OECD Economics Department Working Papers No. 632

The Euro Changeover in the Slovak Republic: Implications for Inflation and Interest Rates

Felix Hüfner,

Isabell Koske

https://dx.doi.org/10.1787/240631807010

OECD

Unclassified **ECO/WKP(2008)40**

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development **12-Aug-2008**

English - Or. English

ECONOMICS DEPARTMENT

ECO/WKP(2008)40
Unclassified

THE EURO CHANGEOVER IN THE SLOVAK REPUBLIC: IMPLICATIONS FOR INFLATION AND INTEREST RATES

ECONOMICS DEPARTMENT WORKING PAPERS No. 632

by
Felix Hüfner and Isabell Koske

JT03249530

English - Or. English

ABSTRACT/RÉSUMÉ

The euro changeover in the Slovak Republic: implications for inflation and interest rates

In January 2009, the Slovak Republic will adopt the euro and become the 16th member of the euro area. This paper investigates the implications of euro adoption in the Slovak Republic for inflation and interest rates with an attempt to quantify their likely size as well as their consequences for the general public. The empirical analysis – which makes use of the experience of the first-wave euro area countries – suggests that the cash changeover will most likely be associated with a moderate increase in consumer prices, estimated at around 0.3%. Policy measures to reduce this effect include public information campaigns, the conversion of publicly administered prices with the exact conversion rate and the reduction of administrative obstacles to increase supply. The minor purchasing power losses associated with this price increase will not be evenly distributed across the population with higher income households and families with children expected to be harder hit than others. Even though the exchange rate *vis-à-vis* the euro area will be irrevocably fixed, past appreciations of the koruna are still likely to pass-through to some downward pressure on consumer prices, with the cumulative effect estimated to amount to around 1.5% up to mid-2009. In the longer run, the Balassa-Samuelson effect and other factors affecting catch-up economies may raise the Slovak inflation rate above the euro area level. As capital markets have already fully priced in euro membership, no immediate effect on short- and long-term interest rates in the wholesale markets is to be expected for January 2009. In the longer run, euro adoption can be expected to foster financial integration, thereby leading to a convergence of Slovak retail interest rates towards euro area levels. This reduction in retail interest rates will benefit the general public with mortgage borrowers likely to reap the largest benefits. A potential risk of low real interest rates is the emergence of a boom-bust cycle; prudent fiscal policy and further structural reforms, including enhanced competition, would help to counter any such developments.

JEL classification: F36; E31; E43
Keywords: Slovak Republic; euro changeover; inflation; interest rates

****

L'adoption de l'euro par la République slovaque: les implications pour l'inflation et les taux d'intérêt

En janvier 2009, la République slovaque adoptera l'euro et deviendra le 16ème membre de la zone euro. Ce document examine les implications de l'adoption de l'euro dans la République slovaque pour l'inflation et les taux d'intérêt avec une tentative d'évaluer quantitativement leur taille probable aussi bien que leurs conséquences pour la population. L'analyse empirique – qui se sert de l'expérience des pays de la zone euro de la première vague – suggère que le changement des liquidités soit très probablement associé à une augmentation modérée des prix à la consommation, estimée à peu près à 0.3 %. Les mesures politiques pour réduire cet effet incluent des campagnes publiques d'information, la conversion des prix publiquement administrés avec le taux de conversion exact et la réduction d'obstacles administratifs pour augmenter l'offre. Les pertes de pouvoir d'achat mineures associées à cette augmentation des prix ne seront pas également distribuées à travers la population; les ménages aux revenus plus élevés et les familles avec des enfants pourraient être frappés plus durement que les autres. Bien que le taux de change vis-à-vis de la zone euro soit irrévocablement fixé, les appréciations passées de la couronne slovaque pourraient encore se répercuter sur les prix à la consommation; l'effet cumulatif des effets retardés est évalué à environ 1½ pour cent jusqu'au milieu de 2009. À plus long terme, l'effet Balassa-Samuelson et d'autres facteurs affectant des économies en rattrapage peuvent accroître l'inflation slovaque au-dessus du niveau de la zone euro. Comme les marchés financiers ont déjà entièrement tenu compte de l'adhésion de l'euro, aucun effet immédiat sur les taux d'intérêt de grande clientèle à court terme ou à long terme n'est attendu pour janvier 2009. À plus long terme, on peut s'attendre à ce que l'adoption de l'euro favorise l'intégration financière, menant ainsi à une convergence des taux d'intérêt aux particuliers vers les niveaux de la zone euro. Cette réduction de taux d'intérêt aux particuliers profitera au grand public avec des emprunteurs hypothécaires récoltant probablement les plus grands avantages. Un risque potentiel lié aux taux d'intérêt réels bas est l'apparition d'une phase d'essor suivie d'une récession ; une politique fiscale prudente et des nouvelles réformes structurelles, y compris l'amélioration de la compétitivité, aideraient à résister à de tels développements.

Classification JEL: F36, E31, E43
Mots clés: République slovaque; adoption de l'euro; inflation; taux d'intérêt

TABLE OF CONTENTS

Tables

Figures

THE EURO CHANGEOVER IN THE SLOVAK REPUBLIC: IMPLICATIONS FOR INFLATION AND INTEREST RATES

by
Felix Hüfner and Isabell Koske[1]

This paper investigates the implications of euro adoption in Slovakia for inflation and interest rates with an attempt to quantify their likely size as well as their consequences for the general public. The following main findings emerge from the analysis:

- The cash changeover can be expected to lead to significant price increases in a number of sectors, most notably in sectors related to recreational activities. The impact on the aggregate HICP, however, is likely to be small. Applying the experience of existing euro area member countries on the case of the Slovak Republic, the cash changeover is estimated to increase aggregate consumer prices by 0.32% between July 2008 and July 2009.

- The price increase implies that a typical household will incur additional consumption expenditures of SKK 504 (€ 16.7) per year as a result of the changeover. The effect will weigh more heavily on citizens in higher income quintiles as they spend a larger share of their income on recreational activities. The consumption expenditures of citizens in the highest income quintile are estimated to increase by 0.11% more than those of citizens in the lowest quintile.

- Product market competition appears to have played a major role in determining the extent of euro changeover-related price increases in the first-wave euro area countries. As such, the overall lighter product market regulation in the Slovak Republic compared to other euro area members and the associated higher level of competition should help containing price increases around the euro changeover.

- Although the overall actual price effect of the cash changeover was very small in most euro area countries, inflation perceptions increased notably after the changeover as there was a widespread feeling among the public that the euro had brought about significant price hikes. Whilst such a widening of the perception gap in the Slovak Republic, if it occurs, might contribute to a negative attitude of citizens towards the euro, it is unlikely to have consequences for actual inflation. This is because in most member countries the effect was perceived as temporary by citizens so that inflation expectations remained unaffected or even declined in the aftermath of the changeover.

---

1. The authors are desk economists for the Slovak Republic in the Country Studies 5 Division of the Economics Department of the OECD. The paper has been drafted under the supervision of Andreas Wörgötter (Head of CS5 Division). They are grateful to Andrew Dean, Peter Höller and other colleagues in the Economics Department as well as participants of the EDRC seminar on 9 July 2008 on the euro adoption in the Slovak Republic for helpful comments. A voluntary financial contribution by the Slovak government is gratefully acknowledged.

- As with euro adoption, the conversion rate between the Slovak koruna and the euro will be irrevocably fixed, the effect of exchange rate changes *vis-à-vis* the euro on inflation will disappear. As the pass-through is operating with long lags, exchange rate changes prior to euro adoption will still affect domestic inflation for some time going forward. This lagging effect is likely to reduce consumer price inflation by 1.5% over the period June 2008 to June 2009.

- Exchange rates *vis-à-vis* countries outside the euro area will continue to change after euro accession. As the euro tends to depreciate against the currencies of countries like Poland, Hungary and the Czech Republic, which account for 30% of Slovak imports, imports from these countries will become more expensive in euro terms, thereby exerting upward pressure on aggregate inflation in the Slovak Republic.

- The strong real exchange rate of the Slovak koruna over the past years was at least partly backed by the development of economic fundamentals such as the strong rise in productivity in the open sectors driven by large FDI inflows. The real appreciation is likely to continue for some time going forward, although to a lesser extent than in the past. With the nominal exchange rate irrevocably fixed against the euro, any real appreciation *vis-à-vis* the euro will be reflected in an inflation rate that exceeds the average inflation rate in the remaining euro area countries.

- On capital markets, the adoption of the euro will lead to an equalisation of short-term interest rates and the vanishing of the exchange rate risk premium in bond yields *vis-à-vis* the euro area. With one-month money market rates already at the euro area level and measures of the exchange rate risk premium near zero, this adjustment already took place. The remaining government bond spread *vis-à-vis* Germany of around 50 basis points is in line with other euro area member countries of similar perceived creditworthiness and is thus likely to persist after euro adoption.

- Retail interest rates in the Slovak Republic are significantly above euro area levels for loans (and below euro area levels for deposits). In particular, Slovak households pay more for their household consumption and mortgage loans with long interest rate fixation periods than the average euro area household. Deeper financial integration following euro adoption is likely to lead to a convergence of Slovak retail interest rates towards euro area levels. This process may extend over several years, however. In case interest rates fully converge to euro area levels, interest rates for a typical mortgage may be up to 1.5 percentage points lower.

- Among the population, borrowers will benefit more from the retail interest rate convergence (through a downward adjustment to euro area levels) than depositors (through an upward adjustment of deposit rates to euro area levels) and households will benefit more than non-financial companies. Most of the benefits of retail interest rate convergence will accrue to the population in the Bratislava region, as most of the loans and deposits are located in this area. Lower mortgage loan interest rates are also likely to support the development of house prices, although the speed and extent of the impact is surrounded by considerable uncertainty.

- Potential policy measures to deal with the impact of the euro changeover differ by the time horizon they aim at. In the short-term, measures could be taken to reduce the effect of the cash changeover, for example by intensifying public information campaigns, by converting publicly administered prices with the conversion rate and by reducing administrative obstacles to increase supply. Any programs to compensate for the price level effects of euro adoption should be limited to low income groups and social partners should be encouraged to exclude changeover costs from wage and price negotiations. Over the medium term, competition enhancing measures are important in order to raise productivity in the services sectors. In addition, measures to counter a potential boom-bust cycle induced by low real interest rates, in particular in the housing market, are essential.

1. Introduction

1. On 1 January 2009, the Slovak Republic will adopt the euro and will become the 16th member of the euro area. Euro area membership will have wide-ranging consequences for the Slovak economy. The aim of this paper is not to present a comprehensive evaluation of all effects of the adoption of the euro, but rather to focus on the likely consequences of euro adoption for inflation and interest rates in the Slovak economy, presenting own estimates as well as drawing on the experience of earlier entries into the euro area.

2. Euro adoption in the Slovak Republic will be carried out according to a 'big bang' scenario with the euro being introduced simultaneously in both cash and non-cash circulation. The Slovak Republic opted for a dual circulation period of 16 days during which cash payments will be possible in both koruna and euro. To prepare the general public for the introduction of the euro, the government has started a wide-ranging information campaign with special attention given to sensitive groups such as the elderly and to economically weaker regions of the Slovak Republic. Nonetheless, in a survey conducted on behalf of the European Commission in September 2007, less than half of all citizens answered that they felt well or very well informed about the euro. To help consumers getting accustomed to the new currency, dual pricing in koruna and euro will start shortly after the announcement of the conversion rate. Dual pricing will be mandatory until the end of 2009, although sellers can continue dual pricing on a voluntary basis for another six months.

3. As all assets and liabilities denominated in Slovak koruna will be converted in January 2009 into euro at a fixed conversion rate (already determined in July 2008), euro adoption should in principle not have any immediate impact on prices. A price effect can only arise if another conversion rate than the official one is used for converting koruna prices into euro. Motivations for such behaviour could be menu costs that sellers pass on to consumers, rounding of prices to obtain a price pattern that is attractive in euro, or simply the exploitation of pricing power on the side of sellers. The experience of existing euro area countries suggests that the cash changeover into euro is typically associated with an - albeit small - price level increase. Slovak citizens appear to expect similar price level effects for the Slovak Republic with 83% of all respondents in the September 2007 Eurobarometer survey saying that they expect the changeover to be associated with increasing prices.

4. Adopting the euro as a new currency will also give rise to more medium-term effects on prices, notably for a country with a lower income level than the euro area average like the Slovak Republic. As the price level in such countries typically converges to the higher price levels of more advanced economies, their real exchange rates tend to appreciate. In the past the real appreciation was to a large extent reflected in an appreciation of the nominal exchange rate of the Slovak koruna. With euro adoption, however, this channel is no longer available and the catch-up process will show up in higher inflation rates rather than exchange rate appreciation. This is also reflected in the vanishing of the pass-through of exchange rate changes (*vis-à-vis* the euro) to consumer prices. In the past, exchange rate appreciation has helped to dampen consumer price inflation by reducing import prices. Although exchange rate changes prior to euro adoption will still help to contain inflation for some time going forward, it can be expected that this disinflationary effect disappears after approximately two years and be replaced by an inflationary effect as the euro is depreciating against the currencies of other central and eastern European countries that are an important source for Slovak imports.

5. Apart from the conversion of prices, the process of euro changeover will involve the loss of monetary autonomy as the monetary policy decision-making process is transferred to the European Central Bank (with the Slovak central bank governor participating in the process through membership in the ECB Governing Council). First of all, this means that short-term interest rates set by the central bank are determined on the basis of the euro area as a whole, instead of only the Slovak Republic. This change,

however, will not lead to immediate adjustments in interest rates in January 2009 given that Slovak monetary policy was already prior to that date closely interlinked with euro area short-term interest rates as the koruna was participating in ERM II. In fact, as capital markets are forward-looking, expectations regarding euro membership have already led to a significant convergence of Slovak long-term interest rates towards the euro area level. At the retail level, however, there is still ample room for convergence and it can be expected that over the medium term Slovak retail interest rates will converge towards the prevailing euro area levels as euro adoption will foster financial integration through more transparency, lower transaction costs and more competition. This convergence in retail interest rate is likely to bring along benefits for both households and non-financial companies.

6. Through the transfer of monetary policy to the ECB, euro area membership will also have real effects on the economy. As a catch-up country the Slovak Republic tends to grow faster and exhibit higher inflation than the euro area average country so that its natural interest rate is likely to be higher. This means that, during the catch-up period, interest rates will tend to be set lower than otherwise, stimulating investment and discouraging savings. This will pose challenges for policy-makers, especially with respect to a potential boom-bust cycle of the economy, but also for the rate of return for ageing-related, necessary pension savings.

7. The remainder of this paper is organised as follows. Section 2 discusses the impact of euro adoption on inflation. Whilst the first part of the section focuses on the immediate changeover-related price effects, the second part focuses on structural aspects of euro adoption for the exchange rate pass-through and the Balassa-Samuelson effect. Section 3 then investigates the impact of the changeover on different interest rates, notably money market rates, government bond rates and retail rates. Section 4 then uses the obtained results to quantify the associated impact on Slovak consumers. Section 5 concludes with some policy recommendations.

2. The impact of euro adoption on prices

2.1 Immediate price level effects of the cash changeover

8. The euro cash changeover that took place in 2002 in 12 EMU countries triggered a heated discussion about its effect on prices in literally all countries. Two years after the changeover, 95% of euro area consumers had the impression that the conversion of prices into euro had been associated with rising prices. Similar concerns were raised in Slovenia when it joined the euro area in 2007. Against this background, this section will review the empirical evidence on the price level effect of the cash changeover in the existing euro area member countries, present results on the likely effect in the Slovak Republic and analyze the role of product market competition for the size of the observed price increases around the changeover.

2.1.1 Existing empirical evidence

9. Most empirical studies on the price level effect of the euro changeover focus on individual euro area member countries. Examples include: Buchwald *et al.* (2002), Chlumsky and Engelhardt (2002) and Deutsche Bundesbank (2002, 2004) for Germany; Folkertsma *et al.* (2002) for the Netherlands; National Bank of Belgium (2002) for Belgium; Pollan (2002) for Austria; Santos *et al.* (2002) for Portugal; and, more recently, Eurostat (2007) and the Institute of Macroeconomic Analysis and Development (IMAD) (2007) for Slovenia; and Eurostat (2008) for Malta. These studies commonly find that price increases were not a general phenomenon but limited to certain categories of goods and services, so that their impact on aggregate consumer price inflation was modest. Most studies estimate the effect at around 0.2 to 0.3% which is in line with the estimate published by Eurostat (2003) for the euro area as a whole (see Table 1).

Nonetheless, prices have risen markedly in some sectors, particularly in some service sectors where the above mentioned studies have singled out restaurants and catering, hairdressers, cinemas, and dry cleaning as sectors with significant price increases.

Table 1. Inflationary impact of the euro changeover

Study	Country	Sample period	Estimated impact on consumer prices (in %)
Folkertsma *et al.* (2002)	Netherlands	01/2002	0.2 – 0.4
Santos *et al.* (2002)	Portugal	01/2002 – 03/2002	0.24
National Bank of Belgium (2002)	Belgium	06/2001 – 04/2002	0.18
Deutsche Bundesbank (2004)	Germany	01/2002	0.3
Ercolani and Dutta (2006)	Euro area members	12/2001 – 01/2002	0.2 – 0.6[1]
Eurostat (2003)	Euro area aggregate	12/2001 – 01/2002	0.09 – 0.28
Eurostat (2007)	Slovenia	12/2001 – 01/2002	0.3
IMAD (2007)	Slovenia	12/2006 – 02/2007	0.24
Eurostat (2008)	Malta	12/2007 – 01/2008	0.2 – 0.3

1. The range refers to those countries where the impact is significantly different from zero (France, Germany, Ireland, Italy, the Netherlands, Portugal and Spain).

10. One reason why the euro changeover could have been associated with rising prices is that retailers may have passed on the menu costs of adjusting their business to the euro on to their customers. While Deutsche Bundesbank (2004) identifies several German service sectors where prices increased by more than was justified by changes in the underlying cost factors, Hobijn *et al.* (2004) argue that the price increases observed around the cash changeover generally closely match those predicted by a simple model of menu costs. This view is supported by Gaiotti and Lippi (2005) showing for the Italian restaurant sector that the rise in the average price of a restaurant meal was mainly due to a greater fraction of restaurants revising their prices rather than to greater individual price revisions the price increases. The authors interpret this as being consistent with the menu-cost hypothesis.

11. Another reason for rising prices around the changeover relates to the need to find new attractive prices in euro.[2] After the conversion of prices into euro the prices obtained were often no longer attractive requiring an adjustment of prices to the nearest attractive euro price. Chlumsky and Engelhardt (2002) show for Germany that in May 2002 attractive deutschmark prices still dominated in more than half of all product groups considered, whilst in October 2002 the majority of prices had been adjusted to attractive euro prices. Although the rounding effect should theoretically be symmetric (with some of the attractive prices being below and some above the exact euro price) there was a tendency by retailers to round prices upwards rather than downwards. This is supported by Folkertsma *et al.* (2002) demonstrating for the Dutch retail sector that prices increased at above average rates in market segments where psychological pricing is of greater importance. Quantifying the effect of this rounding behaviour on retail prices the authors find that it accounts for about two-thirds of the observed euro-related price increases with the remainder attributed to the passing on of menu costs.

2. Two sorts of attractive prices can be distinguished: convenient prices in which the last digit is equal to zero so that they are convenient to pay and psychological prices in which the last digit is equal to eight or nine so that consumers are inclined to undervalue the cost of the product.

12. One frequently cited explanation for why producers were able to raise prices around the cash changeover relates to the phenomenon of rational inattention. The central idea is that the euro changeover temporarily raised the information processing costs on the side of consumers as they had to convert euro prices back to the old currency in order to assess the price of a product. This increase in information processing costs was not matched by an equally large cost increase on the side of vendors as they had to perform the conversion only once rather than for each individual purchase and they knew the exact price that had to be converted whereas consumers needed to remember the benchmark price in the old currency. The high information processing costs might have induced consumers to pay less attention to price changes as the costs of detecting them outweighed the benefits, thereby creating temporary market power for sellers (Sims, 2003 and Reis, 2004).[3] Ehrmann (2006) provides an indirect test of the rational inattention hypothesis, showing that the inflationary impact of the euro changeover tended to be higher in countries with medium-complex conversion rates where consumers relied on (imprecise) rule-of-thumbs rather than using pocket calculators to convert prices.

13. Displaying prices both in euro and in the old national currency reduces the information processing costs on the side of consumers and with it the tendency of vendors to raise prices. This is supported by Folkertsma *et al.* (2002) showing for Dutch retailers that shops displaying prices in both guilders and euro raised their prices by half as much as shops that failed to show both currencies. The importance of dual pricing is confirmed by Ehrmann (2006) who shows that inflation around the cash changeover turned out to be relatively lower in countries where dual pricing was mandatory.[4]

2.1.2 Identifying sectors with significant price increases

14. In this section, sectors with significant changeover-related price increases are identified for the first-wave euro area countries in order to calculate an estimate for the likely effect in the Slovak Republic. The empirical analysis makes use of disaggregated data on harmonised indices of consumer prices (HICP) provided by Eurostat. The data are disaggregated at COICOP levels 2 and 3, covering respectively 39 and 93 different categories of goods and services per country.[5] The results at COICOP level 2 will be used in the assessment of the monetary impact of the cash changeover on Slovak consumers in Section 4.1 as disaggregated data on consumption expenditures are only available at that level; the results at COICOP level 3 will be used in the analysis of the role of product market competition in Section 2.1.3 as it provides a more detailed picture of the changeover effects and allows making use of a larger data sample.

15. A number of corrections are made to the two data sets. First, sectors where prices are to a large extent administered by governments or where government ownership is substantial are excluded from the analysis so that only market determined prices are investigated. As such, the price indices of health, transport services, postal services, electricity, gas and other fuels, and education are dropped from the

3. Note that consumers do not actually need to ignore price changes. All that is needed for prices to rise is that sellers believe that consumers ignore price changes.

4. Dual pricing was only mandatory in Austria, Greece and Portugal. Empirical studies suggest that it was also widely applied in most other countries, especially among hypermarkets and supermarkets (see, for example, Banque de France, 2002 and Santos *et al.*, 2002).

5 . COICOP (Classification of Individual Consumption by Purpose) is a classification by the United Nations Statistics Division used to classify consumption expenditures.

sample.[6] Second, whenever a tax change occurred around the changeover period, the price series of the corresponding sector and country is excluded from the analysis.[7]

16. In a first step sectors with a significant changeover induced price increase are identified by estimating the following system of equations jointly for all countries that started the circulation of euro banknotes and coins on 1 January 2002:[8]

$$\pi_{ijt} = \alpha_{ij}\pi_{ijt-1} + \beta_{ij}\pi_{NEURjt} + \gamma_{ij}GAP_{it} + \delta_{ij}D_{ij} + \varepsilon_{ijt}, \quad (1)$$

17. where π_{ijt} is the change in the price index in country *i* and sector *j* between July year *t*-1 and July year *t*, π_{NEURjt} is the unweighted average of the respective variables in the United Kingdom, Sweden and Denmark, *GAP* is the average output gap of year *t*-1 and *t*, and *D* is a dummy variable equal to unity for the period July 2001 to July 2002. Focusing on July-July inflation rates allows capturing changes in the price setting behaviour that had already taken place in the run-up to the changeover (*i.e.* before January 2002) and changes in the price setting behaviour that did not immediately occur with the changeover (*e.g.* because of voluntary agreements with retailers to keep prices stable around the changeover). The average inflation rate of the United Kingdom, Sweden and Denmark is included in the regression to control for other exceptional events that happened around the changeover and that might have triggered price increases for certain goods and services such as the bad weather conditions of the winter season 2001/2002 and the spreading of the mad cow and the foot-and-mouth diseases somewhat earlier.

18. In a first step, the system of equations (1) is estimated over the period 07/1997 to 07/2007 with generalised least squares (GLS) using price data disaggregated at COICOP level 2.[9] To obtain an estimate of the average changeover effect by sector, the coefficients on the changeover dummy are restricted to be equal across countries (so that $\delta_{ij} = \delta_j$ for all *i*). The results suggest that changeover-related price increases did indeed occur in a number of sectors (see Table 2). Although the size of the changeover effect appears to have been quite sizable for individual sectors, the implied impact on the aggregate HICP is relatively small. Applying the weights of the different sectors in the aggregate HICP of the euro area suggests that the changeover raised HICP inflation in the euro area by about 0.34 percentage points, which is in line with previous studies (see Table 1).[10] Employing the same coefficients and the weights of the different sectors in the aggregate HICP of the Slovak Republic (as of 2008) shows that the price effect in the Slovak Republic is likely to be of similar magnitude than in the first-wave euro area countries, with aggregate prices estimated to rise by 0.32% due to the cash changeover.

---

6. Similar corrections are made by Lünnemann and Mathä (2005) and Ehrmann (2006).

7. The relevant tax changes comprise an increase in the maximum price of certain types of bread in Belgium in July 2001, the abolition of radio and TV license fees in Belgium in April 2002, an increase in French tobacco taxes in January 2002, an increase in German taxes on tobacco, energy and insurance products in January 2002, an increase in municipal taxes and levies in the Netherlands in January 2002, and an increase in taxes on tobacco, alcohol and hydrocarbon products in Spain in January 2002 (see Ehrmann, 2006). The general VAT increase in Portugal in June 2002 requires special treatment. All analyses are carried out twice, once including and once excluding all Portuguese data. As the conclusions remain unaffected, only the results including the Portuguese data are reported in the paper.

8. The equation is similar to the ones used by Santos *et al.* (2002) and Ercolani and Dutta (2006) to investigate the price effect of the cash changeover.

9 . This sample period is chosen due to data availability.

10. The calculations take into account both significant price rises and significant price declines around the changeover period. Significant price declines were identified for other major durables for recreation and culture and for other personal effects. Only taking into account significant price increases leads to a changeover effect of 0.36 percentage points.

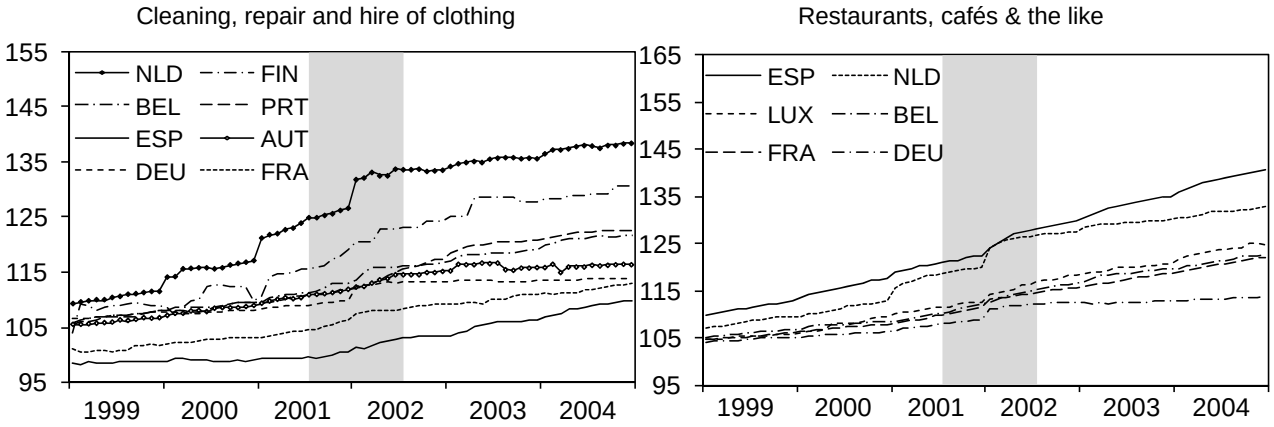
Table 2. Sectors with significant changeover-related price increases

Sector	Coefficient	Standard Error
Newspapers, books and stationery	2.066	0.459
Social protection	2.011	1.062
Other financial services	1.974	0.702
Accommodation services	1.752	0.594
Footwear including repair	1.621	0.451
Recreational and cultural services	1.520	0.362
Package holidays	1.453	0.844
Catering services	1.217	0.153
Other recreational items and equipment, gardens and pets	1.177	0.397
Purchase of vehicles	1.010	0.355
Other services	1.003	0.416
Alcoholic beverages	0.912	0.464

Source: OECD calculations.

19. Next, the system of equations (1) is estimated using data disaggregated at COICOP level 3. To obtain a detailed sector and country breakdown of the changeover effect this time all coefficients, including the one on the changeover dummy are allowed to vary across countries and sectors. Significant changeover effects are again identified mostly in service sectors such as cleaning, repair and hire of clothing, hairdressing salons and personal grooming establishments, newspapers and periodicals, recreational and sporting services, domestic and household services, and restaurants, cafés and the like where changeover-related price hikes are identified in at least half the countries (see Figure 1 and Table 3).[11] This is consistent with other studies on this issue which also identify significant changeover effects in these sectors (see, for example, Deutsche Bundesbank, 2002; Pollan, 2002; Chlumsky and Engelhardt, 2002; and Ercolani and Dutta, 2006) and also with the results obtained earlier at COICOP level 2 as all sectors that show a significant changeover effect in at least one country are included in a sector that was already singled out at COICOIP level 2.

Figure 1. Price developments in selected sectors



Note: Only countries for which the changeover effect is significant at the 5% level are shown. *Source*: Eurostat.

11. There are also a number of sectors where prices significantly declined during the changeover period, most notably major durables for indoor and outdoor recreation including musical instruments; meat; spares parts and accessories for personal transport equipment; and insurance connected with the dwelling, where significant price declines were identified in four countries or more.

Table 3. Number of countries with significant changeover-related price increases

Sector (COICOP level 3)	Number of countries with significant changeover effect		Average size of changeover effect (in ppts)	
	10%	5%	10%	5%
Cleaning, repair & hire of clothing	9	9	3.0	3.0
Hairdressing salons & personal grooming establishments	9	7	2.4	2.1
Newspapers & periodicals	8	7	5.1	5.6
Recreational & sporting services	8	6	5.4	5.9
Domestic services & household services	6	6	4.8	4.8
Restaurants, cafés & the like	6	5	2.0	2.0
Vegetables	5	5	10.2	10.2
Repair of audio-visual, photographic & info. processing equipment	5	5	4.0	4.0
Footwear including repair	4	4	3.2	3.2
Repair of household appliances	4	4	3.2	3.2
Social protection	4	4	11.7	11.7
Wine	4	3	4.2	4.9
Gardens, plants & flowers	4	3	4.3	4.8

Notes: The columns labelled 5% and 10% refer to the changeover dummies that are significant at the 10% and 5% significance level, respectively. For simplicity only sectors with a significant changeover-related price increases in at least four countries at the 10% significance level are shown. For each sector, the average size of the changeover effect is calculated as the unweighted average across countries of the size of all significant changeover dummies.
Source: OECD calculations.

20. The number of incidences of euro-related price increases varies considerably across countries (see Table 4). Price increases appear to have been particularly prevalent in Spain and France where the cash changeover led to price increases in more than one-fifth of all sectors when measured at the 5% significance level. In Finland, by contrast, price increases were not very common with significant changeover effects in only 6% of all sectors. Interestingly the three countries that had a legal requirement for dual display of prices around the cash changeover (Austria, Greece and Portugal) range in the lower part of the list, supporting the hypothesis that dual display helped to contain price increases.

Table 4. Share of sectors with changeover-related price increases

Country	Significance level	
	10%	5%
Spain	26.2	26.2
Luxembourg	23.5	13.2
France	22.4	20.9
Netherlands	20.0	13.8
Germany	20.3	17.2
Belgium	20.0	18.5
Ireland	16.7	7.6
Portugal	16.9	15.4
Italy	12.1	10.6
Greece	13.4	10.4
Austria	11.9	9.0
Finland	6.0	6.0

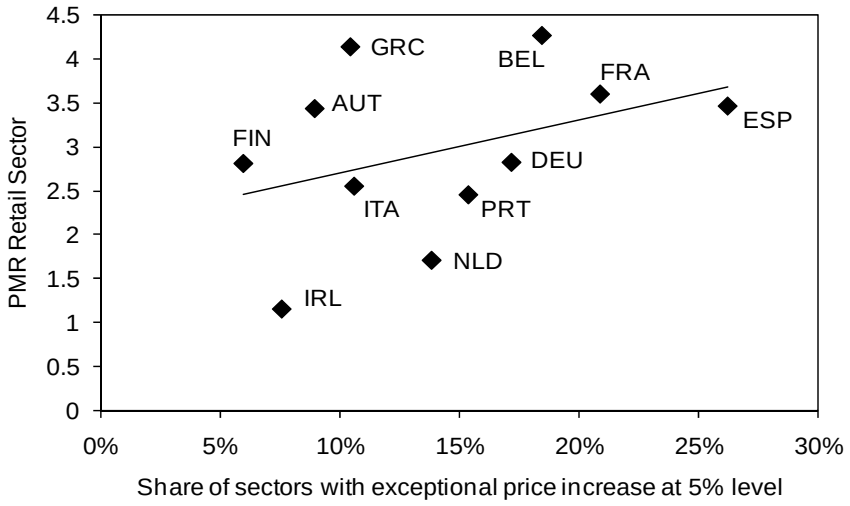
Source: OECD calculations.

2.1.3 The role of product market competition

21. Several studies suggest that the level of competition also played a major role in determining the extent of changeover-related price increases. Folkertsma *et al.* (2002), for example, show for the Dutch retail sector that above average price increases were observed in particular in market segments with low levels of competition. Likewise, Gaiotti and Lippi (2005) demonstrating for Italian restaurants that more market power (as proxied by a local concentration index) was associated with above-average price increases during the changeover. This section will investigate this issue further, relating the changeover-related price increases identified in the previous section to the level of product market competition in the euro area countries.

22. Figure 2 plots the number of sectors with significant changeover effects against the OECD's indicator of product market regulations in the retail sector in 2003.[12] The figure suggests that a higher level of product market regulation (and hence, a lower level of competition) is associated with a higher number of sectors with euro related price increases, though the relationship is not very strong.

Figure 2. Product market regulation in retailing and the euro-changeover effect



Note: A higher value of the Product market regulation indicator denotes a higher level of regulation.
Source: OECD Product market regulations database and OECD calculations.

23. To shed further light on the role of competition as a determinant of the price level effect of the cash changeover, a number of cross-section equations are estimated, relating the size of the changeover effect to the level of competition in the economy and a number of control variables to account for the cyclical position of the economy, the impact of the complexity of the conversion rate and for the presence of mandatory dual pricing:[13]

$$\Lambda_{ij}^{EUR} = \theta_S D_i^S + \theta_C D_i^C + \theta_{DD} D_i^{DD} + \theta_{GAP} \Delta GAP_i + \eta \Psi_i + \varepsilon_{ij} \qquad (2)$$

12. Details about the construction of the indicator can be found in Conway *et al.* (2005). The data are taken from the OECD's PMR database (www.oecd.org/pmrhttp://dotstat/wbos/Index.aspx?datasetcode=PMR). As the database only contains data for 1998 and 2003 data for the intermediate years is obtained by linear interpolation. The final variable shown in the figure is the average of the values for 2001 and 2002.

13. The choice of the control variables is motivated by Ehrmann (2006) who provides empirical evidence that the size of the changeover was affected by the complexity of the conversion rate and the presence of mandatory dual pricing.

24. Where Λ_{ij}^{EUR} is a measure of the price level effect of the cash changeover, D_i^S and D_i^C are dummy variables equal to unity for countries with respectively simple and complex conversion rates, D_i^{DD} is a dummy variable equal to unity for countries that had a legal requirement for dual display around the changeover (Austria, Greece and Portugal), *GAP* is the output gap and Ψ is an indicator of the level of competition. The size of the price level effect of the cash changeover is measured in two ways: first, by the difference between the annual inflation rate in July 2002 and the annual inflation rate in July 2001 which is the measure also used by Ehrmann (2006),[14] and second, by the size of the estimated changeover dummy in equation (1). Whenever the first measure is used as the dependent variable, the equation also includes the change in the output gap to control for business cycle effects.[15]

25. The classification of conversion rates follows Ehrmann (2006) with the conversion rates of Germany, Italy and Portugal classified as simple, those of Belgium, Luxembourg and Greece classified as medium complex, and the conversion rates of the remaining countries classified as complex.[16] Three alternative indicators of the level of competition are used: first, the OECD's summary indicator of product market regulations (*PMR*), second, the OECD's indicator for product market regulations in the retail sector (*RETAIL*), and third, the size of the average mark-up in non-manufacturing industries (*MARKUP*).[17] The use of the indicator of regulatory impediments in retailing is motivated by the observation that most of the euro changeover-related price increases occurred in the retailing business.

26. Equation (2) is estimated for all sectoral inflation rates and, following Ehrmann (2006), for sectoral inflation rates that have increased by more than certain thresholds. Three subsamples are created. The first one comprises only those inflation rates that have increased by more than twice the average unweighted increase observed for Denmark, Sweden and the United Kingdom. The second one comprises only sectors which showed inflationary developments in excess of twice the average inflation rate observed over the period July 1996 to July 2001. Finally, the third subsample comprises only those sectors for which the changeover dummy in the first-stage regression was significantly positive at the 10% significance level.[18]

27. The estimation results are reported in Table 5. The coefficient on the competition indicator is significantly positive in the majority of the specifications, supporting the hypothesis that a higher level of product market competition is associated with a smaller changeover effect. The evidence is particularly strong for specifications (5a) to (5c) which employ the size of the changeover dummy from the first-stage regression as the dependent variable and thus directly control for the national historic pattern of inflation and extraordinary events such as the cold winter and the spreading of the mad cow and the foot-and-mouth diseases that affected prices also in the three EU countries that did not join the euro area.

---

14. The change in inflation is used rather than its level as the latter would require taking into account country-fixed effects which is not possible as the explanatory variables only vary across countries.

15. This is not necessary for all specifications that employ the size of the changeover dummy of the first stage regression as the dependent variable because the output gap was included in this regression.

16. Ehrmann (2006) examines the sensitivity of the analysis to the classification of conversion rates and finds that alternative plausible classifications yield the same results.

17. Details about the construction of the two product market regulations indicators can be found in Conway *et al*. (2005). All data are taken from the OECD's PMR database. The final variable entering the estimations is the average of the values for 2001 and 2002, where these are obtained by linearly interpolating data for the years 1998 and 2003. Mark-ups in non-manufacturing sectors are calculated based on data taken from the OECD STAN database. Using alternatively mark-ups in manufacturing sectors yields very similar results.

18. When estimating equation (2) for the subsamples, no sectoral dummies are included in the specification given that there are some sectors with only a single observation.

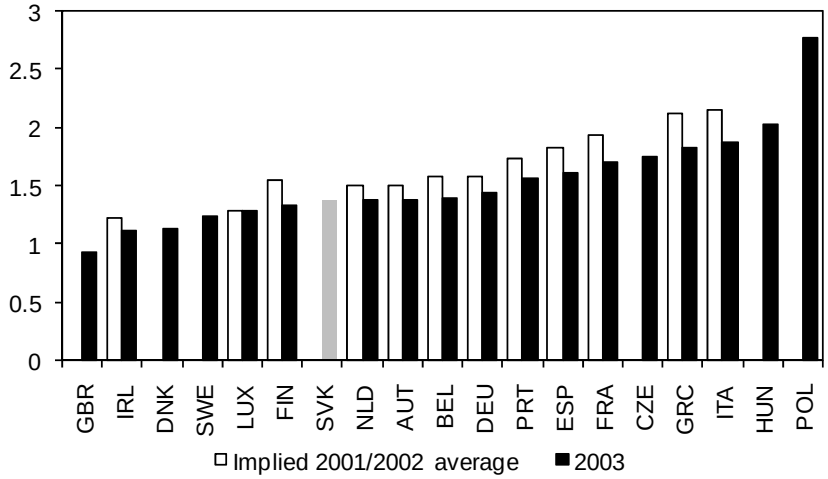
Table 5. The effect of product market competition on the size of the changeover effect

Specification	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)	(4a)	(4b)	(4c)	(5a)	(5b)	(5c)
Included observations	All sectors			>2*(96-01)			>2*(DNK/SWE/GBR)			$\hat{\delta}_{ij} > 0$			$\hat{\delta}_{ij} > 0$		
Dependent variable	$\Delta\pi_{ij}^{01/02}$			$\Delta\pi_{ij}^{01/02}$			$\Delta\pi_{ij}^{01/02}$			$\Delta\pi_{ij}^{01/02}$			$\hat{\delta}_{ij}$		
PMR	1.25** (0.46)			1.20* (0.67)			0.68** (0.24)			2.00** (0.69)			2.44*** (0.48)		
RETAIL		0.37* (0.20)			0.62* (0.28)			0.27* (0.13)			0.96*** (0.30)			0.61* (0.35)	
MARKUP			0.06** (0.02)			0.09 (0.05)			0.03* (0.01)			0.12 (0.07)			0.19*** (0.02)
D^S, D^C and D^{DD}	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ΔGAP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Sectoral dummies	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No
Number of observations	912	835	613	418	386	264	328	292	235	142	126	93	142	126	93

N*otes*: In specifications (1a) to (1c) all sectors are included. In specifications (2a) to (2c) only those observations are included for which the inflation rate in sector i and country j between July 2001 and July 2002 exceeded twice the average inflation rate observed in this sector and country between July 1996 and July 2001. In specifications (3a) to (3c) only those observations are included for which the change in the inflation rate in sector i and country j between July 2001 and July 2002 exceeded twice the average change observed for this sector in the United Kingdom, Sweden and Denmark. In specifications (4a) to (5c) only those observations are included for which the dummy variable in the first stage regression was significantly positive at the 10% significance level. In specifications (1a) to (4c) the dependent variable is the change in the inflation rate between July 2001 and July 2002 and in specification (5a) to (5c) it is the size of the estimated changeover dummy in the first stage regression. The numbers in parentheses are standard errors. As the explanatory variables vary only by country, the standard errors are clustered at the country level to control for any intra-country error correlation. *, **, *** denote significance at the 10%, 5% and 1% level, respectively.
Source: OECD calculations.

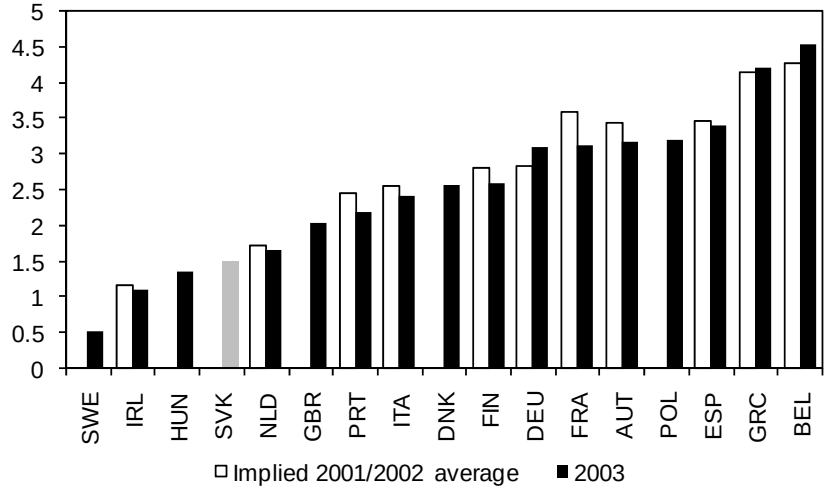
28. Comparing the level of product market regulation across countries shows that the Slovak Republic is better placed than most existing euro area countries (see Figures 3 and 4). The relative degree of anticompetitive regulations is particularly low in the retail distribution sector, where price controls and operational restrictions are less common in the Slovak Republic than in other countries. Administrative burdens by contrast still create entry barriers to the sector, with administrative costs on business weighing particularly heavily on small enterprises. Examples include complicate procedures to pay social security contributions, high costs of obtaining permits to operate a business and high costs of dealing with licenses (see the 2007 OECD *Economic Survey*). Nonetheless, the regression results discussed above suggest that the relatively light product market regulation could contribute to a high level of competition in the Slovak Republic which might help containing price increases around the euro changeover

Figure 3. Product market regulation – summary indicator
0-6 scale from least to most restrictive



Notes: Data available for 1998 and 2003 only; 2001 and 2002 values derived through linear interpolation. Whenever no data is available for 1998 only 2003 values are shown.
Source: OECD Product market regulations database.

Figure 4. Product market regulation in retailing
0-6 scale from least to most restrictive

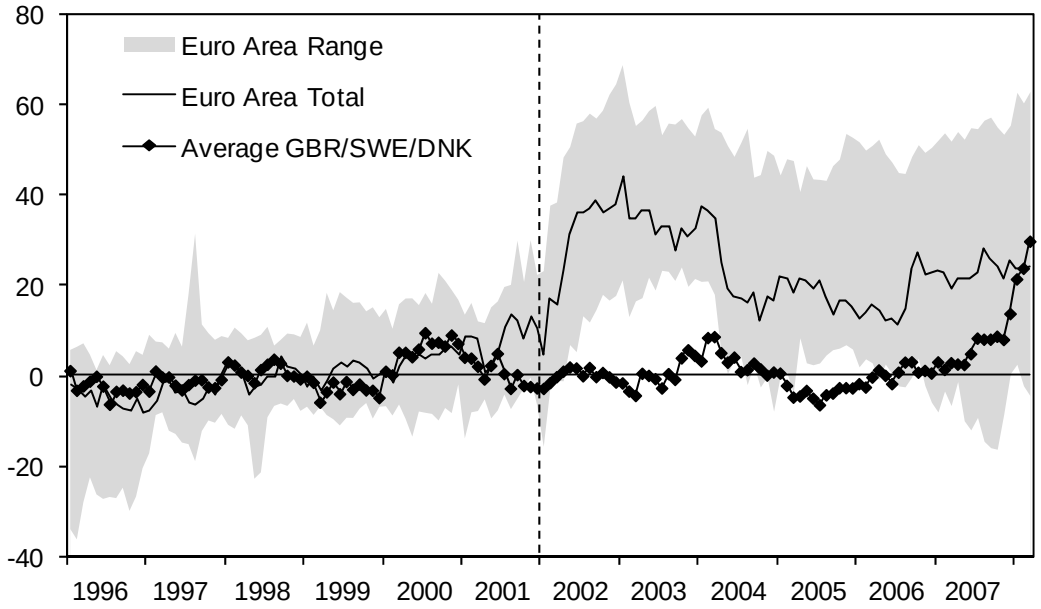


Notes: Data available for 1998 and 2003 only; 2001 and 2002 values derived through linear interpolation. Whenever no data is available for 1998 only 2003 values are shown.
Source: OECD Product market regulations database.

2.1.4 The divergence between perceived and actual inflation

29. A puzzling feature of the euro changeover in essentially all countries that introduced the euro in January 2002 relates to the mismatch between actual and perceived inflation in the aftermath of the cash changeover. Whilst price increases around the changeover were concentrated in a few sectors with only a small impact on aggregate inflation (see Section 2.1.2) the public perceived the changeover as having led to general price increases. This mismatch between actual and perceived inflation is illustrated in Figure 5, showing the gap between actual and perceived inflation over the period 1996 to 2007.[19] While perceived inflation tracked actual inflation very well prior to the euro changeover with the perception gap close to zero in all EU countries, the perception gap opened up in all euro area countries after the changeover. In the three EU countries that did not join the euro area the gap remained close to zero suggesting that the departure of perceived inflation from actual inflation was indeed related to the cash changeover.

Figure 5. The perception gap

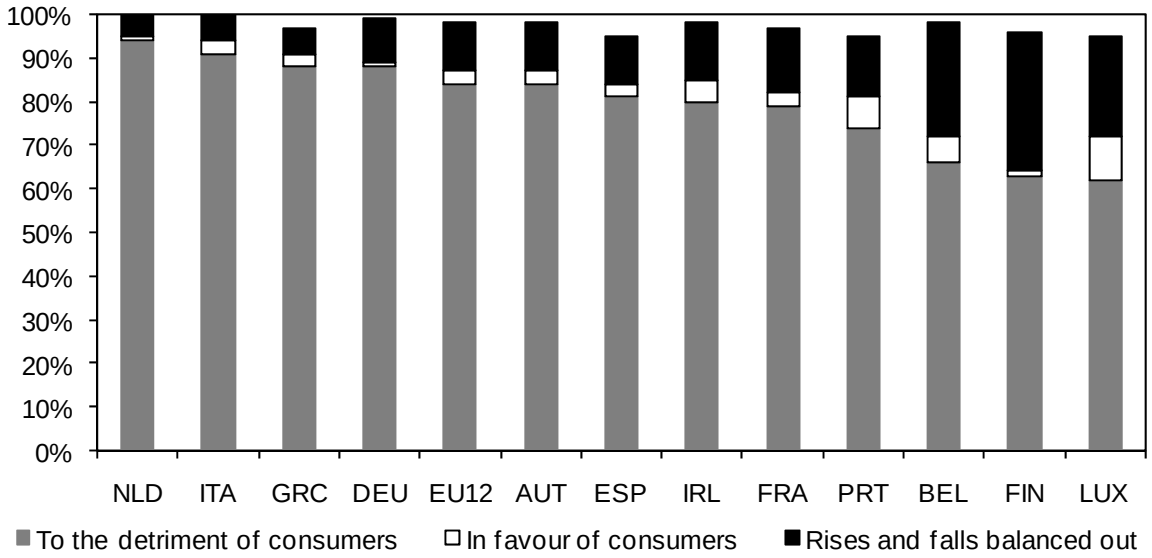


Notes: The perception gap measures the difference between actual and perceived inflation, where actual inflation has been rescaled by applying the coefficients obtained from regressing the perceived inflation index on a constant and actual inflation. The shaded area refers to the lowest and highest level of the perception gap observed in the euro area countries at any point in time.
Source: OECD calculations based on data from the Joint Harmonised EU Programme of Business and Consumer Surveys and from the OECD Economic Outlook 83 database.

30. The sharp rise in perceived inflation around the cash changeover matches well with consumers' responses in the Eurobarometer surveys conducted on behalf of the European Commission. In the survey carried out in November 2002 almost 90% of all respondents in the euro area said that the conversion of prices into euro had been to their detriment; only 3% felt that the conversion had been in their favour (see Figure 6).

19. Data on perceived inflation is obtained from the Joint Harmonised EU Programme of Business and Consumer Surveys. The survey contains, among others, the question: "How do you think that consumer prices have developed over the past 12 months?" The possible answers are: "risen a lot", "risen moderately", "risen slightly", "stayed about the same", "fallen", and "don't know". As perceived inflation is measured on a different scale (-100 to +100) than actual inflation, actual inflation is rescaled by regressing perceived inflation on a constant and actual inflation, $\pi_t^{perc} = \alpha + \beta\pi_t^{act} + \varepsilon_t$ over the period 1996 to 2001, and then calculating rescaled actual inflation as $\pi_t^{resc} = \hat{\alpha} + \hat{\beta}\pi_t^{act}$.

Figure 6. Consumers' perception of the price conversion



Notes: The data are taken from the European Commission's November 2002 Eurobarometer survey. The question asked was: Did you personally notice that, in your country when converted into euro, prices have been: rather in favour of consumers; rather to the detriment of consumers; or one way or another the rises and falls balanced out? The figures do not add up to 100 due to missing answers.
Source: European Commission's November 2002 Eurobarometer survey.

31. A number of arguments have been put forward to explain the deviation of perceived inflation from actual inflation in the aftermath of the cash changeover. Brachinger (2005) claims that consumers' inflation perceptions are more influenced by price rises rather than by price declines as they weigh purchasing power losses higher than purchasing power gains.[20] Moreover, consumers are likely to pay more attention to frequently purchased items than to routine items such as rents and items that are less frequently purchased (Del Giovane and Sabbatini, 2005; Pollan, 2002; Fluch and Stix, 2005). Del Giovane and Sabbatini (2005) explore this argument empirically and show for Italy that the gap between the inflation rates of frequently and less frequently purchased items can partly explain the divergence between perceived and officially measured inflation. Less encouraging results are obtained by Döhring and Mordonu (2007) who cannot find any evidence that an index of out-of-pocket expenditure explains inflation perceptions better than the overall HICP index.[21]

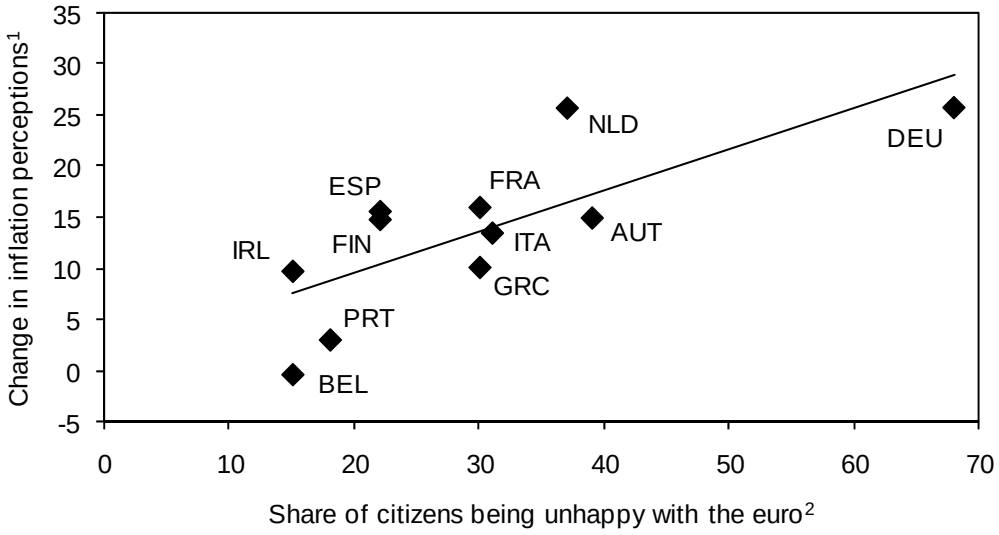
32. The interactions might have been amplified by consumers' expectations of price increases around the changeover as people tend to check data that confirm their expectations less accurately than data that disprove them. Research by Traut-Mattausch *et al.* (2004) and Kamleitner *et al.* (2004) point in this direction showing in an experiment that individuals are biased towards perceiving price increases as a result of previously held expectations even when the price increases are not confirmed by the data. In addition, the extensive media coverage of the changeover with its emphasis on price increases might have amplified consumers' inflation perceptions in a number of countries.

20. The argument is based on the theory of loss aversion put forward by Kahneman and Tversky (1979).

21. These diverging results might be related to the fact that whilst in Italy the inflation differential between frequently and less-frequently purchased items started to widen in the aftermath of the changeover, this was not the case in most other euro area countries.

33. If the perception gap also widens after the euro changeover in the Slovak Republic, this could be problematic in two ways. First, the associated increase in inflation perceptions may contribute to a negative attitude of citizens towards the euro which in turn may delay their adaption to the new currency. For the twelve first-wave euro area countries there is indeed a positive correlation of 0.76 between the change in inflation expectations in the aftermath of the changeover and the dissatisfaction of citizens with the common currency (see Figure 7).

Figure 7. Change in inflation perceptions and unhappiness with the euro



1. Difference between the average value of the perception indicator in 2002 and 2001.
2. Percentage of respondents answering "very unhappy" or "quite unhappy" to the question "Are you personally very happy, quite happy, quite unhappy, or very unhappy that the euro has become your currency?" of the November 2002 Eurobarometer survey.

Source: Own calculations based on data from the Joint Harmonised EU Programme of Business and Consumer Surveys and from the European Commission's November 2002 Eurobarometer survey.

34. Second, to the extent that inflation expectations are adaptive, a rise in perceived inflation may raise inflation expectations. If individuals set prices and wages with reference to the rate of inflation they expect, this might push up actual inflation. As shown in Table 5, perceived inflation and expected inflation are indeed highly correlated in the Slovak Republic.[22] While this was also the case in the first-wave euro area countries before the changeover, this relationship broke down at the beginning of 2002 with inflation perceptions starting to rise and inflation expectations starting to fall (see Table 6 and Figure 8). This suggests that consumers did not expect the price increases they perceived after the changeover to continue in the foreseeable future. The changeover was thus perceived as having an impact on the price level rather than inflation. If the same phenomenon occurs in the Slovak Republic and if it is indeed expected rather than perceived inflation that is driving wage demands, a rise in perceived inflation, if it were to occur, should not trigger any wage-price spiral and thus not pose a threat to overall price stability.

22. Data on inflation expectations are taken from the Joint Harmonised EU Programme of Business and Consumer Surveys. The survey contains, among others, the question: "By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months?" The possible answers are: "they will increase more rapidly", "increase at the same rate", "increase at a slower rate", "stay about the same", "fall", and "don't know".

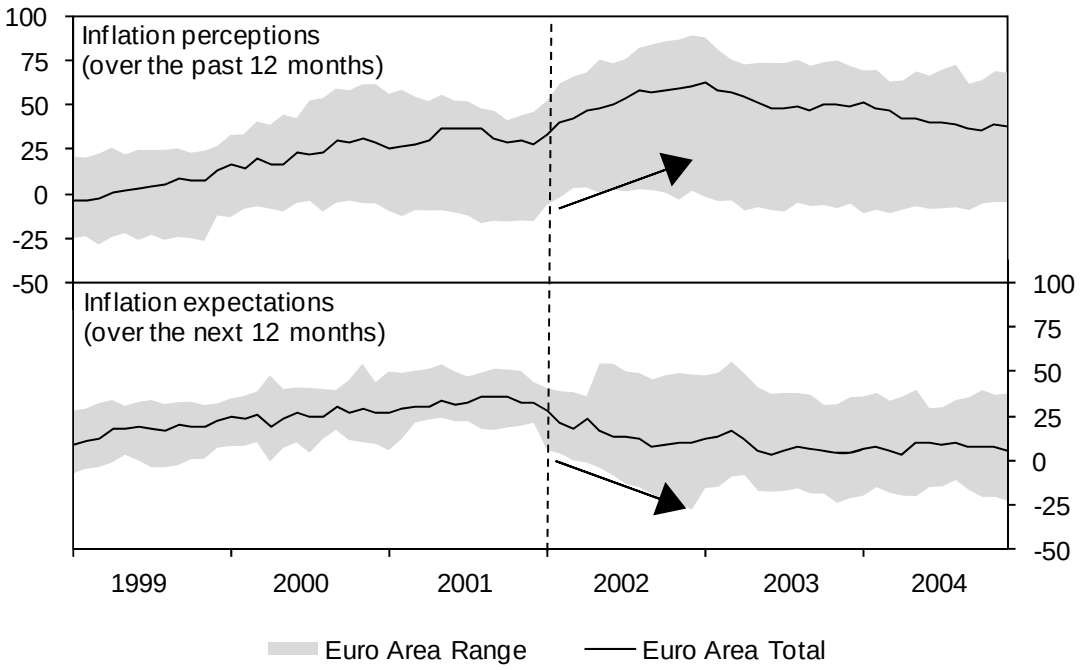
Table 6. Correlation between inflation perceptions and inflation expectations

	Jan 1995 to Dec 2001	Jan 2002 to Dec 2005
Austria	0.95 (0.04)	0.00 (0.15)
Belgium	0.79 (0.07)	0.43 (0.13)
Finland	0.85 (0.06)	-0.15 (0.15)
France	0.75 (0.08)	0.15 (0.15)
Germany	0.84 (0.06)	0.39 (0.14)
Greece	0.89 (0.06)	-0.19 (0.14)
Ireland	0.85 (0.06)	-0.53 (0.12)
Italy	0.67 (0.09)	-0.52 (0.13)
Netherlands	0.86 (0.06)	-0.83 (0.08)
Portugal	0.66 (0.09)	0.30 (0.14)
Spain	0.94 (0.04)	-0.50 (0.13)
Slovak Republic	0.69[1] (0.07)	

1. April 1999 to March 2008.

Source: OECD calculations based on data from the Joint Harmonised EU Programme of Business and Consumer Surveys.

Figure 8. Inflation perceptions and inflation expectations around the changeover



Note: Inflation perceptions and inflation expectations are measured through a balance statistic covering the scale -100 to +100 (with a higher value indicating higher inflation perceptions/expectations). The shaded areas refer to the lowest and highest level of the indicators of inflation perceptions and inflation expectations observed in the euro area countries at any point in time.
Source: OECD calculations based on data from the Joint Harmonised EU Programme of Business and Consumer Surveys.

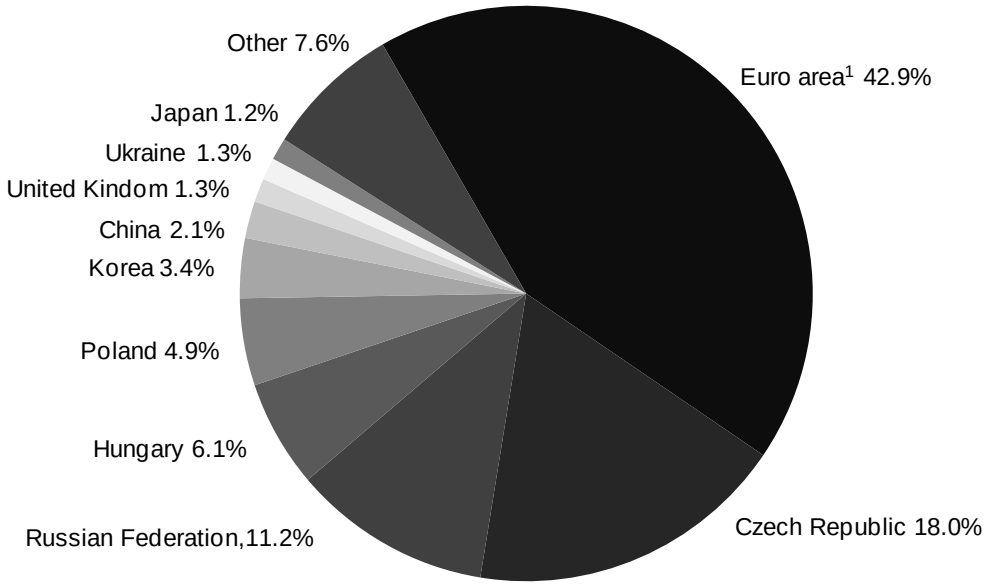
2.2 Structural aspects of euro adoption

2.2.1 The exchange rate pass-through

35. With euro adoption, the conversion rate between the Slovak koruna and the euro will be irrevocably fixed so that the effect of exchange rate changes *vis-à-vis* the euro on inflation will gradually disappear. As the koruna was appreciating against the euro, this pass-through of exchange rate changes had a damping impact on inflation in the past. With imports from the euro area accounting for over 40% of total imports, this effect is likely to be large (see Figure 9). Exchange rates *vis-à-vis* countries outside the euro area will continue to change after euro accession of Slovakia and those changes will continue to pass-through to consumer prices. This concerns foremost other central and eastern European (CEE) countries like Poland, Hungary and the Czech Republic, which account for 30% of Slovak imports. As the currencies of these countries tend to appreciate against the euro, imports from these countries will become more expensive in euro, thereby exerting upward pressure on aggregate inflation in the Slovak Republic.[23] Hence, while the disinflationary impact from the appreciation of the koruna *vis-à-vis* the euro will vanish with euro adoption, an inflationary impact from depreciation *vis-à-vis* the currencies of other CEE economies will emerge.

23. Over the past, the Slovak koruna was appreciating against the Hungarian forint and the Polish zloty (with the appreciation amounting to respectively 2.9% and 2.5% per year on average over the period 2000 to 2007) and remained roughly stable against the Czech koruna, so that the exchange rate pass-through *vis-à-vis* these countries had a dampening effect on Slovak inflation.

Figure 9. Country composition of Slovak imports, 2006
Share of total imports



1. Euro area members as of 2008.
Source: Direction of Trade Statistics, IMF.

36. The pass-through of exchange rate changes to consumer prices is operating with long lags - typically it is assumed that a large share of the effect occurs within one year with the remainder occurring in the second year. This means that, although after euro adoption there will be no further exchange rate changes *vis-à-vis* the euro, past changes will still continue to influence inflation rates. Given the trend appreciation of the koruna over recent months (the appreciation since January 2007 amounts to over 12%) there will still be a damping effect on inflation for some time going forward. This effect will counter somewhat the price-increasing euro changeover effects identified in Section 2.1.2.

37. To identify the likely damping effect on inflation estimates of the exchange rate pass-through to consumer prices as provided by Korhonen and Wachtel (2005), Vyskrabka (2007) and Merrill Lynch (2008) are used (see Table 7).[24] Korhonen and Wachtel (2005) estimate a vector autoregression (VAR) model in first differences at monthly frequency over the sample period January 1999 to December 2004 to analyse the impact of bilateral exchange rate changes on headline inflation. Applying a similar approach to quarterly data over a somewhat longer time horizon Vyskrabka (2007) investigates the impact of both bilateral and effective exchange rate changes on core inflation. Merrill Lynch (2008) estimate a monthly VAR in first differences over the sample period January 2001 to December 2007 for both bilateral and nominal effective exchange rates. In the calculations, only estimates of changes in the bilateral koruna/euro exchange rate (as opposed to the nominal effective exchange rate) are used.[25] When only a short- and a long-run effect were given in the studies, linear interpolation was used to calculate the effect over time.[26]

24. These studies were selected on the grounds that they also identify the speed of pass-through. Doliak and Karmazin (2007) find a total pass-through effect of similar extent (0.13-0.2), which is broadly in line with internal European Commission estimates, as reported in European Commission (2008).

25. As Merrill Lynch (2008) provide an estimate of the speed of the pass-through only for changes in the effective nominal exchange rate, it is assumed that the speed of the pass-through for bilateral exchange rate changes is equal to their estimate for effective exchange rate changes.

26. There are some indications that the extent of pass-through is time-varying. For example, in the Slovak case the arrival of large retail chains between 2003 and 2006 is reported to have raised pass-through rates

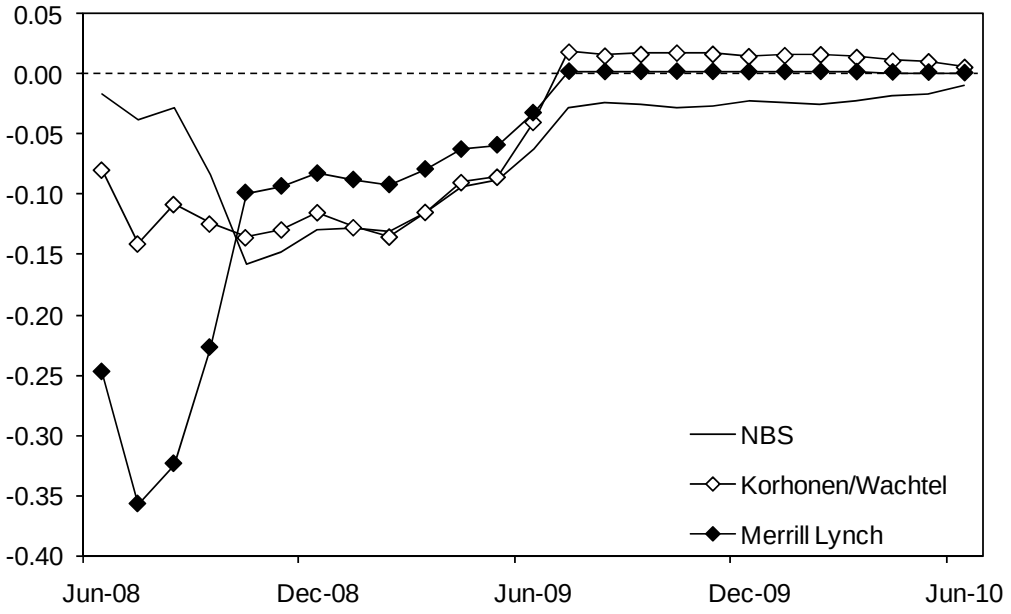
The sample starts in July 2006; thus, the data point for June 2008, for example, is the impact that exchange rate changes between July 2006 and May 2008 have on inflation in that particular month.

Table 7. Selected studies of exchange rate pass-through

Study	Sample period	Dependent variable	Extent of pass-through after	
			12 months	24 months
Korhonen and Wachtel (2005)	Jan. 1999 – Dec. 2004	CPI	0.17	0.15
Vyskrabka (2007)	1999Q1 – 2006Q4	Core inflation	0.09	0.12
Merrill Lynch (2008)	Jan. 2001 – Dec. 2007	CPI	0.224	0.222

Note: The pass-through estimates relate to bilateral exchange rate changes.

Figure 10. Pass-through of past changes in the SKK/EUR exchange rate into consumer prices



Note: The graph shows the impact over time of past changes in the SKK/EUR exchange rate on the consumer price index in the future using a range of estimated pass-through coefficients as well as the estimated pass-through speed of Korhonen and Wachtel (2005), Vyskrabka (2007) and Merrill Lynch (2008).
Source: OECD calculations, Korhonen and Wachtel (2005), Vyskrabka (2007), Merrill Lynch (2008).

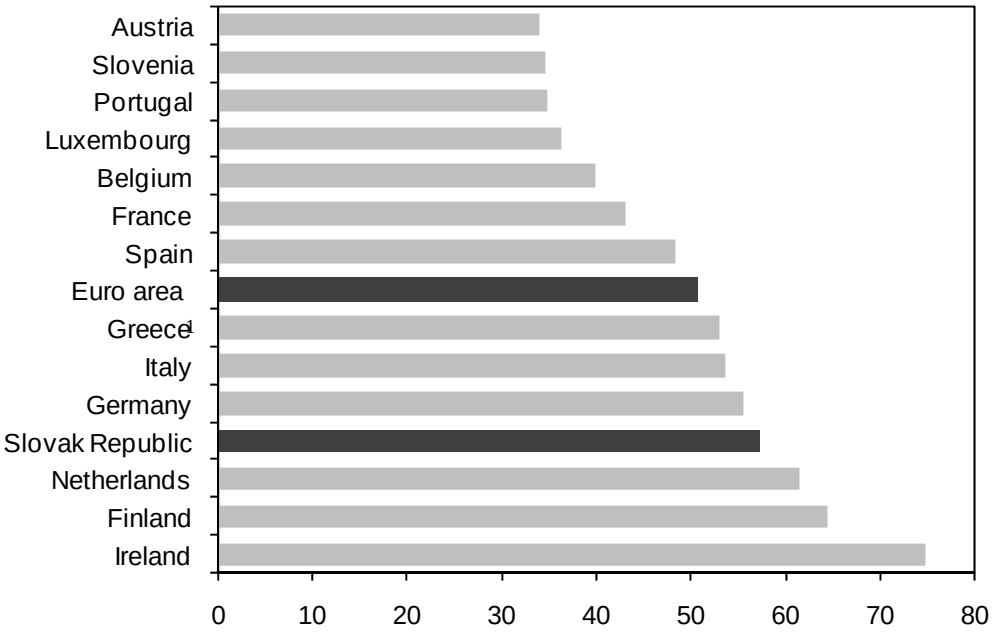
(Doliak and Karmazin, 2007). At the same time, the authors report that more recently, retailers did not pass on cheaper import prices in order to prepare for the costs of euro introduction. Such a time-variation is, however, difficult to identify empirically, above all in real-time. By relying on studies with a relatively recent sample period, however, our calculations should to some extent take such effects into account.

38. Using this approach, Figure 10 shows the impact of past changes in the SKK/EUR exchange rate (July 2006–May 2008) on Slovak consumer prices. As can be seen, the past appreciation of the koruna is likely to exert a damping effect on consumer prices until at least the middle of 2009. The size of the cumulative impact is estimated at around -1½ per cent for the period June 2008 to June 2009 (*i.e.* inflation is likely to be reduced by 1½ per cent over this period); for the period June 2009 to June 2010 the effect is negligible.[27]

39. Although from January 2009 onwards the Slovak Republic will face the same nominal exchange rate changes as the other euro area countries, it is likely that the resulting impact on consumer price inflation will be different. First, imports from outside the euro area represent a larger share of total imports in the Slovak Republic than in most other euro area countries (see Figure 11), implying that any given exchange rate change will affect a larger share of the goods and services in the Slovak Republic. Second, the country composition of extra-euro area imports in the Slovak Republic differs notably from those in other euro area countries (see Figure 12). In particular, the Czech Republic, the Russian Federation, Poland and Hungary are more important sources of imports for the Slovak Republic than for the other euro area countries, implying that exchange rate changes *vis-à-vis* the currencies of those countries will have a larger impact on Slovak consumer prices.

Figure 11. Share of extra-euro area imports in total imports, 2006

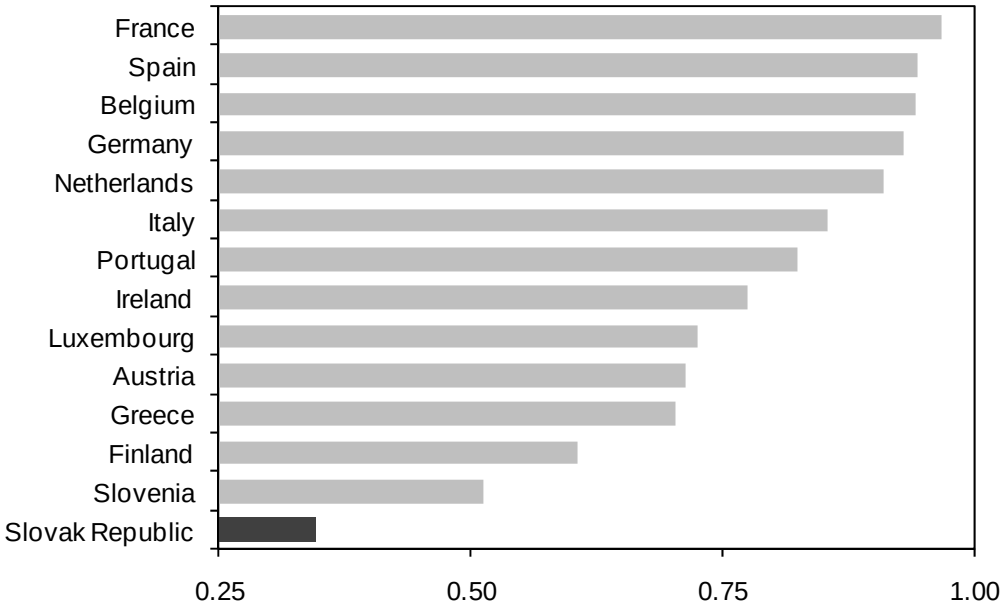
In %



Source: Direction of Trade Statistics, IMF.

27. This assumes that no further changes in the SKK/EUR exchange rate will take place until the end of 2008. While theoretically possible such changes are highly unlikely as the conversion rate is set at the beginning of July.

Figure 12. Country composition of extra-euro area imports – correlation with euro area average, 2006

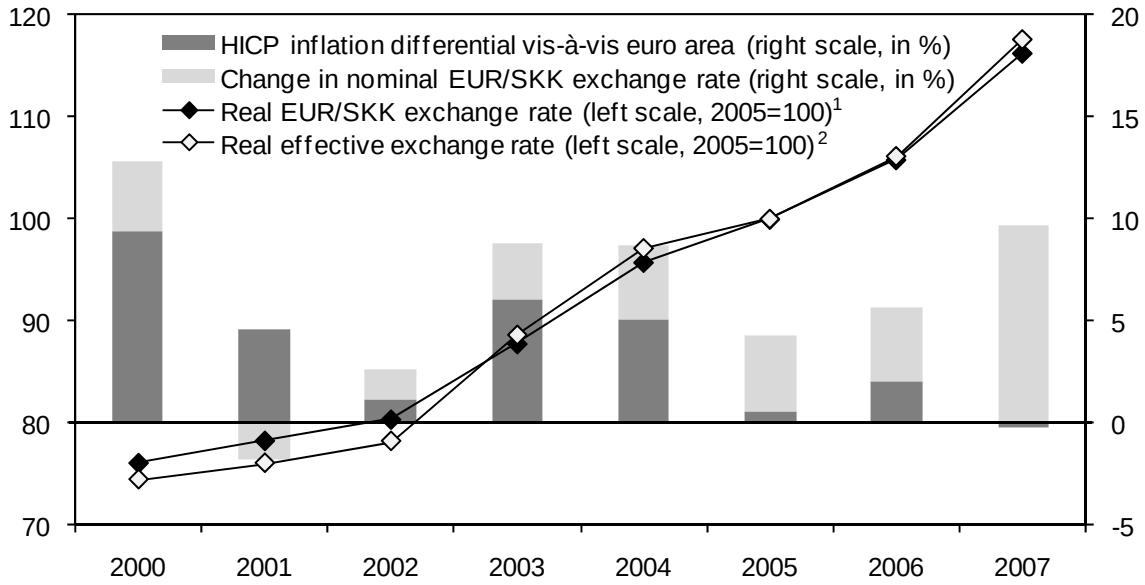


Source: Direction of Trade Statistics, IMF.

2.2.2 The Balassa-Samuelson effect

40. Over the past decade, the real exchange rate of the Slovak koruna appreciated considerably both *vis-à-vis* the euro and in effective terms (see Figure 13). This real appreciation occurred through a combination of nominal exchange rate appreciation and higher inflation rates than in the trading partner countries. The adoption of the euro in 2009 will rule out any further nominal appreciation against the euro and therefore any underlying real appreciation will ultimately be reflected in an inflation rate that exceeds the average inflation rate in the euro area. As such, euro adoption will also have consequences for the longer-run evolution of inflation in the Slovak Republic. Against this background, this section briefly discusses potential explanations for the observed real appreciation of the koruna and reviews the associated empirical evidence. The existing literature suggests that the observed real appreciation was at least partly backed by the development of economic fundamentals such as productivity and is likely to continue for some time going forward, although to a lesser extent than in the past.

Figure 13. The koruna real exchange rate



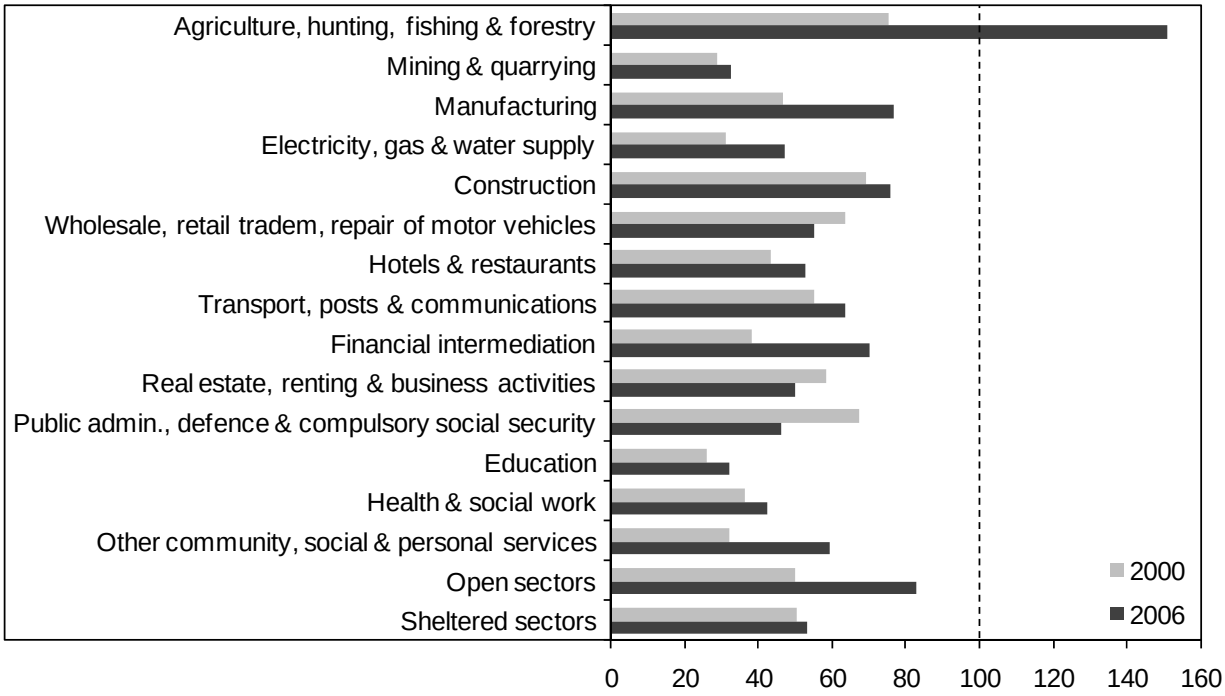
1. HICP based; an increase (decrease) indicates an appreciation (depreciation).
2. CPI based.

Source: OECD Economic Outlook 83 database.

41. The most widely used explanation for the real appreciation of the Slovak koruna is the Balassa-Samuelson (BS) hypothesis. The hypothesis was put forward by Balassa (1964) and Samuelson (1964) to explain differences in inflation rates and price levels between catching-up economies and advanced economies. The price level effect rests upon the idea that catching-up economies such as the Slovak Republic are characterised by productivity levels in the open and sheltered sectors that are lower than those in the advanced economies (see Figure 14). If tradable prices are given by purchasing power parity (PPP), low productivity levels in the open sectors imply low wages in these sectors. If labour is fully mobile or wage setting is solidaristic and wages equalise across sectors, wages and prices should be low also in the sheltered sectors. As the nominal exchange rate is determined by purchasing power parity in the open sectors, non-tradable goods and services should cost less in the Slovak Republic than in the euro area, implying a lower overall price level. Whilst the absolute price level of non-tradable goods in the Slovak Republic is indeed well below the euro area average, thereby supporting the Balassa-Samuelson hypothesis, the price level of many goods that are generally perceived as tradable is also markedly lower, suggesting that purchasing power parity does not hold for the open sectors (see Figure 15). This observation makes it clear already that the Balassa-Samuelson hypothesis cannot fully account for the lower price level in the Slovak Republic relative to the euro area and that other factors must be at work as well.

Figure 14. Sectoral labour productivity gaps *vis-à-vis* euro area

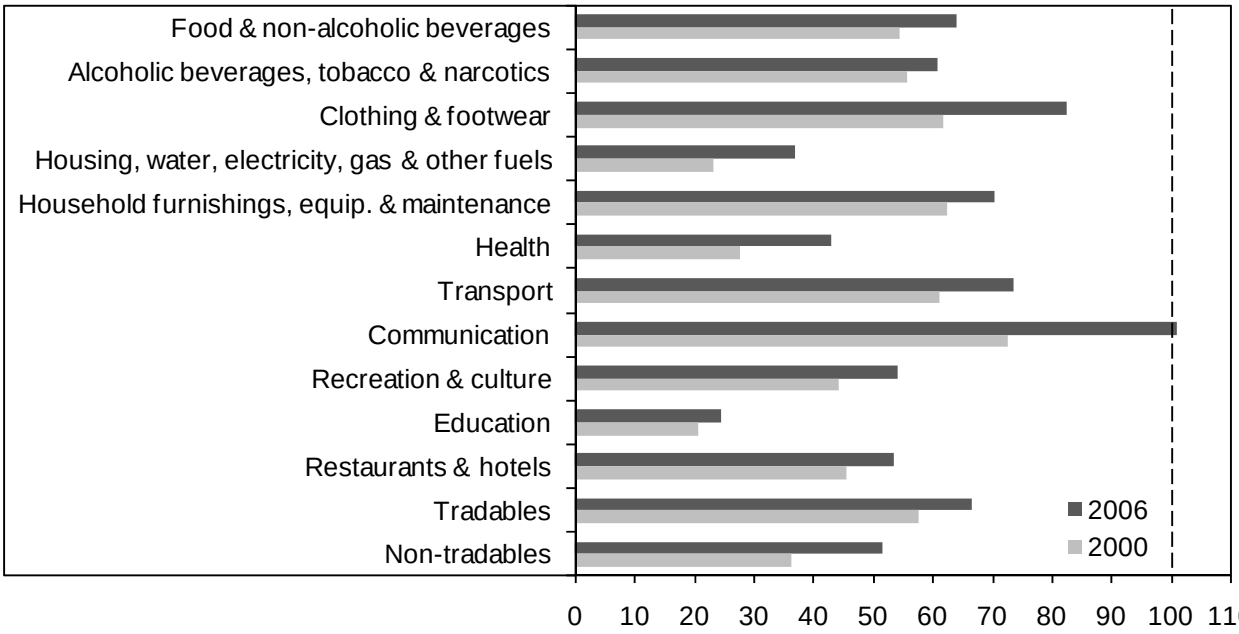
In %



Notes: The euro area includes all members before enlargement in May 2004, except Ireland (owing to unavailable data). Labour productivity is defined as gross value added (in constant 2000 prices) per employment.
Source: Eurostat and OECD Annual National Accounts database.

Figure 15. Comparative price levels in the Slovak Republic

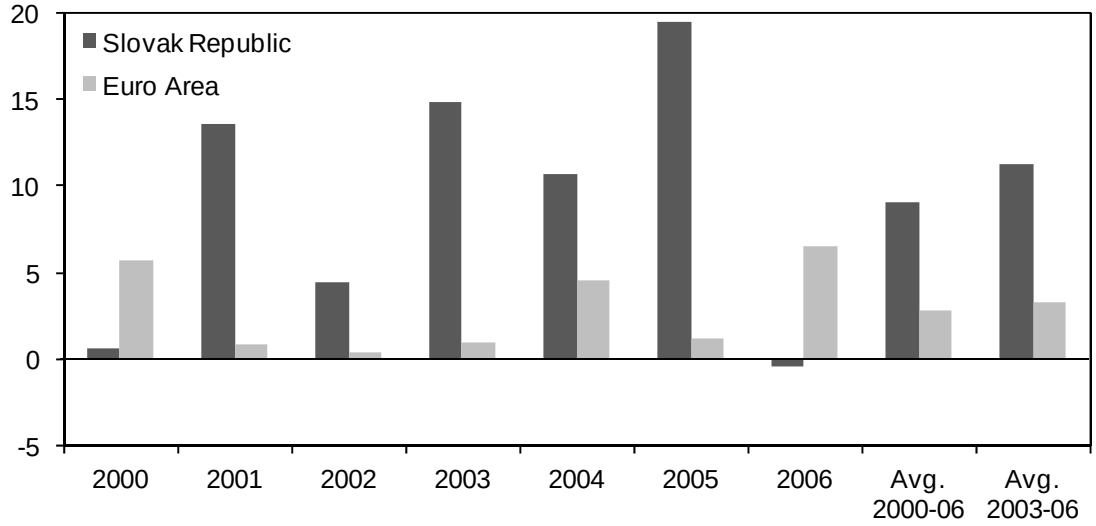
EU12 = 100



Notes: Food & non-alcoholic beverage, alcoholic beverage, tobacco & narcotics, clothing & footwear, and household furnishings, equipment & maintenance are classified as tradable, all other times are classified as non-tradable. Aggregate price levels for tradables and non-tradables are derived using consumption weights.
Source: OECD calculations based on Eurostat data.

42. In its dynamic form, the hypothesis postulates that productivity will improve faster in the open sectors than in the sheltered sectors. Rising wages in the open sectors (in line with productivity developments) will spill over to the sheltered sectors, thereby pushing up the prices of non-tradable goods. Thus, if the productivity differential between the open and the sheltered sectors in the Slovak Republic exceeds that of the euro area, the overall price level should rise faster in the Slovak Republic than in the euro area. Figure 16 shows that productivity growth differentials have indeed been larger for the Slovak Republic than for the euro area, suggesting that this prerequisite for the Balassa-Samuelson effect is fulfilled.

Figure 16. Labour productivity growth differential between open and sheltered sectors
in percentage points



Notes: Agriculture, hunting, fishing, & forestry, mining & quarrying, and manufacturing are classified as open; the remaining sectors are classified as sheltered. Labour productivity is defined as gross value added (in constant 2000 prices) per employment.
Source: Eurostat and OECD Annual National Accounts database.

43. A large number of empirical studies have tried to estimate the size of the Balassa-Samuelson effect in the Slovak Republic (see Table 8). These studies generally conclude that the effect is relatively small, having contributed not more than 1.5 percentage point per year to the real appreciation of the Slovak koruna (which amounted to around 7% per annum *vis-à-vis* the euro when measured based on the HICP).[28] At first, this seems surprising given the strong productivity growth in the open sectors, particularly in automobile manufacturing and electronics, where large inflows of foreign direct investment contributed to a marked increase in productivity growth in recent years.

44. The transmission of this primary impulse seems to have been damped by a number of factors (Vladová, 2007; Égert and Podpiera, 2008). First, wage growth in the open sectors did not reach the growth rate of labour productivity; particularly in recent years (see Figure 17). Second, the wage equalization mechanism was imperfect with wages in the sheltered sectors growing at slightly lower rates than those in the open sectors (see Figure 18). Third, labour productivity growth in the sheltered sectors compensated for a certain part of the wage growth so that producers were not forced to pass on the entire wage growth to prices (see Figure 19). With productivity growth in the sheltered sectors well below the levels seen in Western European countries, promoting competition in the sheltered sectors by reducing administrative barriers and enhancing the general business environment could boost productivity growth in these sectors,

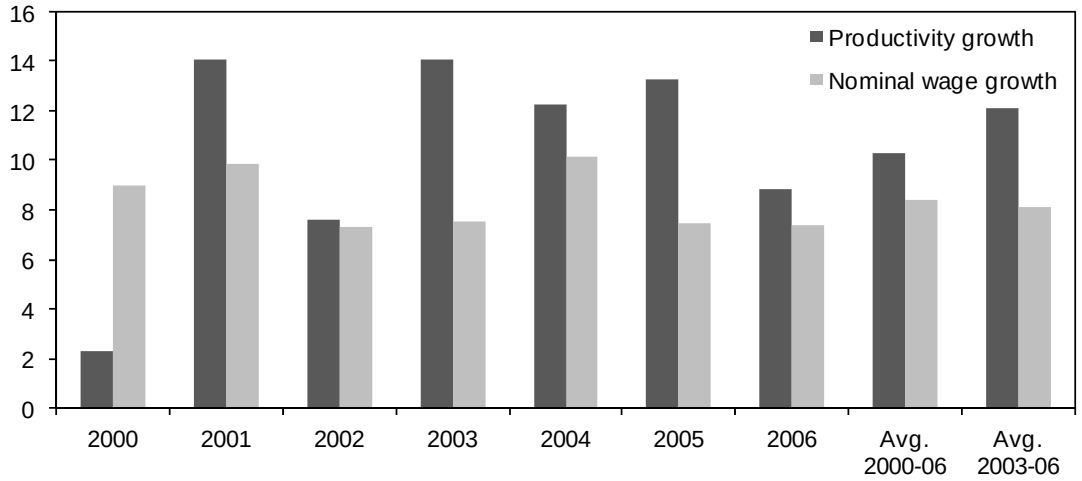
28. A few studies even find a negative BS effect (*e.g.* Égert, 2002a; Wagner and Hlouskova, 2004) or no significant effect at all (*e.g.* Égert, 2007).

thereby further moderating the Balassa-Samuelson effect. Finally, although the share of market services (only those non-tradables for which prices are market-determined and not administered should ultimately matter for the Balassa-Samuelson effect) has risen markedly in the Slovak Republic, it still accounts for only one quarter of the HICP (see Figure 20). So even if a given productivity differential between the open and sheltered sectors would translate one-to-one into higher prices of non-tradable goods and services, the overall HICP would still rise by only one quarter of the productivity differential.

Table 8. Selected estimates of the Balassa-Samuelson effect in the Slovak Republic

Study	Dependent variable	Sample period	Estimated size of BS effect (in % p.a.)
Vladová (2007)	Inflation differential *vis-à-vis* euro area	1997-2006	1.2
Égert (2007)	Domestic inflation	1995-2005	0.4-2.1
NBS (2006)	Inflation differential *vis-à-vis* euro area	1996-2005	1.0-1.8
Mihaljek and Klau (2004)	Domestic inflation	1995-2001	0.6
	Inflation differential *vis-à-vis* euro area	1995-2001	0.1-0.2
Kovács (2004)	Domestic inflation	1995-2001	1.0-2.0
Lojschová (2003)	Inflation differential *vis-à-vis* euro area	1995-2002	0.4-2.5
Égert *et al.* (2003)	Inflation differential *vis-à-vis* Germany	1995-2000	1.4-1.6
Égert (2002a)	Inflation differential *vis-à-vis* Germany	1996-2001	0.02-0.9

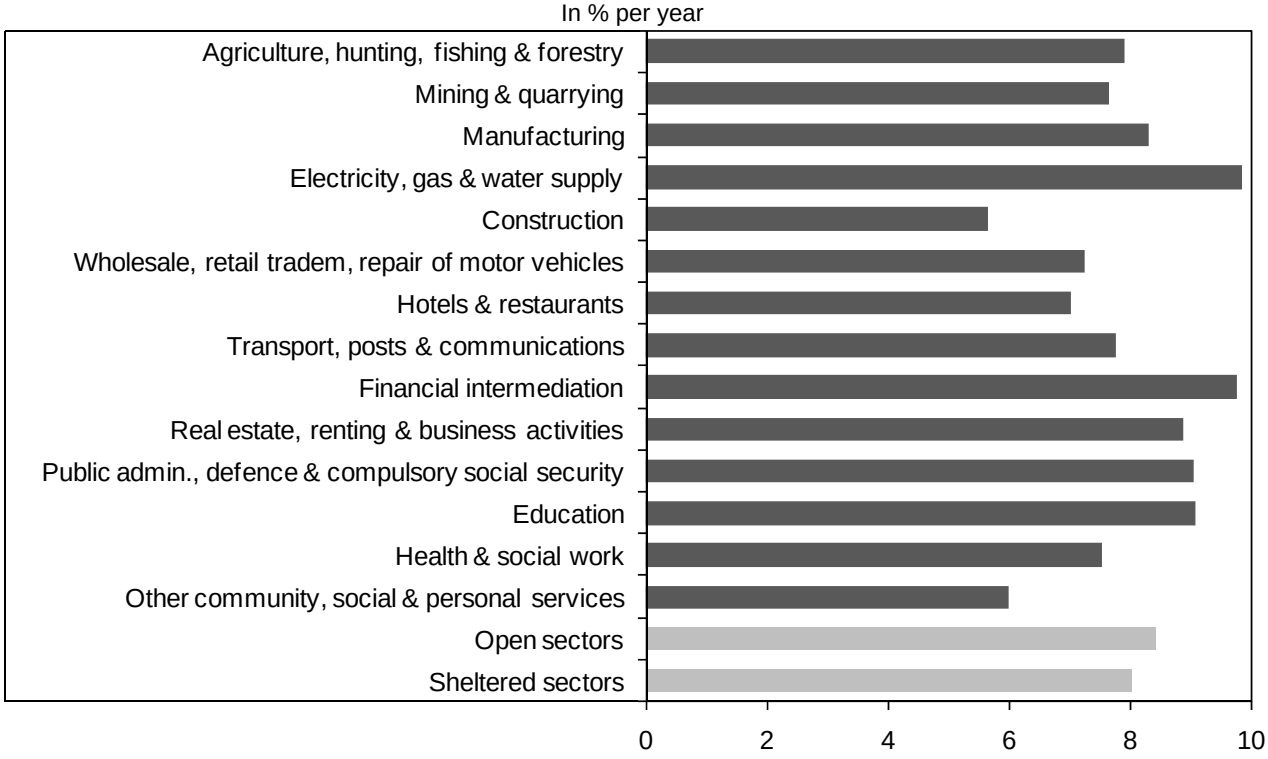
Figure 17. Labour productivity and nominal wage growth in the open sectors
In %



Note: The open sectors include agriculture, hunting, fishing, & forestry, mining & quarrying, and manufacturing. Labour productivity is defined as gross value added (in constant 2000 prices) per employment.
Source: Eurostat and Statistical Office of the Slovak Republic.

Figure 18. Sectoral wage growth, 2000-2006

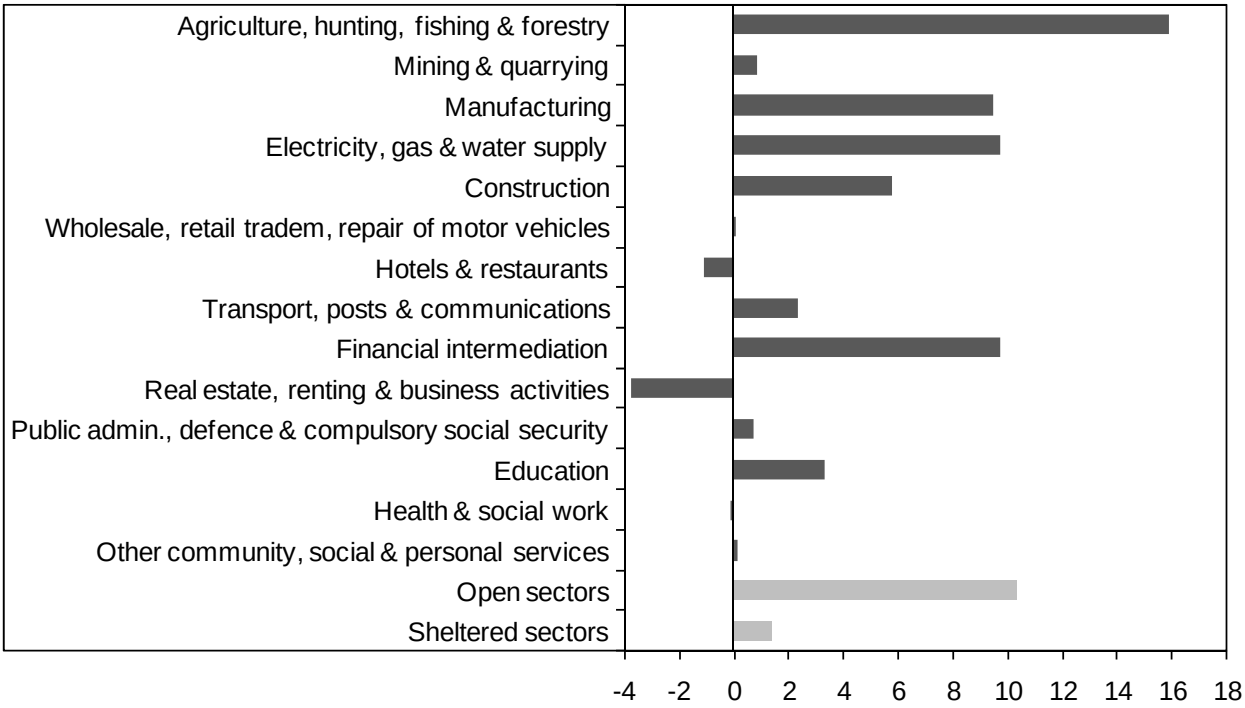
In % per year



Note: Agriculture, hunting, fishing, & forestry, mining & quarrying, and manufacturing are classified as open; the remaining sectors are classified as sheltered. *Source*: Statistical Office of the Slovak Republic.

Figure 19. Sectoral productivity growth, 2000-2006

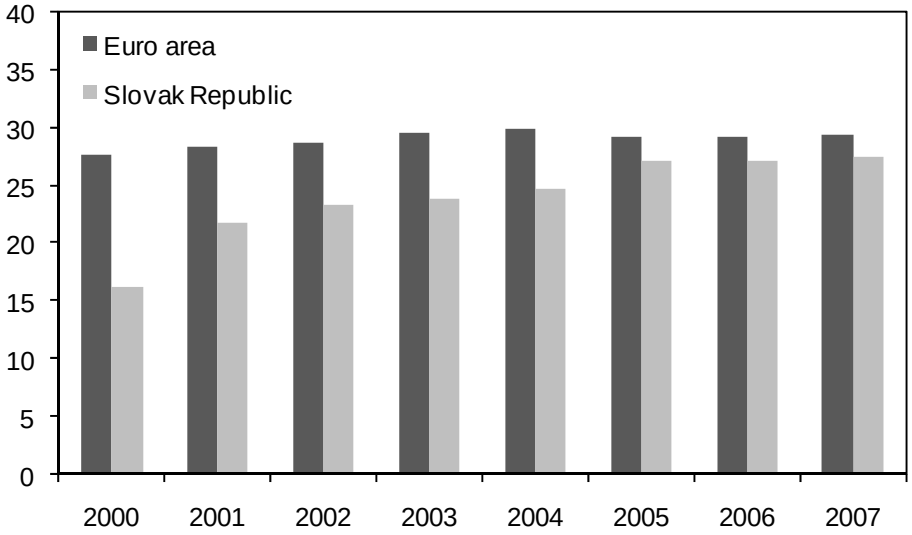
In %



Note: Labour productivity is defined as gross value added (in constant 2000 prices) per employment.
Source: Eurostat and OECD Annual National Accounts database.

Figure 20. Share of non-tradables with market-determined prices in the HICP

In %



Source: Own calculations based on Eurostat data.

45. At less than 1.5% per year, the Balassa-Samuelson effect is clearly too small to explain the entire observed real appreciation of the Slovak koruna which (based on the HICP) amounted to almost 7% per year over the period 2000 to 2007. A number of alternative explanations have been proposed in the literature to explain the share of the real appreciation that cannot be accounted for by the Balassa-Samuelson effect. One widely used explanation is the rising share of non-tradable goods and services in private consumption that comes with rising incomes in catching-up economies.[29] This rising share of non-tradable goods and services affects aggregate consumer prices in two ways. First, assuming that non-tradables have a higher inflation rate than tradables (such as because of the Balassa-Samuelson effect), by increasing the weight of non-tradables within the HICP, aggregate inflation will rise through a simple accounting effect. Second, the higher demand for non-tradable goods will push up the prices of these goods, thereby raising the aggregate price level.[30] This second channel can only affect inflation as long as the share of non-tradables is still rising. As shown in Figure 20, the share has remained fairly constant since 2005, so that in recent years, this second channel should have played only a minor role in influencing inflation in the Slovak Republic.

46. A closely related argument is the rising GDP share of government consumption observed in most catching-up economies. As government expenditures are biased towards non-tradable goods and services, a rising GDP share of government consumption is likely to lead to a rise in the relative price of non-tradable goods, thereby causing an appreciation of the real exchange rate.[31] However, in the Slovak Republic, the GDP share of government consumption has actually declined over the past (from around 21% in the mid-1990s to around 17% in 2007), exerting a depreciating effect on the real exchange rate and thereby

29. The idea is an extension of Engle's law, stating that with a given set of tastes and preferences, as income rises, the proportion of income spent on food falls, even if actual expenditure on food rises.

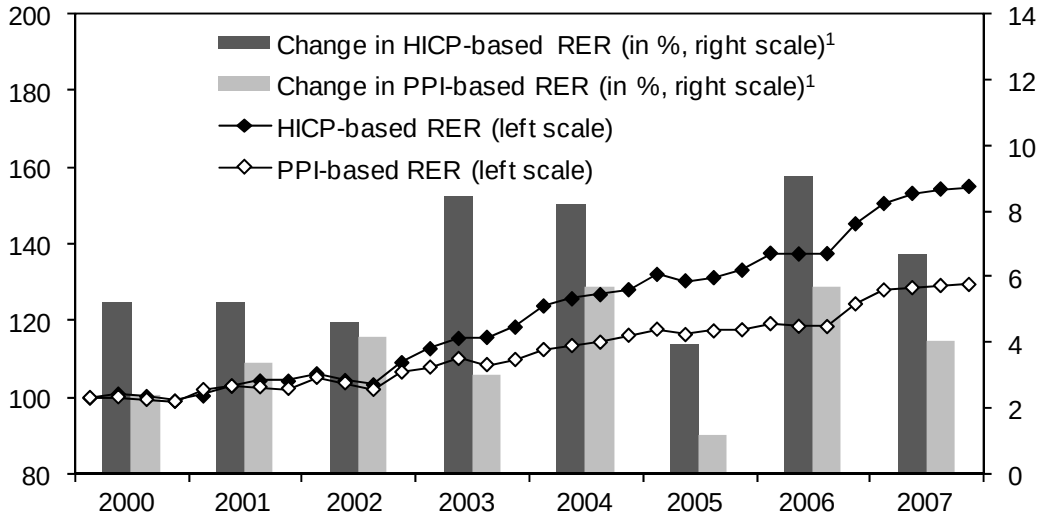
30. Theoretically, such a shift in preferences towards non-tradable goods and services should only lead to a shift in relative prices. However, with the prices of tradables determined on the world market (small country assumption) the price level will be affected as well.

31. Oomes (2005) confirms this positive relationship between the GDP share of government consumption and the real exchange rate for the Slovak Republic, while Frait *et al.* (2006) cannot detect any significant relationship.

counteracting the appreciating effect of the Balassa-Samuelson effect and the rising share of non-tradables in private consumption.[32]

47. As the Balassa-Samuelson effect and the rising share of non-tradables in the private consumption basket lead to an appreciation of the real exchange rate *via* a rise in the prices of non-tradable goods and services they can only explain an appreciation of the HICP-based real exchange rate (which reflects the prices of both tradable and non-tradable goods and services). The real exchange rate based on producer prices (which should mainly reflect the prices of tradable goods and services) should remain constant as purchasing power parity is assumed to hold for tradables. This is not reconcilable with the empirical evidence as the real exchange rate has also appreciated when based on the producer price index, although to a lesser extent than the HICP-based real exchange (see Figure 21).

Figure 21. HICP-based vs. PPI-based EUR/SKK real exchange rate)



1. Q4 over Q4; positive values indicate an appreciation of the Slovak koruna *vis-à-vis* the euro.
Source: OECD Main Economic Indicators database and OECD Economic Outlook 83 database.

48. Another potential explanation for the observed real appreciation is the quality bias hypothesis (Hanousek and Filer, 2001; Mikulcová and Stavrev, 2001). Quality bias occurs when statistical agencies fail to adequately reflect improvements in product quality, thereby falsely attributing the quality-related part of the price increase to inflation. Filtering out quality effects is difficult in practice, especially in catching-up economies where quality improvements happen more rapidly than in advanced economies. If quality is not fully accounted for in the measurement of price indices, the real exchange rate will appreciate as it contains a part of the quality improvements. The quality bias occurs both on the consumer side, with households switching to higher quality goods and services as their disposable income increases, and on the producer side with foreign direct investment inflows causing a shift in the product mix towards high quality differentiated products such as cars and consumer electronics. It can thus provide an explanation for both the share of HICP-based real appreciation that cannot be accounted for by the Balassa-Samuelson effect and for the appreciation of the PPI-based real exchange rate. Empirical support for the quality hypothesis in the Slovak Republic is provided by Cincibuch and Podpiera (2006) and Égert *et al.* (2006).

32. This depreciating effect is likely to have been reinforced by the rising openness of the Slovak economy (the GDP share of exports plus imports doubled between the mid-1990s and 2007), which should have fostered competition in the tradable goods sectors, thereby holding down the prices of tradable goods. Égert (2002b) provides support for the depreciating effect of rising openness for the Slovak Republic.

49. Pricing-to-market practices offer another explanation for lower price levels and higher inflation rates in catching-up economies. Producers might set prices deliberately lower in catching-up economies because of the lower disposable income of households in these countries. As disposable income rises, prices are adjusted upwards, leading to inflation rates in excess of those in advanced economies. Égert (2007) provides some evidence of such behaviour in the Slovak Republic, showing that the prices of small cars are around 10% lower than the euro area average.

50. A final explanation to be mentioned relates to regulated prices which make up a significant share of the overall HICP. As regulated prices have been adjusted upwards in the past in order to achieve cost-recovering levels, they can partly explain the observed real appreciation of the koruna real exchange rate.

51. Going forward, the factors driving the real appreciation of the Slovak koruna are likely to moderate as the country's GDP *per capita* level catches up with the levels of western European countries. As regards the Balassa-Samuelson effect, Oomes (2005) expects an inflationary impact of 3% per year on average until 2010 compared with a projection of 1.5% per year by the National Bank of Slovakia (2006).[33] A further rise in the share of non-traded goods and services in private consumption might reinforce this effect, although any rise in the share is likely to be small as it is already very close to the euro area average.[34] Continued integration of Slovak manufacturing production into the global economy should lead to a closing of the quality gap with advanced economies and a saturation of the quality bias effect, albeit at a slow pace. The appreciating influences are likely to be dampened by continued fiscal consolidation in line with the Stability and Growth Pact, which will further reduce the GDP share of government consumption.

3. The impact of euro adoption on interest rates

52. The effect of euro adoption on interest rates runs *via* financial integration of capital markets and is multi-faceted. First, policy controlled interest rates converge to the euro area level immediately once monetary authority is transferred to the ECB in January 2009. Second, the premium for exchange rate risk imbedded in market interest rates relative to euro-denominated bonds will vanish which will reduce the spread of bonds *vis-à-vis* the euro area. Also, market interest rates will be increasingly influenced by factors common to the euro area rather than specific factors relating to the Slovak Republic. Third, Slovak retail banking markets will become more integrated with the euro area markets as the lack of exchange rate risk as well as lower transaction costs are likely to enhance cross-border financing activities. Hence, over the longer term, Slovak retail interest rates for loans (to both households and non-financial companies) may converge towards the lower euro area level and interest rates for deposits may rise towards the higher euro area level. Of these three effects, the convergence of retail interest rates is likely to have the largest impact on the population going forward.

53. Financial integration is defined as a situation where there are no frictions that discriminate between economic agents in their access to capital, particularly on the basis of their location. In practice this means that the same financial products, such as bonds, loans or deposits should have the same price across countries. While financial integration has already started in the CEE countries, not least with EU accession, the experience from existing euro area member countries shows that euro adoption enhances and

33. These estimates are based on historical estimates of the Balassa-Samuelson effect. To the extent that wage growth in the open sector will catch up with productivity growth, this might increase the size of the Balassa-Samuelson effect.

34. The dispersion of the share of non-tradables in private consumption across euro area countries is very small. The share is the highest in Austria (36%) followed by Spain, Ireland and Italy (32%).

accelerates integration (ECB, 2003; Baltzer *et al.*, 2008).[35] This is due to the removal of important obstacles, such as exchange rate risk, to the cross-border provision of financial services. As financial markets become better integrated, economies of scale can be realised and the supply of funds for investment opportunities is increased as banks and non-financial companies can tap the large and more liquid euro capital markets. Greater integration raises price transparency and lowers transaction costs, which should foster more cross-border activities, increase competition in the national markets and result in a more efficient allocation of capital as well as a reduction in the cost of capital.

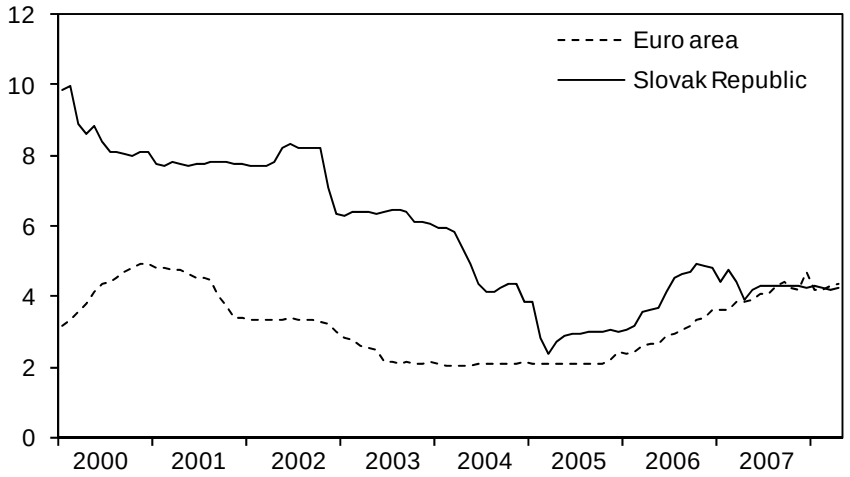
54. At the same time, financial integration in the euro area is still far from perfect. While wholesale markets (such as the interbank money markets and government bond markets) are already fairly integrated, retail markets remain more fragmented (ECB, 2008). For the Slovak Republic, it can thus be expected that wholesale markets will continue to integrate fairly quickly with the adoption of the euro - in fact, a lot of the adjustment has already happened. Even though integration in the case of retail banking markets in the euro area is far from perfect, it is here where the Slovak Republic's markets still have the most catch-up to do with most of the adjustment potential probably existing in the business with households (with banking activities with non-financial companies already much closer to euro area integration levels).

3.1 Changeover effects on money markets and government bond markets

3.1.1. Equalization of short-term interest rates

55. With the adoption of the euro, the Slovak Republic will give up its autonomous monetary policy and short-term interest rates will equal those in the euro area and will mainly depend on interest rate decisions made by the European Central Bank. The change in short-term interest rates at the time of joining will be relatively small, as *i)* monetary policy was constrained also before while the koruna had been in ERM II; and *ii)* expectations of euro adoption have already diminished the short-term interest rate differential. Indeed, as can be seen from Figure 22 one-month money market rates have converged to the euro area level by now.

Figure 22. Evolution of money market rates (1-month rates)



Source: Eurostat.

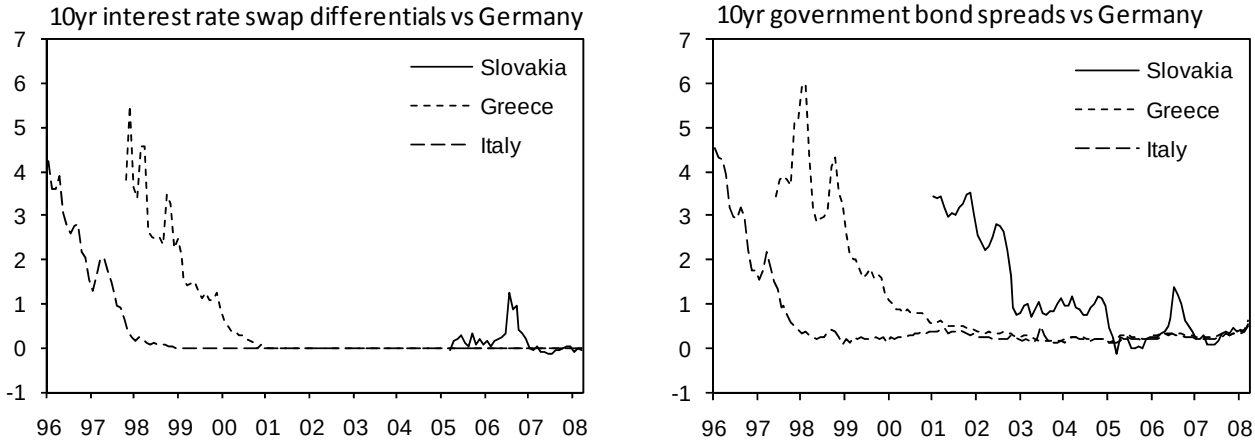
35 . Financial integration, of course, has already started prior to 1999, as European authorities took deep and successful steps to stabilise cross-country exchange rates and eliminate controls on international capital movements within what is now the euro zone.

3.1.2 Exchange rate risk in long-term interest rates will disappear

56. Euro adoption also implies that the Slovak koruna will cease to exist as a currency so that the exchange rate risk premium embedded in longer-term interest rates, which previously compensated euro-based investors in Slovak financial assets for the risk of exchange rate changes *vis-à-vis* the euro, will vanish. As the adoption of the euro in the Slovak Republic had long been expected, a large part of this adjustment has already been factored into the prices of Slovak bonds. One measure for the size of the exchange rate risk premium that the market is pricing for a given country is the difference in swap rates between the country and a benchmark country.[36] This measure has converged to zero in all euro area countries in the period prior to joining, as can be seen in the case of Italy from 1999 onwards and in Greece, which became a member of the euro area in January 2001 (Figure 23).

Figure 23. Interest rate differentials for 10yr government bonds

Percentage points



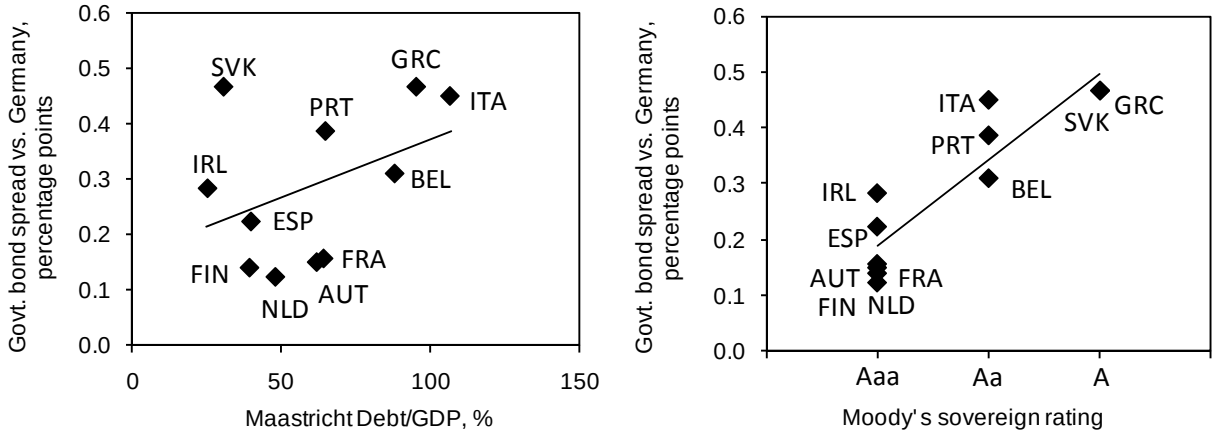
Source: Datastream.

57. For Slovakia, the swap differential to the euro area has also already fallen to almost zero (Figure 23, left panel), meaning that government bond yields are unlikely to include any significant exchange rate risk premium at this stage. Indeed, the current differential between Slovak and German government bond yields is already comparable to other euro area countries, such as Italy and Greece (Figure 23, right panel). The resulting spread, which reflects liquidity and default risk premia, will continue to exist once Slovakia becomes a member of the euro area and its size is likely to depend on the development of public finances as well as liquidity conditions going forward. As can be seen in Figure 24,

36. The swap rate is usually defined as the interest rate of the fixed leg of a fixed-for-floating interest rate swap with ten year maturity. Swap contracts are private agreements between financial institutions (typically investment banks) to exchange a flow of interest payments at a fixed rate for one at a floating rate, usually the six-month LIBOR. An interest rate swap does not involve any principal to be potentially lost by any of the two counterparts in case of default of the other. The counterpart risk for swap rates denominated in different currencies should be the same, since the investment banks who deal in swaps operate in all major markets. Also, swap rates do not contain a liquidity premium as there is no fixed amount of swaps outstanding (*i.e.* they are created upon demand). As a consequence, differentials between fixed interest rates on swaps should solely reflect exchange rate risk and therefore those differentials among euro area countries converged towards zero as the probability of monetary union increased up to 1999 (Codogno *et al*. 2003).

the level of interest rate differentials in the euro area tends to be positively related to the level of public debt (although the relation is not very strong) and overall credit worthiness (as reflected in sovereign ratings), respectively.[37]

Figure 24. Interest rate differentials and debt levels / Moody's sovereign ratings



Notes: Maastricht Debt levels are from 2006 and Moody's ratings are from 2008; both are compared with the average interest rate differentials (10-year government bonds) for 2008q1. Moody's sovereign rating scale ranges from Aaa (highest best creditworthiness) to C (lowest creditworthiness).
Source: Datastream, OECD Analytical Database and Moody's.

58. The current yield spread of Slovak government bonds *vis-à-vis* Germany is roughly 50 basis points, equal to the upper bound of the current distribution among euro area countries. While the current Maastricht debt level for the Slovak Republic of around 30% of GDP is below that of most other euro area countries (which would argue for a lower spread), the Moody's sovereign rating of A1 is worse. Recent research suggests that credit ratings are the primary driver of bond spreads in the euro area (Manganelli and Wolswijk, 2007), probably reflecting the more forward-looking nature of this variable in contrast to the backward-looking debt levels. Taking the rating as an indication suggests that the current yield differential of Slovak government bonds relative to the euro area is already close to the level that will prevail once the Slovak Republic has joined the euro area (similar to the Greek spread, as Greece is also rated as A1 by Moody's).

3.1.2 Increasing influence of common factors on yield changes

59. While the *level* of the interest rate differential will thus still depend to some extent on local factors, such as public creditworthiness, the experience of existing euro area countries suggests that, with increased integration, interest rate *changes* are increasingly driven by factors common to the euro area. With euro adoption and thus closer integration, this phenomenon is also to be expected for the Slovak bond market.

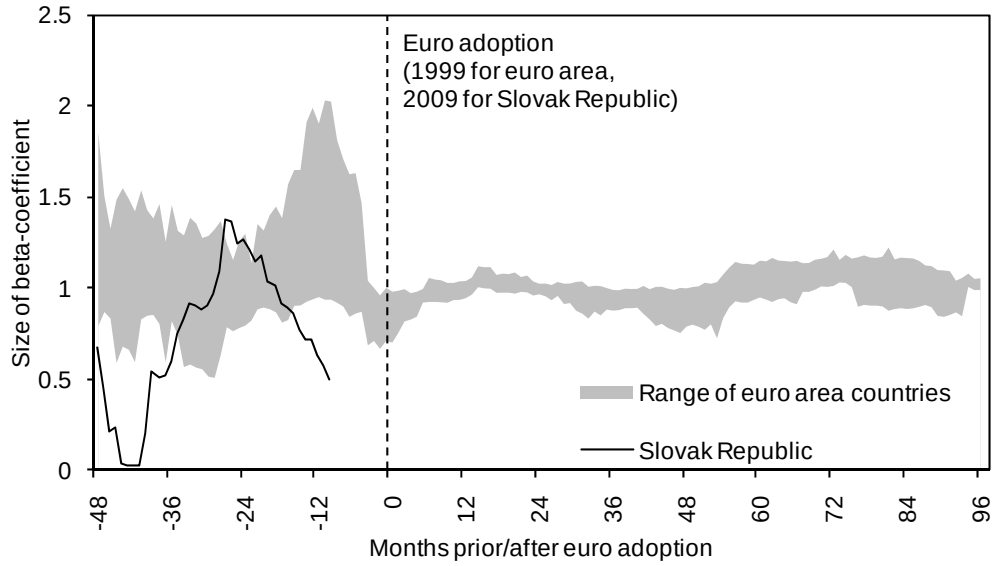
37. See Codogno *et al.* (2003) for a discussion of default risk and yield spreads. While they a significant influence of debt-to-GDP ratios *vis-à-vis* Germany on the spread in some countries, they suggest that international risk factors are the more important drivers.

60. The extent of co-movement is usually estimated by regressing individual country's yield changes against changes in the yield of the benchmark bond (which is the German government bond) (Baltzer *et al.*, 2008):

$$\Delta y_{i,t} = \alpha_{i,t} + \beta_{i,t}\Delta y_{B,t} + \varepsilon_{i,t} \quad (1)$$

61. Perfect integration would mean that the beta coefficient is equal to one, *i.e.* bond yields in all countries would only follow changes in the benchmark bond and local news would have no influence. Figure 25 shows the estimated slope coefficients for Slovak government bonds and the range for euro area countries in the 4 years prior to euro area membership. As can be seen, the beta coefficient for euro area members is fluctuating around one since the introduction of the common currency in 1999. The coefficient for the Slovak Republic is still below one but given historical experience it should converge towards one fairly quickly after 2009.

Figure 25. Euro area countries increasingly driven by common factors after EMU entry



Note: The chart shows the development of the estimated beta-coefficient for individual countries (euro area excludes Greece and Slovenia). The estimation was conducted over a 12-month moving window with the sample for Slovakia starting in March 2002.
Source: OECD calculations, ECB.

3.2 Effects of financial integration on retail interest rates

62. While the integration of money markets and government bond markets determines the underlying interest rate level for the economy, prices in the retail markets signal what consumers and enterprises actually have to pay for taking up a loan or the interest they receive on deposits. Even though the overall interest rate level, as seen above, has converged fairly closely to euro area levels, there still remains a large gap between the interest rates on loans and deposits for Slovak citizens and non-financial companies as compared with euro area residents. Euro adoption, by effectively leading to a more liquid and transparent capital market, will increase competition. This will lead to a reduction in the difference between market interest rates and deposit rates on the one hand and between market interest rates and lending rates on the other hand, thereby reducing banks' interest margins.[38] Cross-border activity of banks plays an important

38 . The high concentration among commercial banks in the Slovak Republic has led to a rather low level of competition (which, however, has increased over the last years) (IMF, 2007). Van Leuvensteijn *et al.*

role in this process.[39] Even though cross-border competition between banks in the existing euro area member countries is far from perfect, their experience suggests that over time Slovak retail interest rates should converge towards the euro area level.

63. Integration is still an ongoing process and retail banking interest rates at the euro area level are in a continuous process of becoming more integrated, also reflecting the efforts of the Eurosystem and the EU to promote financial integration (European Commission, 2005; and ECB, 2008). As integration tends to lead to convergence towards the lower end of the distribution, this process will lead to a lower euro area average. Therefore, the assumption that Slovak interest rates converge towards the current euro area average level is likely to be a conservative estimate and the extent of convergence might well turn out to be larger.

64. In order to analyze the extent of integration as well as to proxy the likely changes following euro adoption, we use the monthly harmonised MFI interest rate statistics on loans and deposits for households and non-financial companies as published by the ECB and the National Bank of Slovakia. They break down different loan and deposit categories by type and period of initial interest rate fixation or maturity.[40] The statistics are available for both new business and for outstanding amounts; in order to better gauge changes in the offer price of banks, we concentrate on the rates for new business in the following. These statistics are available from 2003 onwards for the euro area and from 2004 onwards for the Slovak Republic.[41]

3.2.1 Notable differences between Slovak and euro area retail interest rates

65. Turning first to households, interest rates for all loan categories are higher than in the euro area, notably for consumption loans (Table 9).[42] For the latter, Slovak households have to pay 2¼ and 8¾ percentage points (depending on the initial interest rate fixation of the loan) more for a new loan than the average euro area household. The differences are smaller for housing loans, where the spread to euro area rates is between ¾ (for an initial interest rate fixation period of up to 1 year) and 3¾ percentage points (for an initial interest rate fixation period of 5 to 10 years). For the category of household loans for other purposes, differences from the euro area amount to up to 1.3 percentage points.

66. In contrast to household loans, loan conditions for Slovak non-financial companies in general are closer to those prevailing in euro area countries. This holds in particular for loan amounts of over € 1 million where Slovak companies are even paying somewhat less for loans with an initial interest rate fixation of over five years than their counterparts in euro area countries. For loans up to 1 million, differences are between 10 and 130 basis points. This suggests that competition for company loans is already more developed than for household loans.

(2008) find evidence that spreads between bank and market interest rates are smaller in countries with stronger competition.

39 . One example would be Slovenia, where interest rates on loans to households even fell below the euro area average recently. Allegedly, this is due to foreign commercial banks entering the market and trying to gain market share by undercutting local retail interest rate conditions.

40 . The initial period of interest rate fixation is a predetermined period of time at the start of a loan contract during which the value of the interest rate cannot change (ECB, Manual on MFI interest rate statistics, October 2003).

41 . For the Slovak Republic, we use interest rates for loans and deposits in koruna rather than euros as the latter represent only a very small share of the total volume (2½ % of total household loan volume).

42 . The following and Table 9 refer to averages for the first quarter 2008.

67. Interest rates on deposits are generally lower in the Slovak Republic than in the euro area, both for households and for non-financial companies. Differences are larger for deposits with a longer agreed maturity (up to 1 percentage point for households, up to 2.7 percentage points for non-financial companies) as well as for deposits which are redeemable at notice (up to 1¾ percentage points for a notice period of over 3 months for households).

Table 9. MFI interest rates for new business 2008, %

				Slovak Republic	Euro area average	Spread Slovakia – Euro area average	Standard deviation in euro area countries (2007 avg.)
Deposits	Households		Overnight	0.46	1.21	-0.75	
		agreed maturity	<1yr	3.45	4.14	-0.70	
			1<x<2 yr	3.73	4.16	-0.42	
			>2yr	2.24	3.25	-1.00	
		redeemable at notice	<3 months notice	1.45	2.64	-1.19	
			>3months notice	2.12	3.77	-1.64	
	Non-financial companies		overnight	0.91	2.02	-1.10	
		agreed maturity	<1yr	3.76	4.13	-0.37	
			1<x<2 yr	2.77	4.27	-1.51	
			>2yr	1.71	4.37	-2.66	
Loans	Households		bank overdraft	14.55	10.48	4.08	
		consumption	<1yr fix	10.59	8.34	2.25	
			1<x<5yrs fix	15.86	7.10	8.77	1.16
			>5yrs fix	14.00	8.44	5.56	
		house purchase	<1yr fix	5.97	5.26	0.71	0.28
			1<x<5yrs fix	6.15	4.96	1.19	
			5<x<10yrs fix	8.82	5.02	3.80	0.30
			>10yrs fix	8.63	5.11	3.52	
		other purposes	<1yr fix	6.80	5.60	1.21	
			1<x<5yrs fix	6.86	5.86	1.00	
			>5yrs fix	6.80	5.49	1.31	
	Non-financial companies		Overdraft	5.83	6.58	-0.74	
		loans < €1 million	<1yr fix	6.00	5.89	0.10	0.38
			1<x<5yrs fix	6.39	5.84	0.54	
			>5yrs fix	6.54	5.24	1.30	0.44
		loans > €1 million	<1yr fix	5.38	5.12	0.27	0.27
			1<x<5yrs fix	6.08	5.38	0.70	
			>5yrs fix	4.70	5.23	-0.53	0.24

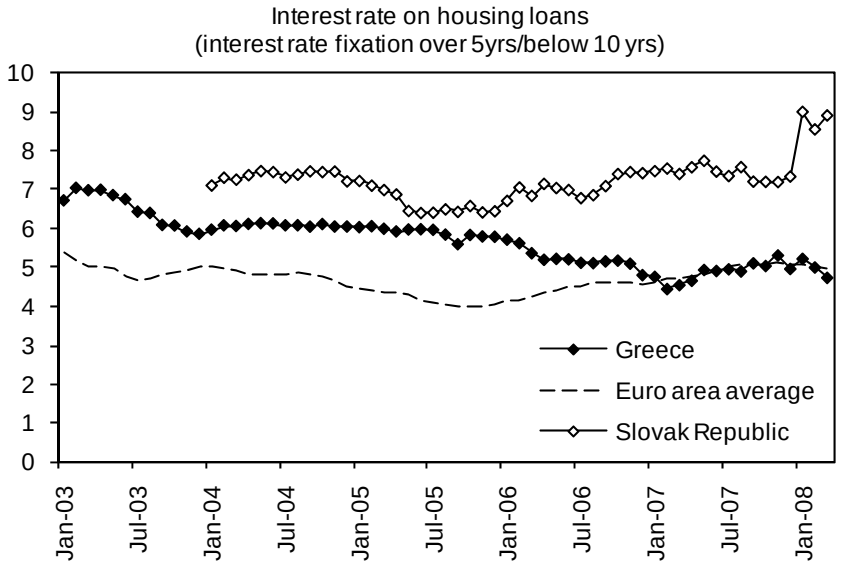
Note: Interest rates are averages from January to March 2008.
Source: Harmonised MFI interest rate statistics from the ECB and the National Bank of Slovakia.

3.2.2 Extent and speed of convergence

68. Even though there is still significant dispersion of retail interest rates within the euro area analyses from the ECB suggest that they tend to converge over time. As can be seen from Table 9 (last column), the standard deviation of interest rates across euro area countries differs by loan category and ranges between ¼ and 1¼ percentage points. Even assuming that Slovak interest rates only decline towards the upper bound of the euro area interest rate distribution leaves ample scope for convergence, at least for household loans. The adjustment process, however, is likely to take some time as it will work through

increased competition and reduced bank margins. The example of Greece, which joined the euro area in 2001, shows that interest rates on housing loans (with an intermediate interest rate fixation period) only fully converged by 2007, after having decreased by around 2 percentage points since 2003 (Figure 26).

Figure 26. Convergence of housing loan conditions



Source: ECB, National Bank of Slovakia and Bank of Greece.

69. It should be noted that differences in bank interest rates across countries can also reflect differences in institutional factors (such as taxation, supervision and consumer protection) and financial structures. This may explain why integration in the euro area is far from complete. It might also influence the extent to which Slovak interest rates converge to the euro area level.

70. So far, empirical analysis suggests that convergence of Slovak interest rates is already underway. One way to demonstrate this is to estimate the following equation, which relates the change in the interest rate spread *vis-à-vis* the euro area average for every loan/deposit category *i* ($\Delta S_{i,t}$) to the lagged level of the spread ($S_{i,t-1}$) as well as two lags of itself (Baltzer *et al.*, 2008):

$$\Delta S_{i,t} = \alpha_i + \beta_i S_{i,t-1} + \sum_{l=1}^{2} \gamma_l \Delta S_{i,t-1} + \varepsilon_{i,t} \qquad (2)$$

71. A negative value for β_i is indicative of convergence as loan or deposit categories with a higher spread have a tendency to converge to the benchmark euro area average more rapidly than those categories with a lower spread. A higher absolute value for β_i is indicative of a higher speed of convergence (with a coefficient close to -1 signalling a complete convergence process). Table 10 shows the estimated β_i coefficients for different Slovak retail interest rate categories, estimated over the time period January 2004 to March 2008. As can be seen, all coefficients are negative, *i.e.* all categories are converging towards the euro area level. The speed of convergence (higher absolute β-values) tends to be highest for loans to non-financial corporations, suggesting that competition for this category is most intense. Convergence is also high for deposits of both households and non-financial companies. For household loans, the size of the β-coefficient is generally smaller, although for those categories with substantial interest rate differentials to

the euro area average, there is evidence of faster convergence (consumption and housing loans with longer interest rate fixation periods).

Table 10. Estimates of retail interest rate convergence

				α_i	β_i	*p*-value β_i
Deposits	Households		Overnight	-0.05	-0.08	0.11
		agreed maturity	<1yr	-0.03	-0.12	0.01
			1<x<2 yr	-0.07	-0.34	0.00
			>2yr	-0.07	-0.25	0.00
		redeemable at notice	<3 months notice	-0.14	-0.13	0.00
			>3months notice	-0.35	-0.26	0.01
	Non-financial companies		overnight	-0.10	-0.13	0.08
		agreed maturity	<1yr	0.01	-0.17	0.00
			1<x<2 yr	-0.20	-0.22	0.24
			>2yr	-1.42	-0.94	0.00
Loans	Households		bank overdraft	0.14	-0.03	0.52
		consumption	<1yr fix	0.80	-0.22	0.03
			1<x<5yrs fix	6.22	-0.68	0.00
			>5yrs fix	0.17	-0.06	0.37
		house purchase	<1yr fix	0.03	-0.03	0.26
			1<x<5yrs fix	0.07	-0.06	0.05
			5<x<10yrs fix	1.87	-0.71	0.02
			>10yrs fix	0.94	-0.37	0.04
		other purposes	<1yr fix	0.40	-0.16	0.05
			1<x<5yrs fix	0.09	-0.06	0.22
			>5yrs fix	0.60	-0.31	0.01
	Non-financial companies		Overdraft	-0.03	-0.09	0.00
		Loans < €1 million	<1yr fix	0.17	-0.25	0.01
			1<x<5yrs fix	0.24	-0.27	0.03
			>5yrs fix	0.36	-0.26	0.03
		loans > €1 million	<1yr fix	0.12	-0.20	0.00
			1<x<5yrs fix	0.27	-0.35	0.00
			>5yrs fix	0.23	-0.37	0.29

Note: The table shows the estimated coefficients from equation 2, estimated separately for every loan/deposit category and using Newey-West heteroskedasticity and autocorrelation consistent covariance estimates.
Source: OECD calculations.

4. Implications of the changeover for the general public

4.1 Impact of euro related price increases on different groups of Slovak consumers

72. As discussed in Section 2 the cash changeover in the Slovak Republic will most likely be associated with price increases for a number of goods and services but only a modest increase in the aggregate consumer price index. In this section the implied financial impact on Slovak consumers is estimated making use of a disaggregated data set on consumption expenditures provided by Eurostat. Specifically, the data are disaggregated at the COICOP 2 level and by income, household type, age of the reference person, employment status of the reference person, and degree of urbanisation.

73. To gauge the implied impact on different groups of Slovak consumers, the coefficients on the changeover dummies obtained in Section 2.1.2 at the COICOP 2 level (Table 2) are multiplied by the

weights of the respective sectors in the consumption baskets of different groups of consumers. As the latest year for which disaggregated data on consumption expenditures are available is 2005, the calculations are based on the presumption that the composition of the consumption basket after the cash changeover will be the same as in 2005. This assumption is of course somewhat problematic, especially since cash changeover induced relative price changes might lead to substitution effects whereby consumers substitute goods and services with relative price increases by goods and services with relative price declines. As such, the financial impact on consumers presented here is likely to be an upper bound of the financial impact on consumers.

Table 11. Financial impact of the cash changeover on Slovak consumers

	Price level effect in %	Financial impact in SKK (in €)			
		Per household		Per adult equivalent	
Average household	0.20	504	(14.93)	275	(8.15)
First quintile	0.15	241	(7.13)	129	(3.81)
Second quintile	0.15	304	(9.01)	170	(5.05)
Third quintile	0.20	480	(14.21)	265	(7.84)
Fourth quintile	0.20	524	(15.53)	282	(8.36)
Fifth quintile	0.26	981	(29.05)	534	(15.81)
Single person	0.14	173	(5.13)	173	(5.13)
Single parent with dependent children	0.19	364	(10.79)	230	(6.82)
Two adults	0.16	349	(10.33)	232	(6.88)
Two adults with dependent children	0.25	705	(20.87)	341	(10.09)
Three or more adults	0.23	744	(22.04)	330	(9.76)
Three or more adults with dependent children	0.20	676	(20.02)	243	(7.18)
Less than 30 years	0.24	627	(18.56)	347	(10.27)
Between 30 and 44 years	0.25	710	(21.03)	337	(9.99)
Between 45 and 59 years	0.20	560	(16.59)	293	(8.67)
60 years and over	0.10	163	(4.82)	120	(3.56)
Manual workers in industry and services	0.20	543	(16.10)	264	(7.81)
Non manual workers in industry and services	0.26	815	(24.15)	426	(12.63)
Self-employed	0.26	843	(24.97)	407	(12.06)
Unemployed	0.09	138	(4.10)	79	(2.35)
Retired	0.10	151	(4.47)	113	(3.34)
Inactive population - Other	0.12	194	(5.76)	117	(3.46)
Densely-populated area	0.26	681	(20.16)	399	(11.83)
Intermediate urbanised area	0.21	499	(14.77)	269	(7.98)
Sparsely populated area	0.16	383	(11.36)	198	(5.86)

Source: OECD calculations.

74. The calculations suggest that the consumption expenditures of the average households will increase by around 0.2 percentage points due to the cash changeover.[43] This implies that a typical

43. This number differs from the HICP impact calculated in section 3.1.2 due to the use of two different weighing schemes. Whilst the weights used in section 3.1.2 correspond to the weights used by Eurostat in the calculation of the HICP, the weights used here correspond to the share of a certain category of goods and services in total consumption expenditures. The use of 2005 weights instead of 2008 weights as in section 3.1.2 contributes only a little to the difference as the HICP weights of the relevant sectors hardly changed between 2005 and 2008.

household will incur additional consumption expenditures of SKK 504 (€ 15) per year (see Table 11).[44] Different types of consumers will be affected to different degrees by this price increase. For citizens in the highest income quintile consumption expenditures are estimated to increase by almost 0.26% compared with an increase of only 0.15% for persons in the lowest income quintile, mainly reflecting the higher share of recreational goods and services, vehicle purchases and catering services in the consumption basket of the highest income quintile. Expressed in monetary units, this implies additional expenditures of SKK 981 per year for households in the highest income quintile compared with SKK 241 for those in the lowest income quintile.

75. Comparing the changeover effect across different household types suggests that households with dependent children will be more severely hit by the changeover induced price increases than households without children as expenditures for catering services, recreational activities and vehicle purchases tend to be larger when dependent children are present.[45] For example, the additional annual costs per equivalent adult are estimated at SKK 232 for a couple without dependent children compared with SKK 341 for a couple with children.

76. Households with a reference person aged 60 and over should be less severely hit by the changeover induced price increases than households with a younger reference person. Recreational goods and services, vehicle purchases and catering services represent only 0.06% of their consumption expenditures compared with around 0.14% for households with a reference person aged 45 and below. The implied financial impact of the cash changeover amounts to SKK 163 per year for a household with a reference person aged 60 and over compared with SKK 560 to 710 for those with a reference person aged below 60.

77. Looking at the employment status of the reference person shows that the retired and the unemployed are likely to be the least affected by the cash changeover induced price increases. For the retired the financial impact is estimated at SKK 151 per year and household which, given the large overlap between the two groups, is very close to the estimate for those aged 60 and above. This suggests that the real value of pensions is diminished only slightly as a result of the changeover. The same applies to unemployment benefits with the size of the financial impact on a household with an unemployed reference person estimated at SKK 138 per year.

78. Regional differences in the estimated size of the cash changeover-related price increase largely reflect regional differences in income levels with a higher impact of around 0.26% in densely populated areas (which comprise mainly the Bratislava region) and a lower impact of 0.16 to 0.21% in intermediate and sparsely populated areas.

4.2 Impact of financial integration on Slovak consumers and non-financial enterprises

79. Slovak households and non-financial companies will benefit from increased convergence of retail interest rates towards the euro area level (see Section 3.2), in particular mortgage borrowers as mortgage loans currently make up roughly one third of all outstanding loans (and two thirds of outstanding loans to

44. It cannot be excluded that some of this cost increase might be regained in the future as prices might increase by less than they would have done without the changeover-related price hikes.

45. As no data are available for the share of vehicle purchases in the expenditures of single parents with dependent children, the share is set equal to its value in the Czech Republic. This decision is motivated by the high correlation of 0.96 between the composition of the consumption basket of this household type in the Czech Republic and the Slovak Republic. Robustness checks show that alternative methods to derive an estimate of the share lead to almost identical results.

households).[46] Assuming that interest rates on household loans fully converge to the lower current euro area average level, households would benefit from lower interest payment in the order of SKK 6 billion (€ 200 million) (Table 12).[47] Around half of this benefit would accrue to mortgage borrowers. This compares with around SKK 1 billion (€ 33 million) lower interest payments for non-financial companies, reflecting the fact that interest rates for their loans are closer to the euro area level. Depositors would benefit from a convergence of Slovak deposit interest rates towards the higher euro area level. Using the current stock of deposits, households can expect to receive an additional SKK 4 billion (€ 130 million) in interest payments and non-financial companies SKK 1.8 billion (€ 60 million). Total interest savings/gains for borrowers and depositors add up to SKK 12¾ billion, around 0.8% of GDP.

80. Overall, households are thus likely to benefit significantly more from the convergence of retail interest rates than non-financial companies. Within the household sector, borrowers will save more in interest payments than depositors will gain by receiving higher interest rates. This static calculation (based on current outstanding loan amounts) does not take into account that private credit is expanding rapidly as is often observed in catch-up countries. For example, the share of mortgage loans in GDP currently accounts for 11% (compared with 40% in the euro area), up from around 6% in 2002. Thus, as more and more households become debtors and the outstanding amount of loans increases, the benefits of lower retail interest rates will also rise in absolute terms.

Table 12. Benefits of lower retail interest rates (in SKK millions)

	Outstanding volume April 008	Savings in interest payments for borrowers / Gains in interest received for depositors
Household deposits	509 223	4 109
Household loans	317 453	5 935
Total households		*10 044*
Non-financial company deposits	243 652	1 828
Non-financial company loans	279 303	958
Total non-financial companies		*2 786*
Total		12 830

Notes: Savings in interest payments are calculated by assuming complete convergence of Slovak interest rates to the euro area average (in both cases using the interest rate levels prevailing in the first quarter of 2008), multiplying the interest rate spread for each loan/deposit category with the outstanding amounts in the first quarter of 2008 and summing up across categories. Due to the lack of a breakdown for loans to non-financial companies by size in the banking balance sheet, the average spread for loans above/below 1 million euro was used in the calculations. The calculation does not include bank overdrafts (for both households and non-financial companies) due to the lack of information about outstanding amounts.
Source: National Bank of Slovakia, OECD calculations.

81. Taking into account the current composition of loans outstanding by initial interest rate fixation period, the average Slovak mortgage borrower pays a roughly 1.5 pp higher interest rate on his new mortgage than the average euro area borrower. In case interest rates have fully converged to euro area

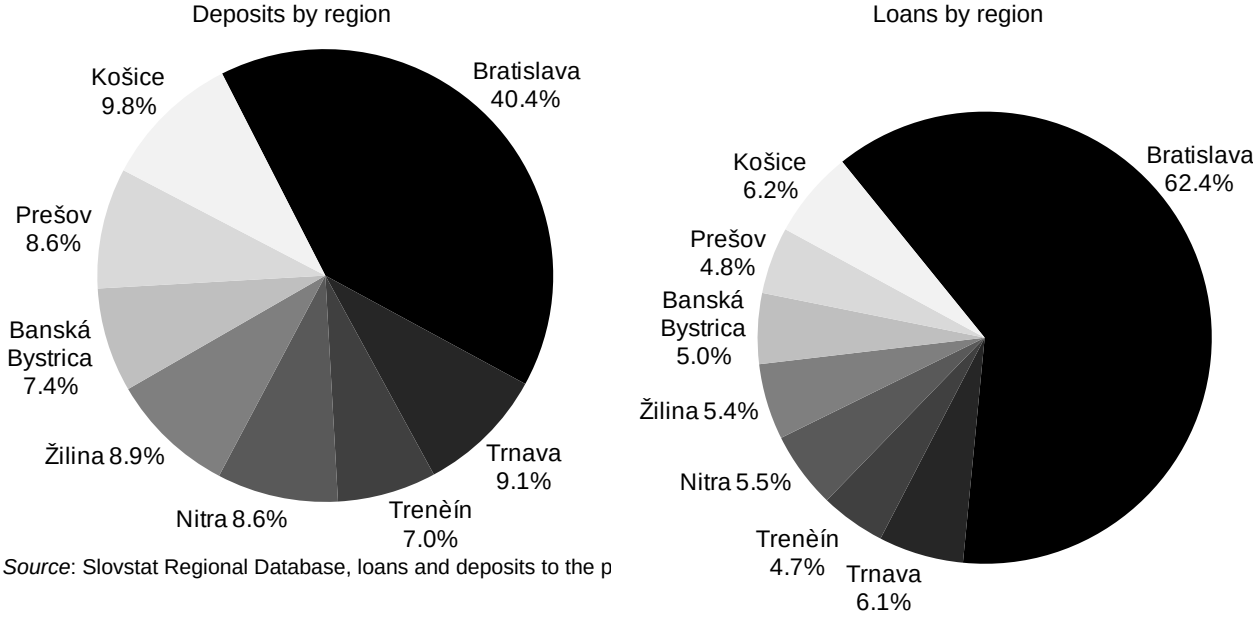
46 . Data are taken from the bank balance sheet statistics in April 2008 as published by the National Bank of Slovakia and refer to loans granted to residents.

47. This and the ensuing calculation are based on applying the interest rate differentials for new business *vis-à-vis* the euro area average (Table 9) on the outstanding loan amounts by different categories in April 2008. As data for outstanding loan amounts are available only by maturity, we approximated the outstanding amounts of households loans by initial interest rate fixation period using the average shares of different types of interest fixation of new housing loans granted since 2005. For non-financial companies, we assumed the initial interest rate fixation period matches the maturity of the loans. The calculated welfare benefits only materialise once the outstanding loan amounts are refinanced as borrowers will benefit from the lower interest rates only at the time when they take up a new loan or when they refinance their outstanding loan. The same holds for depositors.

levels, a citizen who takes up a new housing loan of SKK 4.9 million (€ 160 000) (*e.g.* reflecting the costs of a 130 m^2 flat at an average price of 38 000 SKK/m^2) with an average interest rate fixation period will save interest expenses of up to SKK 73 500 (€ 2 400) in the first year.

82. Looking at the regional breakdown of loans and deposits suggests that it is mostly the region of Bratislava that is likely to benefit from this convergence in interest rates as more than half of all outstanding loans to the population fall in this area (Figure 27).[48] This also reflects the fact that in Bratislava real estate prices are around one third above the national average. In addition, almost half of all deposits are located in the Bratislava region.

Figure 27. Outstanding loans and deposits by region, 2006



Source: Slovstat Regional Database, loans and deposits to the p

83. Within the population it is usually the younger cohorts who tend to be borrowers while older age groups tend to be savers. As the adjustment of interest rates to households is likely to be larger for loans than for deposits (Table 12), the younger cohorts are likely to benefit more from saved interest payments than the older generation gains by receiving higher interest rates on their deposits.

4.3 The likely impact on house prices

84. A lower level of retail interest rates is also likely to have an impact on house prices as it increases the affordability of real estate for households. Apart from interest rates, Beka (2007) points to the importance of disposable income, development of credit markets, demographics, public housing support, as well as supply of new housing as important factors driving real estate prices. While is it undisputed that the past dynamic increase in real estate prices in the Slovak Republic (annual price increases have averaged over 20% from 2005q1 to 2008q1) has also been driven by a lowering of real interest rates, it remains difficult to isolate the effect of this single variable. Empirical analysis is made even more difficult by the availability of only a short time series for house price data for the Slovak Republic (starting only in 2005).

48. Developments for loans since 2001, however, indicate that the regional divergence is likely to become smaller. Since 2001 the share of the Bratislava region in total new loans to the population has decreased from close to 80% to the current 62%. For new deposits, on the other hand, the share of the Bratislava region has increased over the past years.

85. Studies on house price determinants in CEE countries, such as Égert and Mihaljek (2007) who study a sample of CEE countries (excluding the Slovak Republic due to data constraints) usually find that house prices are significantly affected by changes in real interest rates. However, they find a wide range of impact estimates and thus the definitive size of the real interest rate effect remains somewhat inconclusive. The same uncertainty holds for the speed of adjustment of house prices to real interest rates. For example, it is conceivable that prices have already risen in expectation of this future decline in real interest rates. Such concerns are all the more important as the convergence of retail interest rates to euro area levels is likely to take some time and thus any increasing effect on house prices will be spread over several years. Hence, although the expected decline in mortgage interest rates is likely to give a further boost to house prices, the magnitude and timing of the effect is difficult to gauge.

5. Summary and policy recommendations

This paper has studied the impact of euro adoption on inflation and interest rates in the Slovak Republic. In general, the immediate impacts in January 2009 are likely to be relatively small. While euro cash changeover effects on prices could be sizeable in specific sectors and for particular groups of consumer items, the overall price level may rise by around 0.3%, in line with the experience from previous countries that joined the euro area. Price effects can be expected to materialise rather quickly, either already before the euro adoption or shortly after the "hot phase" of price watch terminates. As euro membership has been fully priced in on capital markets, short- as well as long-term interest rates will probably not change at all in January 2009.

More significant will be the medium- to longer term effects of euro adoption. First, as the exchange rate *vis-à-vis* the euro is irrevocably fixed, there will no longer be a damping effect on inflation (from exchange rate appreciation) through imports from the euro area, at least after past exchange rate changes have filtered through the distribution chain by around the middle of 2009. Second, Balassa-Samuelson and other effects related to catch-up countries may raise the Slovak inflation rate above the euro area level for a longer period of time, although the size of the effect is difficult to quantify. Regarding interest rates, euro adoption will foster financial integration with the euro area and this is likely to lead to a convergence of Slovak retail interest rates towards euro area levels. However, those interest rate changes associated with capital market integration will materialise only over a medium to long term horizon.

Taking into account that the euro changeover will have an impact on inflation and interest rates at different points in time, the following policy recommendations are organised according to their time horizon.

Policy recommendations for the short term – From now to mid 2009

- Rounding effects should only exert a minor upward pressure on prices. A pure mathematical rounding procedure would lead to rounding up in five out of 10 cases while rounding down in four out of ten cases. *Public information campaigns as well as negotiations with retailers should therefore emphasize that euro adoption does not automatically mean rounding up prices. The same logic also applies to the transition to a system of new "attractive prices".*

- Publicly administered prices as well as prices and fees for public services still play an important role in the consumption basket for Slovak citizens. The changeover for such price items in the public domain should be presented as show case. For such prices the need to charge "attractive" numbers is less evident. *Publicly determined prices and fees should be changed strictly according to the conversion rate. The euro adoption should be used as an opportunity to introduce publicly available price and fee comparisons for public services, like public and municipal utilities.*

- International retail chains are already operating in the Slovak Republic. Most of them offer price information which is available via the internet. *Consumer protection organizations could consider to put together representative samples of consumer baskets and maintain a "beauty contest" for retail chains, which is publicly accessible. Such comparisons should also include neighbouring countries, especially Austria and Hungary, which are in reach for a large share of consumers in Western Slovakia.*

- Calculations show that those socio-economic groups which are likely to experience a larger increase in the costs of their consumption expenditure also have a higher income. *Programs to compensate for the price level effects of euro adoption should be limited to low income groups, especially families with children. General transfer increases would only stimulate price increases and should be avoided.*

- If suppliers want to increase their profits by gaining market share (and not by increasing prices) during the changeover period then any obstacles to bring the additional supply to the market will deter firms from choosing such a strategy. *Remaining administrative obstacles to increase supply should be removed and arguments in their favour, referring to health and safety concerns should be carefully examined to avoid that such concerns are misused as entry barriers which protect insiders.*

Unavoidable changeover costs, like menu costs, as well as costs related to the handling of a new currency for some time in parallel with the current Slovak koruna, are equivalent to a one-off cost increase, which – under conditions of perfect competition – will be shared among suppliers and consumers according to the slopes of demand and supply schedules. Such cost increases cannot be rolled forward into wage increases without increasing wage costs throughout the economy and thus putting employment at risk. *Social partners should be encouraged to exclude changeover costs from wage and price negotiations in the current and next rounds.*

Policy recommendations for the medium term

- Competition is limiting the scope for misusing the euro changeover for an increase of mark-ups and to reap extra profits. A competition friendly regulatory environment, which keeps entry barriers low and avoids administrative overheads and red tape, is a powerful ally for the changeover campaign. While past reforms have achieved a lot already, much remains still to be done and this also includes network industries. Although regulatory changes need time to exercise an impact it is now the time to use this opportunity. *The government should use the euro changeover to reduce and remove altogether entry barriers and accelerate its efforts to remove administrative barriers. Where competition is not yet possible due to the existence of natural monopolies, regulators should be endowed with sufficient powers to allow the use of private networks at fair conditions and to set prices which do not include excessive monopoly rents.*

- Financial market integration should lead to lower spreads, not the least because of the removal of any exchange rate risk within the euro area. Currently lending rates are above the euro area average, while deposit rates are below. Experience from the euro area demonstrates that financial sector integration takes time and that it more often takes the form of takeovers than cross border expansion. This process has been more or less concluded insofar as domestic (Slovak) banks and financial institutions are involved. However, there may be some scope for consolidation among the foreign banks. *The government should investigate in co-operation with the central bank and financial market supervision in how far barriers for the establishment of a more competition friendly market structure in financial services exist. In order to reap these potential benefits from a pro-competitive market structure it will also be necessary to make sure that the associated cost cutting opportunities can be exercised.*

- Adopting the euro will eliminate the opportunity to pursue real appreciation via nominal appreciation. This is important for catching up economies, which have lower prices in domestic services sectors than in richer euro area member countries. This Balassa-Samuelson effect will damp real interest rates and can possibly contribute to a boom-and bust cycle. In order to avoid such a scenario the government should prepare a comprehensive policy package in order to compensate for the loss of monetary policy and the elimination of the nominal exchange rate as a channel for real appreciation. Such a package should include:

  – *Measures to increase the scope for competition in domestic services sectors in order to close the gap of productivity growth with the (international competition exposed) export manufacturing sector.* Such a measure would reduce the Balassa-Samuelson effect directly.

  – *Measures to reduce the attractiveness of loan financed asset bubbles, in particular a capital gains tax.* Such a measure would reduce the attraction of investing in a bubble market.

  – *Maintaining a prudent fiscal stance and avoiding in particular to expand general transfer programs. The government should continue to improve the incentives to work as well as to search for work and to participate in lifelong learning in order to be employable longer.* Such measures would increase the overall supply of labour and avoid a premature overheating of the labour market.

  – *Establishing a regulatory environment which allows the development of a rental housing market.* This would reduce the need to enter the housing market as a buyer in order to satisfy a housing need.

BIBLIOGRAPHY

Balassa, B. (1964), "The purchasing-power-parity doctrine: a reappraisal", *Journal of Political Economy*, Vol. 72, pp. 584-596.

Baltzer, M.*et al.* (2008), "Measuring financial integration in new EU member states", *ECB Occasional Paper* No. 81.

Banque de France (2002), "The euro cash changeover in France: assessment and main conclusions", *Banque de France Bulletin Digest* No. 107, pp. 33-54, November.

Beka, J. (2007), "Real Estate Prices, Credit Growth and Implications for Monetary Policy", *BIATEC*, Vol. 12/12, pp. 1-10, National Bank of Slovakia.

Brachinger, H.W. (2005), "Der Euro als Teuro? Die wahrgenommene Inflation in Deutschland", *Wirtschaft und Statisik* 9/2005, pp. 999-1013, Statistisches Bundesamt.

Buchwald, W., Chlumsky, J. and N. Engelhardt (2002), "Zum Einfluss des Euro auf die Preisentwicklung in Deutschland", *Wirtschaft und Statistik* 3/2002, Statistisches Bundesamt.

Chlumsky, J. and N. Engelhardt (2002), "Ein Jahr Euro – ein Jahr Teuro? Amerkungen der amtlichen Preisstatistik", mimeo, Statistisches Bundesamt, December.

Cincibuch, M. and J. Podpiera (2006), "Beyond Balassa-Samuelson: real appreciation in tradables in transition countries", *Economics of Transition*, Vol. 14, pp. 547-573.

Codogno, L., C. Favero and A. Missale (2003), "Yield spreads on EMU government bonds", *Economic Policy*, Vol. 18, pp. 503-532.

Conway, P, V. Janod and G. Nicoletti (2005), "Product Market Regulation in OECD Countries: 1998 to 2003", *OECD Economics Department Working Paper* No.419, *www.olis.oecd.org/olis/2005doc.nsf/linkto/eco-wkp(2005)6*.

Del Giovane, P. and R. Sabbatini (2005), "The introduction of the euro and the divergence between officially measured and perceived inflation: the case of Italy", mimeo, Bank of Italy, May.

Deutsche Bundesbank (2002), "Consumer prices and the changeover form Deutsche Mark to euro", *Deutsche Bundesbank Monthly Report*, pp. 15-24, July.

Deutsche Bundesbank (2004), "The euro and prices two years on", *Deutsche Bundesbank Monthly Report*, pp. 15-28, January.

Döhring, B. and A. Mordonu (2007), "What drives inflation perceptions? A dynamic panel analysis", *European Economy Economic Papers* No. 284.

Doliak, M. and B. Karmazin (2007), "Analysis of the influence of the exchange rate on consumer prices – a disaggregated view", *BIATEC*, Vol. 15/11, pp. 3-7, National Bank of Slovakia.

ECB (2003), "The integration of Europe's financial markets", *ECB Monthly Bulletin*, October.

ECB (2008), *Financial Integration in Europe*, April.

Égert, B. (2002a), "Investigating the Balassa-Samuelson hypothesis in transition: Do we understand what we see?", *Bank of Finland Discussion Paper* No. 6.

Égert, B. (2002b), "Equilibrium real exchange rates in central Europe's transition economies; knocking on heaven's door", *William Davidson Working Paper* No. 480.

Égert, B. (2007), "Real convergence, price level convergence and inflation differentials in Europe", *CESifo Working Paper* No. 2127.

Égert, B.*et al.* (2003), "The Balassa-Samuelson effect in central and eastern Europe: myth or reality?", *Journal of Comparative Economics*, Vol. 31, pp. 552-572.

Égert, B., Lommatzsch, K. and A. Larhèche-Révil (2006), "Real exchange rate in small open OECD and transition economies: comparing apples with oranges", *Journal of Banking and Finance*, Vol. 30, pp. 3393-3406.

Égert, B. and D. Mihaljek (2007), "Determinants of house prices in central and eastern Europe", *BIS Working Paper* No. 236.

Égert, B. and J. Popdiera (2008), "Structural inflation and real exchange rate appreciation in Visegrad-4 countries: Balassa-Samuelson or something else?", *CEPR Policy Insight* No. 20.

Ehrmann, M. (2006), "Rational inattention, inflation developments and perceptions after the euro cash changeover", *ECB Working Paper* No. 588.

Ercolani, M.G. and J. Dutta (2006), "The euro-changeover and euro-inflation: evidence from EuroStat's HICP", mimeo, Department of Economics, University of Birmingham, February.

European Commission (2005), *White Paper on Financial Services Policy 2005-2010*.

European Commission (2008), *Convergence Report 2008*.

Eurostat (2003), "Euro changeover effects", annex to news release dated 18 June 2003, *http://epp.eurostat.ec.europa.eu/pls/portal/docs/PAGE/PGP_PRD_CAT_PREREL/PGE_CAT_PREREL_YEAR_2003/PGE_CAT_PREREL_YEAR_2003_MONTH_06/2-18062003-EN-AP.PDF*.

Fluch, M. and H. Stix (2005), "Perceived inflation in Austria – extent, explanations, effects", *Monetary Policy & The Economy* Q3/2005, pp. 22-47, Österreichische Nationalbank.

Folkertsma, C.K., C. van Renselaar and A.C.M. Stokman (2002), "Smooth euro changeover, higher prices? Results of a survey among Dutch retailers", *Research memorandum* No. 682, De Nederlandsche Bank.

Frait, J., L. Komárek and M. Melecký, (2006), "The Real Exchange Rate Misalignment in the Five Central European Countries", *Warwick Economic Research Paper* No. 739, University of Warwick.

Gaiotti, E. and F. Lippi (2005), "Pricing behaviour and the introduction of the euro: evidence from a panel of restaurants", *CEPR Discussion Paper* No. 4893.

Hanousek, J. and R.K. Filer (2001), "Consumers' opinion of inflation bias due to quality improvements in transition in the Czech Republic", *CERGE-EI Working Paper* No. 184.

Hobijn, B., F. Ravenna and A. Tambalotti (2004), "Menu costs at work: restaurant prices and the introduction of the euro", *Federal Reserve Bank of New York Staff Report* No. 195.

IMF (2007), *Slovak Republic: Financial System Stability Assessment Update*.

Kahneman, D. and A. Tversky (1979), "Prospect theory: an analysis of decisions under risk", *Econometrica*, Vol. 47, pp. 313-327.

Kamleitner, B., E. Kirchler and E. Hofmann (2004), "The euro: perception of a loss in purchasing power", paper presented at the 29th SABE-IAREP Conference, Philadelphia, PA,15-18 July.

Korhonen, I. and P. Wachtel (2005), "A note on exchange rate pass-through in CIS countries", *Bank of Finland Discussion Paper* No. 2.

Kovács, M.A. (2004), "How real is the fear? Investigating the Balassa-Samuelson effect in CEC5 countries in the prospect of EMU enlargement", in Szapary, G. and J. von Hagen (eds.), *Monetary Strategies for Accession Countries*, Edwar Elgar.

Lojschová, A. (2003), "Estimating the impact of the Balassa-Samuelson effect in transition economies", *Economies Series* No. 140, Institute for Advanced Studies, Vienna.

Van Leuvensteijn, M. *et al.* (2008), "Impact of bank competition on the interest rate pass-through in the euro area", *ECB Working Paper* No. 885.

Lünnemann, P. and T. Mathä (2005), "Regulated and services prices and inflation persistence", *ECB Working Paper* No. 466.

Manganelli, S. and G. Wolswijk (2007), "Market discipline, financial integration and fiscal rules: What drives spreads in the euro area government bond market?", *ECB Working Paper* No. 745.

Merrill Lynch (2008), "Exchange rate pass-through – a blessing or a curse?", *EEMEA Economics Paper* No. 1, June.

Mihaljek, D. and M. Klau (2004), "The Balassa-Samuelson effect in central European countries: a disaggregated analysis", *Comparative Economic Studies*, Vol. 46, pp. 63-94.

Mikulcová, E. and E. Stavrev (2001), "Replacement of a consumer basket component by another of higher quality and the CPI adjustment for the quality change – Camcorders", *CERGE-EI Discussion Paper* No. 70.

National Bank of Belgium (2002), "Effets du passage à l'euro fiduciaire sur l'inflation", *Revue Économique*, II 2002, pp. 41-55.

National Bank of Slovakia (2006), *The effects of euro adoption on the Slovak economy*.

Oomes, N. (2005), "Maintaining competitiveness under equilibrium real appreciation: the case of Slovakia", *IMF Working Paper* No. 05/65.

Pollan, W. (2002), "Die Preisentwicklung vor dem Hintergrund der Euro-Bargeldeinführung", *WIFO Monatsbericht* 10/2002, pp. 633-640.

Reis, R. (2004), "Inattentive consumers", *NBER Working Paper* No. 10883.

Samuelson, P. (1964), "Theoretical Notes on Trade Problems", *Review of Economics and Statistics*, Vol. 46, pp. 145-154.

Santos, D. *et al*. (2002), "Analysis on the impact of the conversion of escudos into euros", *Banco de Portugal Economic Bulletin*, pp. 101-114, September.

Sims, C.A. (2003), "Implications of rational inattention", *Journal of Monetary Economics*, Vol. 50, pp. 665-690.

Traut-Mattausch, E. *et al*. (2004), "Expectancy confirmation in spite of disconforming evidence: the case of price increases due to the introduction of the euro", *European Journal of Social Psychology*, Vol. 34, pp. 739-760.

Vladová, A. (2007), "The operation of the Balassa-Samuelson effect in the Slovak economy", *Current Topic*, Vol. 15, 11/2007, pp. 18-27, National Bank of Slovakia.

Vyskrabka, M. (2007), "Exchange rate pass-through to domestic prices", *BIATEC*, Vol. 15/11, pp. 8-17, National Bank of Slovakia.

WORKING PAPERS

The full series of Economics Department Working Papers can be consulted at www.oecd.org/eco/Working_Papers/

631. *Tax reform for efficiency and fairness in Canada*
(August 2008) Alexandra Bibbee

630. *Reforming the Polish tax system to improve its efficiency*
(August 2008) Alain de Serres

629. *Modernising Canada's agriculture policies*
(August 2008) Peter Jarrett and Shuji Kobayakawa

628. *Recent trends and structural breaks in US and EU15 labour productivity growth*
(August 2008) Laure Turner and Hervé Boulhol

627 *Health status determinants: lifestyle, enviroment, health care resources and efficiency*
(August 2008) Isabelle Joumard, Christophe André, Chantal Nicq and Olivier Chatal

626. *Market mechanisms in public service provision*
(August 2008) Hansjörg Blöchliger

625. *Improving human capital formation in India*
(July 2008) Sean S. Dougherty and Richard Herd

624. *Labour regulation and employment dynamics at the state level in India*
(July 2008) Sean S. Dougherty

623. *India's growth pattern and obstacles to higher growth*
(July 2008) Sean S. Dougherthy, Richard. Herd, Thomas. Chalaux and Abdul Azeez Erumban

622. *Reaping the benefits of stronger competition in network industries in Germany*
(July 2008) Nicola Brandt

621. *The Usefulness of Output Gaps for Policy Analysis*
(July 2008) Isabell Koske and Nigel Pain

620. *Taxation and Economic Growth*
(July 2008) Åsa Johansson, Christopher Heady, Jens Arnold, Bert Brys and Laura Vartia

619. *Coping with labour shortages: How to bring outsiders back to the labour market*
(July 2008) Ekkehard Ernst

618. *Achieving sustainability of the energy sector in Canada*
(June 2008) Annabelle Mourougane

617. *The Dutch tax-benefit system and life-cycle employment. Outcomes and reform options*
(June 2008) Ekkehard Ernst and Timo Teuber

616. *Regulation, Allocative Efficiency and Productivity in OECD Countries: Industry and Firm-Level Evidence*
(May 2008) Jens Arnold, Giuseppe. Nicoletti, and Stefano Scarpetta

615. *Public social spending in Korea in the context of rapid population ageing*
(May 2008) Randall S. Jones

614. *Enhancing the globalisation of Korea*
(May 2008) Randall S. Jones and Taesik Yoon

613. *Reforming housing and regional policies in Korea*
(May 2008) Randall S. Jones and Tadashi Yokoyama

612. *Moving towards more sustainable healthcare financing in Germany*
(May 2008) Nicola Brandt

611. *Improving education outcomes in Germany*
(May 2008) David Carey

610. *Have developed countries escaped the curse of distance?*
(May 2008) Hervé Boulhol and Alain de Serres

609. *Measures of international transport cost for OECD countries*
(April 2008) Stephen S. Golub and Brian Tomasik

608. *Encouraging labour force participation in Chile*
(April 2008) D. Contreras, L. de Mello and E. Puentes

607. *Tackling business and labour informality in Chile*
(April 2008) D. Contreras, L. de Mello and E. Puentes

606. *Delivery cost-efficient public services in health care, education and housing in Chile*
(April 2008) D. Contreras, L. de Mello and E. Puentes

605. *Managing Chile's macroeconomy during and after the copper price boom*
(April 2008) Luiz de Mello

604. *Avoiding the value added tax: Theory and cross-country evidence*
(April 2008) Luiz de Mello

603. *Oil Price Shocks, Rigidities and the Conduct of Monetary Policy: Some Lessons from a New Keynesian Perspective*
(April 2008) Romain Duval and Lukas Vogel

602. *The Contribution of Economic Geography to GDP Per Capita*
(April 2008) Hervé Boulhol, Alain de Serres and Margit Molnar

601. *Estimating a supply block for Poland*
(April 2008) Rafal Kierzenkowski, Patric Ollivaud, Franck Sédillot and Philippe Briard