ISSN 1392–1258. EKONOMIKA 2006 76

ON THE EFFECTS OF INTER-SECTOR PRODUCTIVITY GROWTH DIFFERENCES ON SECTORIAL INFLATION IN THE BALTIC STATES RELATIVE TO THE EURO AREA

Lina Bukevičiūtė

Faculty of Economics
Vilnius University
Saulėtekio 9, 10222 Vilnius, Lithuania

The ability of the Baltic States to damp the growth of inflation might partly depend on the scale of the Balassa–Samuelson (BS) effect. In recent years, inflation was lower in the Baltic States as compared to the beginning of the transition period. This raises the question whether the BS impact on inflation is still relevant. Based on an empirical assessment, this paper aims to provide some recent evidence concerning the productivity growth pattern in the tradable and non-tradable sectors in the new Member States vis-à-vis the euro area. Thus, the paper analyses whether the main assumptions in the Balassa–Samuelson effect of a higher growth of productivity in the tradable sector and a higher wage growth in the non-tradable sector have come true.

1. Introduction: links between inflation and productivity and why they are important for the Baltic States

The differences in productivity growth in the tradable and non-tradable goods sectors in the new Member States have frequently emerged in the economic debates as a significant reason why inflation in the new Member States might be higher than in the euro area. This effect was broadly addressed as the Balassa–Samuelson (BS) effect. As productivity grows faster we expect the productivity gap between the tradable and non-tradable sectors to widen. This will put up wage pressures in the non-tradable sector, leading to increased inflation. This aspect has been widely analysed in the literature as the BS effect[1].

Definition: The Balassa–Samuelson effect is based on the fact that productivity in the tradable goods sector tends to rise relative to productivity in the non-tradable sector as part of the process of real income convergence. Higher real wages in the tradable sector will add pressure on wages in the non-tradable sector, as competitive pressures within the labour market occur. Accordingly, more intensive productivity growth in the tradable goods sector will intensify the relative cost of production in the non-tradable sector.

[1] See Faria and León-Ledesma (2003).

Thus, the relative price of non-tradables will rise. Given that the productivity in the non-tradable goods sector is usually lower, an excess increase in wages compared to the productivity growth would be followed by higher price increases in the non-tradable goods sector and appreciation of the nominal or real exchange rate. Restriction: The validity of the assumption regarding cross-sector wage equalisation is not analysed in this note. However, according to the empirical evidence, there is no significant gap in industry and sector wage levels in the new Member States.

The second effect of productivity growth is a change in the price setting mechanism. The price setting mechanism under imperfect competition implies that firms set prices as a mark-up over unit labour costs[2]. An increase in productivity increases product variety, which may lead to a mark-up reduction due to a competition effect. This is relevant for the Baltic States, which were transforming towards the introduction of more competitive market structures. The final impact will depend on the relative strengths of the two effects. Given data shortages, I focus mainly on the first (BS) effect in my analysis. In the analysis, the proxies are applied: manufacturing for the tradable goods sector and services for the non-tradable sector. It should be noted, however, that some services are becoming increasingly tradable. Sector productivity is measured as a sector value added in constant prices per person employed (labour productivity). Thus, the ability of new Member States to meet the Maastricht inflation criterion for participation in EMU might partly depend on the scale of the BS effect.

Finally, it is important to note the problems related to the productivity measures in the Baltic States. One of the applied measures of a country's sector productivity performance is labour productivity – gross value added per person employed by a sector. However, labour productivity is influenced by capital deepening, which increases with the quantity of capital per unit of labour input. Measures of labour productivity take into account the impact of changes in employment on output, but they do not take into account the impact of changes in the capital stock. Another productivity measure, the total factor productivity, captures the efficiency with which both labour and capital inputs are used, and thus it is the most advantageous measure of productivity. However, the total factor productivity is difficult to measure in the Baltic States, as estimates of the effective capital stock are subject to considerable uncertainty, especially in the earlier stages of the transition period. Thus, labour productivity is applied for the analysis below.

2. The overview of studies on the BS effect in the Baltic States

The calculation of the BS effect in different studies has led to quite different results. According to the literature, the estimates of the BS effect in the Baltic States vary from zero to 2 percentage points per annum[3].

Most studies investigating the BS effect in the Baltic States apply a measure of prices of tradable / non-tradable goods relative to the productivity gap in tradable and the non-tradable sectors. The remaining studies focus on the evolution of real effective exchange rates relative to the productivity gap. It should be noted that this approach may lead to an inaccurate measurement of the BS effect in the Bal-

[2] See MacDonald and Ricci (2002).

[3] See IMF (2003), Égert, B (2003).

tic States relative to the euro area, as the real effective exchange rates include inflation differentials as well as nominal exchange rate changes vis-à-vis countries outside the euro area.

Here, some general difficulties related to the measuring of the BS effect should be mentioned. This applies mainly to the difficulties to isolate the BS effect from the other factors influencing inflation. In this context, especially country-specific factors such as exchange rate policies, trade structure and investment demand can be mentioned. For instance, under a fixed exchange rate regime the BS effect will result in inflation and real exchange rate appreciation. Under a flexible exchange rate regime it will result in some combination of nominal appreciation and inflation. Moreover, some significant administrative price changes in the service sector have occurred in the Baltic States over the recent years. The recent administrative price change was an increase in heating costs due to the imported gas price increases, mainly during the last year. This was an important factor which pushed up inflation in the service sector. However, this increase in service sector inflation had little to do with the BS effect.

3. Was inflation in the non-tradable sector higher in the Baltic States since 1998?

It appears from Chart 1 that sector inflation developments are quite dynamic over time in the Baltic States. There is no clear trend that inflation in the non-tradable sector exceeds that in the industrial sector since 1998. It is interesting to note that since mid-2005 the tradable sector inflation went beyond the non-tradable in the euro area, mainly due to an increase in oil prices. However, the increase in oil prices did not have a similar effect in the Baltic States, as the non-tradable sector inflation has stayed above the tradable sector inflation since the beginning of 2005.

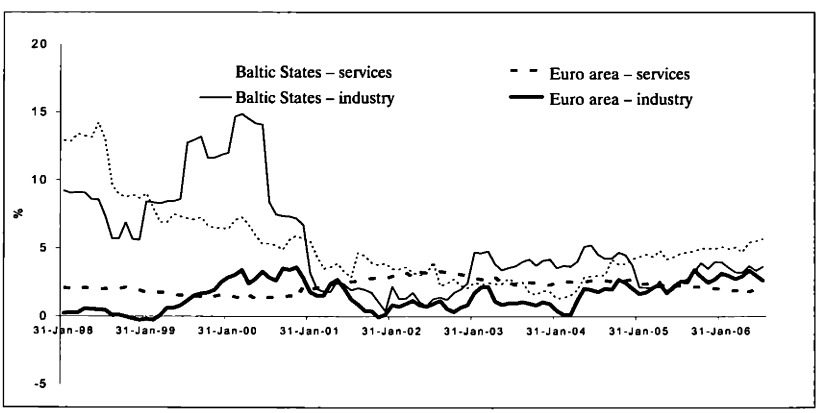

*Chart 1: **Inflation in tradable and non-tradable sectors, 1998–2006***
Source: Eurostat.

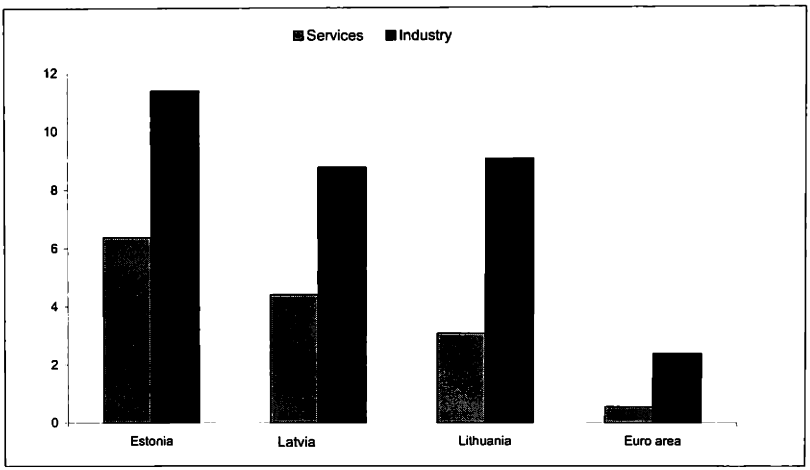

*Chart 2: **Annual average sector productivity growth in the Baltic States and the euro area 1996–1999***
Source: Eurostat.

4. Productivity gaps in the Baltic States: tradable and non-tradable sectors relative to the euro area from 1996 to 2004

According to Chart 2, the labour productivity catch-up, particularly in the tradable sector, was substantial in the Baltic States in the period 1996–1998. Hence the underlying BS assumptions of a productivity gap between tradable and non-tradable sectors came true.

Several factors contributed to the higher productivity growth in the tradable sector in this period. During the transition period, liberalisation and movements in relative prices led to the reallocation of capital resources toward the exporting manufacturing sector. Especially in the first part of the transition period the manufacturing sector attracted most of the FDI, which had a positive impact on capital endowment and technological improvement. Also, the process of labour shedding in the manufacturing sector as well as the re-allocation of labour between the manufacturing and service sectors led to the inter-sector productivity growth differences. The employment share of the tradable sector was rapidly decreasing in the Baltic States in the period 1996 through 1999 (*Chart 2*). In the same period, these countries experienced large inter-sector productivity growth gaps.

The inter-sector productivity growth gap in the Baltic States stayed broadly unchanged in the period from 2000 to 2004[4]. Compared to other new EU member states, the Baltic States experienced a rapid real GDP growth in this period. Accordingly, the inter-sector productivity growth differentials stayed above the euro area level also in the period from 2000 to 2004 (see Chart 4).

[4] These are the latest data available from the Eurostat.

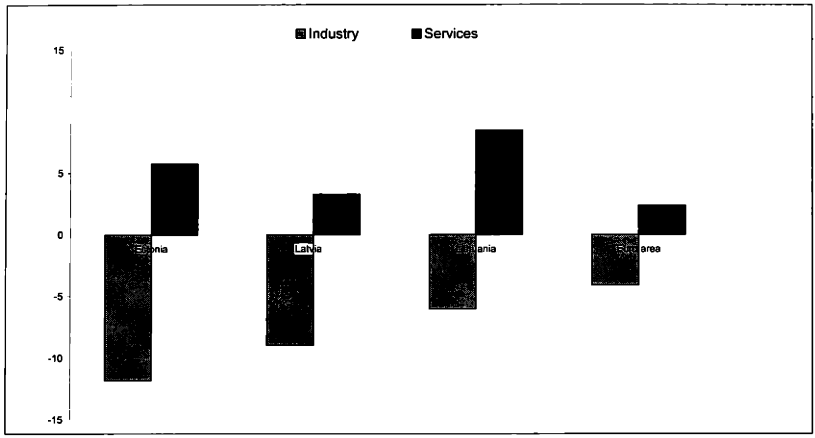

Chart 3: Changes in the employment share (as % of total employment) of tradable sector in 1999 versus 1996

Source: Eurostat.

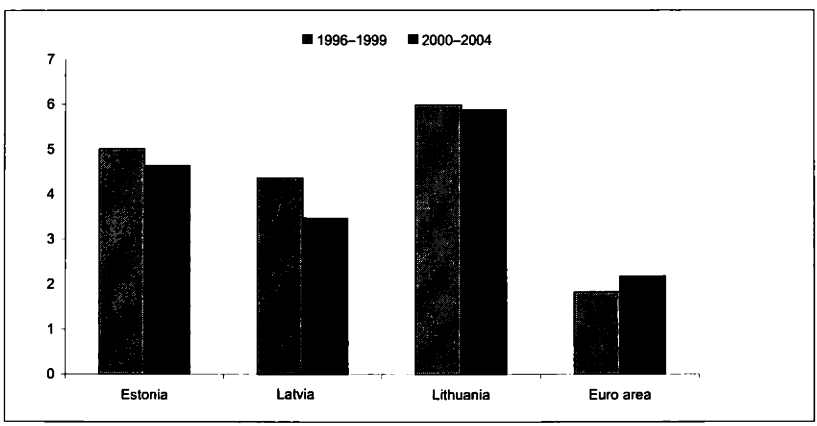

Chart 4: Differences in the sector productivity (industrial sector productivity versus services sector productivity) annual average growth in the Baltic States and the euro area 1996–1999, 2000–2004

Source: Eurostat.

5. Do assumptions regarding a similar wage growth rates in the tradable and non-tradable sectors support the BS effect existence in the Baltic States?

According to Chart 5, wage growth in both sectors was broadly equal in the Baltic States and the euro area. This supports the hypothesis that the unit labour costs (the difference between wage growth and the productivity growth) is higher in the service sector. This is also in line with the fact that the service sector inflation exceeded that of the industrial sector in the period from 1998 to mid 2004. Disregarding the inter-sector productivity growth differentials, it is important to remember that the overall demand pressure coming from the wage increases in the service sector spillover also to the industrial sector inflation. The recent increase in the industrial sector inflation is also due to the exceptional factors such as an increase in oil prices.

6. Conclusions

In the period from 1996 to 2004, the inter-sector productivity growth differences (tradable versus non-tradable sectors) were bigger in the Baltic States compared to the euro area. Thus, the convergence in terms of inter-sector productivity growth structure was quite minor. At the same time, a higher growth in both sectors' productivity suggests that there has been a strong convergence in productivity growth in the Baltic States relative to the euro area in terms of the productivity level. Accordingly, the findings suggest that the underlying assumptions for the BS effect have come true.

Thus, it can be expected that a higher service sector inflation will contribute stronger to the overall inflation in the Baltic States compared to the euro area. Disregarding the inter-sector productivity growth differentials, it is important to remember that the overall demand pressure coming from the wage increa-

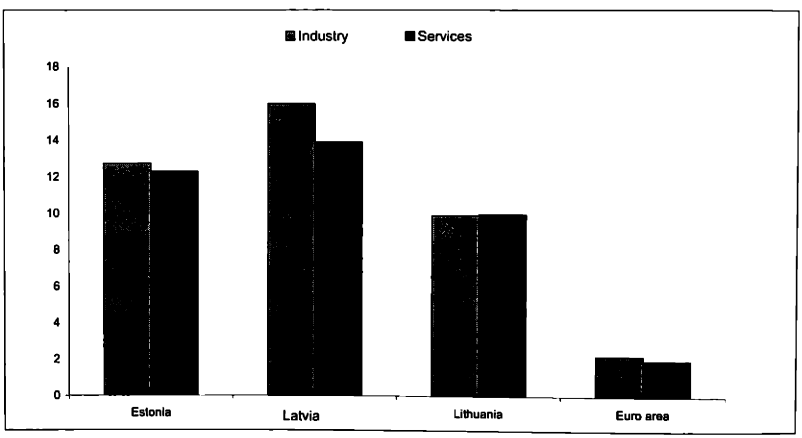

Chart 5: Annual average wage growth in the period from 1998 to 2004

ses in the service sector spills over also to the industrial sector inflation.

However, it is very difficult to measure the exact impact of the BS effect on inflation. This applies mainly to the difficulties to isolate the BS effect from other factors influencing inflation. Moreover, there is no clear trend that inflation in the non-tradable sector exceeds that in the industrial sector since 1998. However, the non-tradable sector inflation has stayed above that in the tradable sector since 2005 in the Baltic States.

Thus, when analysing the pass-through from productivity growth to inflation in the Baltic States several caveats should be kept in mind:

1) the share of non-tradable goods in consumption is still significantly lower in the Baltic States than in the euro area. The estimations suggest that the share of non-tradables in consumption is just above one third in the Baltic States, which is lower than in the euro area countries. Thus, it limits the magnitude of the pass-through from the productivity growth to inflation in the Baltic States compared to the euro area. Moreover, the BS effect will tend to be smaller in small open economies, such as the Baltic States, as the share of tradable goods in consumption is relatively high;
2) factors other than the inter-sector productivity gaps contributed to the higher inflation in the non-tradable sector in most of the Baltic States in 1998 through mid 2004. For instance, an increase in the administrative prices, which cover a significant share in consumer price indices in the Baltic States and are mainly concentrated in the service sector, contributed significantly to the increase in the price of non-tradables. The recent administrative price changes included an increase in heating costs in the Baltics due to the imported gas price increases, mainly during the last year. Also, the change in the structure of demand might have been an important factor, as the demand for services tends to increase as real income rises. In this context, it is important to note that administrative prices are typically concentrated in the non-tradable sector. Moreover, price liberalisation has contributed directly to an increase in the price of non-tradables. Nevertheless, the price level, most particularly in the non-tradable sector, is still considerably lower in the Baltic States compared to the euro area.

REFERENCES

1. Buiter, W. H., Grafe C. (2002) Anchor, float or abandon ship: exchange rate regimes for accession countries, *CEPR Discussion Paper* No. 3184.

2. Burgess, R., Fabrizio S., Xiao Y. (2003) Competitiveness in the Baltics in the run-up to EU accession. *IMF Country Report* No 114.

3. De Broeck, M., Sluk T. (2001) Interpreting real exchange rate movements in transition countries, *IMF Working Paper* No. 56.

4. Égert, B., Halpern L., MacDonald R. (2004) Equilibrium exchange rates in transition economies: taking stock of the issues, *CEPR Discussion Paper No. 4809 and Journal of Economic Surveys.*

5. Égert, B., Drine I., Lommatzsch K, Rault C. (2003) The Balassa–Samuelson effect in Central and Eastern Europe: myth or reality? *Journal of Comparative Economics.*

6. Faria, J., León-Ledesma (2003) Testing the Balassa–Samuelson effect: Implications for growth and the PPP. *Journal of Macroeconomics*. 25(2). P. 241–253.

7. Fischer, C. (2004) Real currency appreciation in accession countries: Balassa–Samuelson and investment demand, *Weltwirtschaftliches Archiv*.

8. Flek, V., Marková L., Podpiera J. (2002) Sectoral productivity and real exchange rate appreciation: much ado about nothing? *Czech National Bank Working Paper Series No. 4.*

9. Halpern, L., Wyplosz C. (2001) Economic transformation and real exchange rates in the 2000s: the Balassa–Samuelson Connection. *UNECE Economic Survey of Europe.*

10. Kovács, M. A. (2002) On the estimated size of the Balassa–Samuelson effect in five cCentral and Eastern European countries. *National Bank of Hungary Working Paper No. 5.*

11. Klau, M., Mihaljek, D (2003) The Balassa–Samuelson effect in central Europe: a disaggregated analysis. *The BIS, Working Papers* No. 143.

12. Lojschova, A. (2003) Estimating the Impact of the Balassa–Samuelson effect in transition economies. *Institute for Advanced Studies Working Paper* No. 140.

13. Lommatzsch, K., Tober S. (2004) The inflation target of the ECB: does the Balassa–Samuelson effect matter? *European University Institute Working Paper* No. 19.

14. MacDonald, R., Wójcik C. (2004) Catching up: the role of demand, supply and regulated price effects on the real exchange rates of four accession countries. *Economics of Transition.*

15. Maeso-Fernandez, F., Osbat C., Schnatz B. (2005) Pitfalls in estimating equilibrium exchange rates for transition economies. *Economic Systems.*

16. Mihaljek, D., Klau M. (2004) The Balassa–Samuelson effect in Central Europe: a disaggregated analysis. *Comparative Economic Studies.*

17. Pesaran, M. H., Shin Y., Smith R. J. (2001) Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16, p. 289–326.

18. Rosati, D. K. (2002) The Balassa–Samuelson effect in the EU candidate countries. In: Roger, G. and A. Inotai (eds.) Trade, *Integration and Transition*, The World Bank and Institute for World Economics, Hungarian Academy of Sciences, Budapest.

19. Swagel, P. (1999) The contribution of the Balassa–Samuelson effect to inflation: cross-country Evidence. Greece: selected issues. *IMF Staff Country Report No.138.*

20. Wagner, M., Hlouskova J. (2004) *What is really the story with this Balassa–Samuelson effect in the CEECs*. University of Bern.

SEKTORINIO PRODUKTYVUMO DIDĖJIMO SKIRTUMŲ POVEIKIS SEKTORINEI INFLIACIJAI BALTIJOS ŠALYSE, PALYGINTI SU EURO ZONA

Lina Bukevičiūtė

Santrauka

Nuo 1996 m. iki 2004 m. Baltijos valstybėse sektorinio produktyvumo didėjimo skirtumai (lyginant gamybos sektorių su negamybiniu) buvo ženklesni Baltijos valstybėse nei euro zonoje. Vadinasi, kalbant apie sektorinio produktyvumo didėjimo struktūrą, konvergencija buvo pakankamai nedidelė. Didesnis produktyvumas abiejuose sektoriuose leidžia daryti išvadą, kad, lyginant Baltijos valstybių produktyvumo didėjimą su euro zonos produktyvumo lygiu, konvergencija buvo stipri. Kaip ir euro zonoje, nuo 1996 m. iki 2004 m. Baltijos valstybėse sektorinio darbo užmokesčio didėjimo skirtumai buvo maži. Darbo užmokesčio didėjimas abiejuose sektoriuose buvo aukštesnis nei euro zonoje. Baltijos šalių atžvilgiu galima teigti, kad darytos prielaidos dėl Balassa–Samuelson efekto yra teisingos. Vadinasi, galima tikėtis, kad didesnė paslaugų sektoriaus infliacija labiau paveiks bendrą infliaciją Baltijos šalyse, palyginti su euro zona. Daugumoje literatūros šaltinių Balassa–Samuelson efekto poveikis infliacijai Baltijos šalyse vertinamas nuo 0% iki 2%. Nepaisant sektorinio produktyvumo didėjimo skirtumų, svarbu neužmiršti, kad bendros paklausos didėjimas dėl darbo užmokesčio didėjimo paslaugų sektoriuje taip pat turės įtakos ir pramonės sektoriaus infliacijai.

Tačiau labai sunku įvertinti tikslų Balassa–Samuelson efekto poveikį infliacijai. Daugiausia dėl to, kad sudėtinga izoliuoti Balassa–Samuelson efektą nuo kitų veiksnių, darančių įtaką infliacijai. Taip pat

reikėtų paminėti, kad infliacija paslaugų sektoriuje buvo didesnė nei pramonės sektoriuje nuo 2005 m., tačiau tai nebūdinga visam nagrinėjamam periodui nuo 1998 metų. Taigi, analizuojant produktyvumo didėjimo įtaką infliacijai Baltijos valstybėse, reikia nepamiršti keleto pastabų. Baltijos valstybėse negamybinių prekių vartojimo dalis yra mažesnė nei euro zonoje. Pagal atliktus vertinimus, Baltijos valstybėse negamybinių prekių dalis sudaro truputį daugiau nei vieną trečiąją vartojimo, o tai yra mažesnė dalis nei euro zonos šalių. Vadinasi, tai riboja produktyvumo didėjimo įtaką infliacijai Baltijos valstybėse, palyginti su euro zona. Be to, Balassa–Samuelson efektas yra mažesnis mažose atvirose ekonomikose, tokiose kaip Baltijos valstybės, kuriose gamybos prekių dalis sudaro pakankamai didelę vartojimo dalį. Kiti veiksniai, be sektorinio produktyvumo atotrūkio, skatino didesnę infliaciją negamybiniame sektoriuje Baltijos valstybėse nuo 1998 m. ir 2004 m. vidurio. Pavyzdžiui, reguliuojamų kainų pakilimas, kuris Baltijos valstybėse sudaro reikšmingą vartojimo kainų indekso dalį ir daugiausia susijęs su paslaugų sektoriumi, turi didelę įtaką negamybinių prekių kainoms didėti. Paskutinieji reguliuojamų kainų pasikeitimai buvo šildymo kaštų padidėjimas Baltijos valstybėse dėl importuojamų dujų kainų pakilimo pastaraisiais metais. Taip pat svarbus veiksnys – paklausos struktūros pokyčiai, nes paslaugų paklausa turi tendenciją didėti, didėjant realioms pajamoms. Šiame kontekste svarbu paminėti, kad reguliuojamos kainos daugiausia susikoncentravusios negamybiniame sektoriuje. Be to, kainų liberalizavimas tiesiogiai paskatino negamybinių prekių kainų didėjimą. Nepaisant to, kainų lygis, ypač negamybiniame sektoriuje, Baltijos valstybėse vis dar ženkliai mažesnis nei euro zonoje.

ON THE EFFECT OF INTER-SECTOR PRODUCTIVITY GROWTH DIFFERENCES ON SECTORIAL INFLATION IN THE BALTIC STATES RELATIVE TO THE EURO AREA

Lina Bukevičiūtė

Summary

In the period from 1996 to 2004, inter-sector productivity growth differences (tradable versus non-tradable sectors) were bigger in the Baltic States compared to the euro area. Thus, the convergence in terms of inter-sector productivity growth structure was quite minor. At the same time, the higher growth in both sectors' productivity suggests that there has been a strong convergence in productivity growth in the Baltic States relative to the euro area in terms of the productivity level. In line with developments in the euro area, sector wage growth differences were small in the Baltic States. At the same time wage growth in both sectors was much stronger than in the euro area.

Thus, the findings suggest that the underlying assumptions for the Balassa–Samuelson effect are fulfilled. Accordingly, it can be expected that higher service sector inflation will contribute stronger to the overall inflation in the Baltic States compared to the euro area. According to the literature, the estimates of the Balassa–Samuelson effect in the Baltic States vary from zero to 2 percentage points per annum. Disregarding the inter-sector productivity growth differentials, it is important to remember that the overall demand pressure coming from the wage increases in the service sector spill-over also to the industrial sector inflation.

However, it is very difficult to measure the exact impact of the Balassa–Samuelson effect on inflation. This applies mainly to the difficulties to isolate the Balassa–Samuelson effect from other factors influencing inflation. Moreover, there is no clear trend that inflation in non-tradable sectors exceeds that in the industrial sector since 1998. However, non-tradable sector inflation stayed above the tradable sector since 2005 in the Baltic States.

Thus, when analysing the pass-through from productivity growth to inflation in the Baltic States, several caveats have to be kept in mind. The share of non-tradable goods in consumption is still significantly lower in the Baltic States than in the euro area. Thus, it limits the magnitude of the pass-through from the productivity growth to inflation in the Baltic States compared to the euro area. Moreover, the Balassa–Samuelson effect will tend to be smaller in small open economies such as the Baltic States, as the share of tradable goods in consumption is relatively high. Factors other than the inter-sector productivity gaps contributed to the higher inflation in the non-tradable sector in most of the Baltic States from 1998 to mid 2004. For instance, an increase in the administrated prices, which cover a significant share in consumer price indices in the Baltic States and are

mainly concentrated in the service sector, contributed significantly to the increase in the price of non-tradables. The recent administrative price changes were the increase in heating costs in the Baltics due to the imported gas price increase mainly during the last year. Also, the change in the structure of demand might have been an important factor, as the demand for services tends to increase as real income rises. In this context, it is important to note that administered prices are typically concentrated in the non-tradable sector. Moreover, price liberalisation has contributed directly to the increase in the price of non-tradables. Nevertheless, the price level, most particularly in the non-tradable sector, is still considerably lower in the Baltic States compared to the euro area.

Įteikta 2006 m. spalio mėn.
Priimta spausdinti 2006 m. lapkričio mėn.