets, reinforce the

competitive environment and will lead to higher efficiency.

Slovakia's accession to the euro-area will represent an important impulse for the growth of the economic level. This process will be connected with a convergence of prices, i.e. the level of prices in Slovakia will gradually approach the average of the European Union. The said factor should be the main reason for a faster growth of prices as compared to the advanced EU countries. However, this will be a long-term process, associated also with catching up with the economic level of these countries, i.e. with a growth of productivity, wages and the standard of living. There will thus by no means be any considerable inflation impact associated with a negative impact on the economy. This process is also under way in the converging euro-area countries (Greece, Spain, Portugal and other countries), the level of inflation in these countries, however, is currently stabilized and exceeds the euro-area average only slightly.

*Table 4 Overview of the influence of the exchange rate on the individual components of the consumption basket and on headline inflation*

	Weights	PTE	Average contribution to the total PTE
Market services	34.7%	0 – 0.1	0.017
Tradable goods excluding fuels	24.5%	0.23	0.056
Fuels	3.1%	0.2 – 0.3	0.008
Energy (heat, gas, electricity)	15.2%	0.34	0.052
Food	15.0%	0.1 – 0.3	0.030
Other regulated prices	7.5%	0	0.000
<b>Total</b>	<b>100%</b>		<b>0.163</b> <b>(0.13 – 0.20)</b>