

ESTIMATION OF THE BALASSA-SAMUELSON EFFECT IN SLOVENIA *

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Abstract

As in other transitional economies the real exchange rate appreciation has been observed in Slovenia over the transition period. There are many factors influencing real exchange rate movements in the economies undergoing structural changes in the short and medium term. In this paper the Balassa-Samuelson effect as one of the sources of the real exchange rate movements is analysed in greater detail.

From the simple accounting framework that was proposed in other studies, it is obtained that the Balassa-Samuelson effect is indeed evident in Slovenia, though its value is not very large over the analysed period. However, when dividing the period into two sub-periods, it can be found that Balassa-Samuelson effect became more significant in the later part of the transition period.

Key words: Balassa-Samuelson effect, real exchange rate, relative productivity, transition countries

Povzetek

Tako kot v večini tranzicijskih držav je tudi v Sloveniji prisotna realna apreciacija domače valute. Na gibanje realnega tečaja na kratki in srednji rok vplivajo različni dejavniki, še posebej v državah, kjer se izvajajo strukturne spremembe. V tem gradivu poskušamo oceniti enega izmed teh dejavnikov v Sloveniji, t.i. Balassa-Samuelsonov učinek.

Na podlagi preprostega modela za oceno Balassa-Samuelsonovega učinka, ki je bil uporabljen v podobnih študijah za druge države, ugotovimo, da je bil v Sloveniji ta učinek v opazovanem obdobju prisoten, vendar ni bil zelo izrazit. Če razdelimo opazovano obdobje na dve podobdobji ugotovimo, da je Balassa-Samuelsonov učinek postal izrazitejši šele v drugem delu tranzicije.

Ključne besede: Balassa-Samuelsonov učinek, realni tečaj tolarja, relativna produktivnost, tranzicijske države

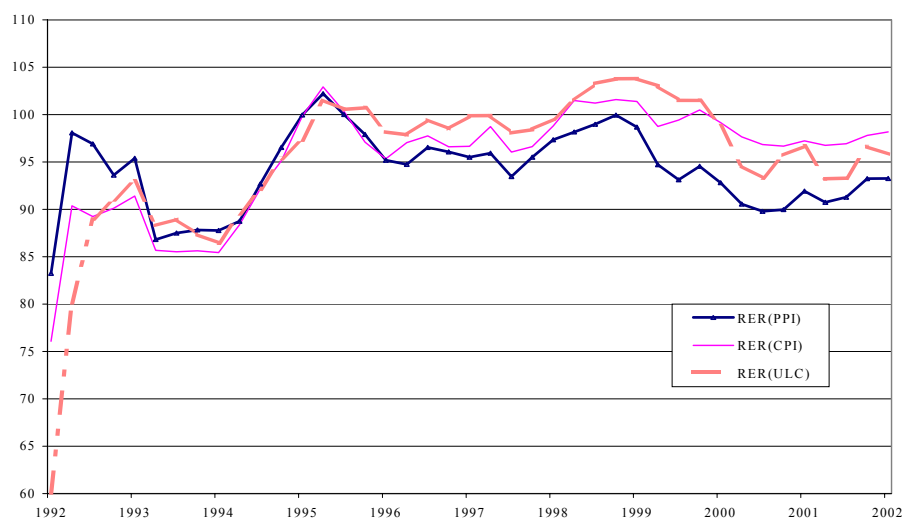
* Članek je bil pripravljen za srečanje guvernerjev centralnih bank petih držav Srednje in Vzhodne Evrope, ki je bil marca 2002 v Baslu. Zato ga, v delno spremenjeni obliki, objavljamo v angleškem jeziku.

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1. INTRODUCTION

As in other transitional economies, a trend real exchange rate appreciation has been observed in Slovenia over the transition period. However, as can be seen in *Figure 1*, if considering only the second half of that period the real exchange rate has remained rather stable. There are many factors influencing the real exchange rate movements in the short and medium run: transition specific factors that were more important at the beginning of transition process, productivity differentials and other factors influencing the relative prices and monetary policy actions. In the analysis below we focus on factors determining relative price movements between the sectors and countries and try to estimate the Balassa-Samuelson (BS) effect that is important for the discussion on real and nominal convergence which attracted much attention in the EU accession countries. The theory of BS effect is not discussed in this paper, though for this analysis it is important to know why does the BS effect arise. The BS effect is reflected in real exchange rate appreciation that arises from productivity development differentials in the sectors of the economy. Lower productivity growth in nontradable compared to that in tradable sectors usually results in higher prices of nontradables whereby the wage growth rates in both sectors tend to equalise¹. This is commonly the case in the fast growing economies where the catch-up process is driven mainly by increasingly productive tradable sector.

Figure 1: Real exchange rate of Slovene Tolar against Euro (1995=100; increase indicates appreciation)



2. A SIMPLE ACCOUNTING FRAMEWORK²

For the assessment of the BS effect a simple accounting framework of the real exchange rate is used. The real exchange rate between two countries is decomposed into two main components: the relative price of tradables between countries, and the relative price ratio of nontradables and tradables between the two countries. For simplicity, the first is referred to as external and the second as internal real exchange rate.

¹ In other words this means that the fundamentals for the wage growth in nontradable sector do not lie in the productivity growth of this sector. As the result the prices of nontradables need to increase more in order for this sector to be able to finance its wage increases.

² A framework proposed by Kovács-Simon (1998) and Kovács (2002).

The real exchange rate (RER) is computed as:

$$RER = \frac{P}{EP^*} = \frac{1}{E} \left(\frac{P_T}{P_T^*} \right)^{\alpha} \left(\frac{P_N}{P_N^*} \right)^{1-\alpha} = \left(\frac{P_T}{EP_T^*} \right) \cdot \left(\frac{P_N / P_T}{P_N^* / P_T^*} \right)^{1-\alpha} \quad (1)$$

where

RER is the CPI based real exchange rate

E is the nominal exchange rate

P, P^* are CPI prices in and foreign country domestic

P_T, P_T^* are CPI prices of tradables in and foreign country domestic

P_N, P_N^* are CPI prices of nontradables in and foreign country domestic

α is the share of tradables in the CPI³

The external exchange rate is usually dominated by nominal exchange rate movements and behaves in a stable manner in the long run. It is defined as the ratio of prices of tradable goods in different countries and can be considered as a measure of a country's competitiveness. The BS effect is closely related to the internal real exchange rate. Lower productivity growth in nontradable sector compared to tradable sector is translated into a trend increase in nontradable-tradable relative prices.

Furthermore, the assumption that prices are set as a mark-up over unit labour cost plus some "other factors" is applied. The latter tries to measure the effect of intermediates and indirect taxes on the difference of value added deflators and final (CPI) prices⁴.

The price setting can be written as following:

$$\frac{P_N^{CPI}}{P_T^{CPI}} = \frac{o_N m_N W_N / PROD_N}{o_T m_T W_T / PROD_T} \quad (2)$$

and

$$\frac{P_N^{CPI}}{P_T^{CPI}} = \frac{o_N P_N^{VA}}{o_T P_T^{VA}} \quad (3)$$

where

P_N^{CPI}, P_T^{CPI} are CPI prices of tradables and nontradables

P_N^{VA}, P_T^{VA} are value added deflators of nontradables and tradables

o_N, o_T are other factors in nontradable and tradable sector

m_N, m_T are mark-ups in nontradable and tradable sector

W_N, W_T are wage rates in nontradable and tradable sector

$PROD_N, PROD_T$ are labour productivity rates in nontradable and tradable sector

Equation (2) shows that changes in internal exchange rate are driven by four main factors between nontradable and tradable sector:

- the change in the difference between relative value added deflators and CPI prices,
- the change in relative mark-ups,

³ Here it is assumed that the composition of the CPI basket is similar in both countries. For derivation of the formula see Kovács-Simon (1998).

⁴ Especially in transitional economies these factors are often non-negligible in price setting.

- the change in relative wages,
- the change in relative labour productivities.

From these four factors, in a strict sense only the fourth component is the BS effect⁵.

3. SLOVENE EVIDENCE WITHIN A SIMPLE ACCOUNTING FRAMEWORK

3.1. Data and assumptions

For the purpose of our analysis the sectors are defined as: The *tradable sector* comprises manufacturing, and the *nontradable sector* includes construction and the following service industries: wholesale and retail trade, hotels and restaurants, transport and communication, financial services and real estate and renting services. The state sector, energy and agriculture were not included because of the difficulties in measuring their output as well as the non-negligible role of government in wage and price determination process in these sectors⁶.

Another assumption made for simplification is that the prices of tradables represent prices of goods and the prices of nontradables represent prices of services. Furthermore, in the CPI for Slovenia a modification has been made: because of a large share of administered prices in CPI (on average amounting to 21% in 1992-2001 period), with dynamics not necessarily tied to economic fundamentals⁷, a new price index has been constructed (CPIA). In this new price index only the dynamics of non-administered prices is considered; the share of tradables in this new index is equal to the share of non-administered goods and the share of nontradables to the share of non-administered services. With this modification the shares of services and goods change only very little compared to their shares in the original CPI. Also the dynamics of CPI and CPIA is similar, with the major differences observed in the first sub-period.

The price level in Slovenia is a geometric average of tradables and nontradables prices, with weights α and $(1 - \alpha)$, where

α - the share of tradables in the CPI is the share of goods in CPI, the share of nontradables $(1 - \alpha)$ is the share of services in CPI.

Measure of labour productivity is output per employee.

The analysed period extends from 1992 to 2001, data used are yearly data and the reference country is Germany⁸.

⁵ In fact the BS effect in a strict sense is related to total factor productivity, which might deviate from labour productivity, because of changes in capital intensity. Due to the lack of capital stock data, we use labour productivity measures. However as the capital intensity of the CEC5 is increasing during the catch-up, with this methodology we might overestimate the BS effect (Kovács, 2002).

⁶ Similar sectorisation was used also in other studies (see "On the estimated size of the BS effect in CEC5 countries", 2002).

⁷ This is important because of the definition of the BS effect stating that faster growth in nontradable prices arises because of lower productivity growth but equal wage growth in this sector compared to tradable sector.

⁸ Reason for this is the comparability of this study with those of other CEC5 countries in "On the estimated size of the BS effect in CEC5 countries", Kovács (2002).

The data sources for Slovenia are Bank of Slovenia and Statistical Office of the Republic of Slovenia. The data sources for Germany are Deutsche Bundesbank and German Statistical Office.

3.2. Real exchange rate decomposition

In this analysis the two components of the real exchange rate (the external and internal) are computed (as defined in section 2) as well as the relative productivity and prices between Slovenia and Germany. The real exchange rate (RER) movements were analysed in the period 1993-2001 as well as in two sub-periods, 1993-1996 and 1997-2001.

Table 1: Components of the real exchange rate
(Average annual growth rates, in %; positive numbers indicate appreciation)

	External	Internal	Weights*	Total (CPIA)	Total (CPI)
1993-1996	0,2	1,2	0,5	2,0	1,0
1997-2001	0,5	0,6	0,8	1,8	1,9
1993-2001	0,4	0,9	0,7	1,9	1,5

* This component of the RER represents the differences in the composition of the consumption baskets in Slovenia and Germany (see footnote 3).

The real exchange rate appreciation over the entire period computed with new price index (CPIA) is higher than the one computed with original CPI. The difference can be explained by slower growth of administered prices compared to overall index in the 1993-1996. In the second period administered prices rose faster and so does the real exchange rate computed with original CPI.

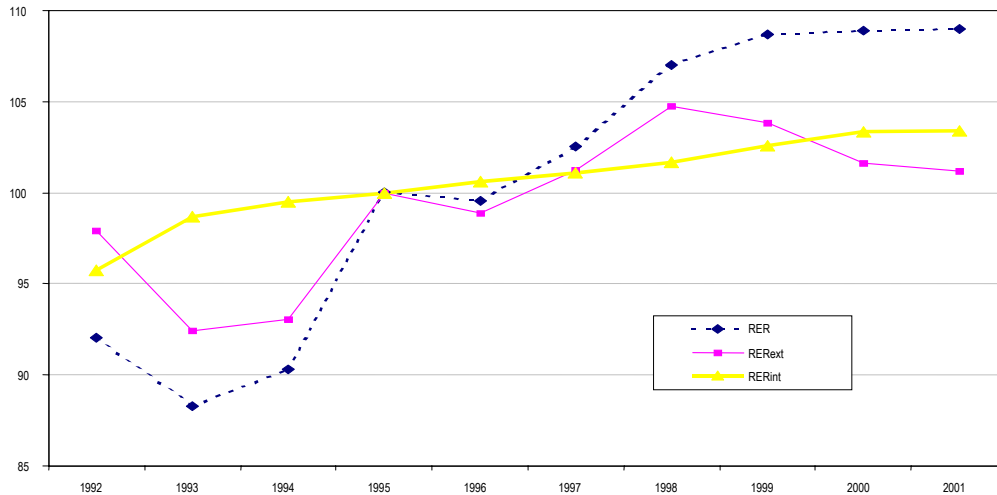
As it can be seen from *table 1* both the external and internal component contributed to real exchange rate appreciation over the whole period. Overall average appreciation of internal component amounts to 0,9% p.a. and of external component to 0,4% p.a. Though in the later period the appreciation of internal exchange rate was less pronounced it still explains more RER movements than the external component. The internal real exchange rate growth rate, which indicates faster growth in relative prices (nontradables to tradables) in Slovenia than in Germany, on average amounted to 1,2% p.a. in 1993-1996 and to 0,6% p.a. in 1997-2001.

Looking at the external component of RER, which indicates the external competitiveness of a country, we find that its appreciation was small (on average 0.4% p.a.). This means faster growth in prices of tradables in Slovenia compared to Germany (in common currency) by 0.4% annually. Relatively modest appreciation of the external exchange rate could be explained by monetary policy interventions in the foreign exchange market. Based on this indicator the external competitiveness of Slovenia has not deteriorated, especially over last three years, when the external real exchange rate depreciated (see *figure 2*, RERext series).

The internal real exchange rate is strongly connected with BS effect, but its value cannot be simply taken as the BS effect though it can be interpreted as its maximum value. This is clear by looking at *equation 4*. It indicates that the difference in relative prices between the countries is influenced not only by different relative productivity, but also by relative nominal wages, other factors and mark-ups in tradable and nontradable sector. Therefore, in order to estimate the BS effect, we look closer at relative productivity and prices in each country.

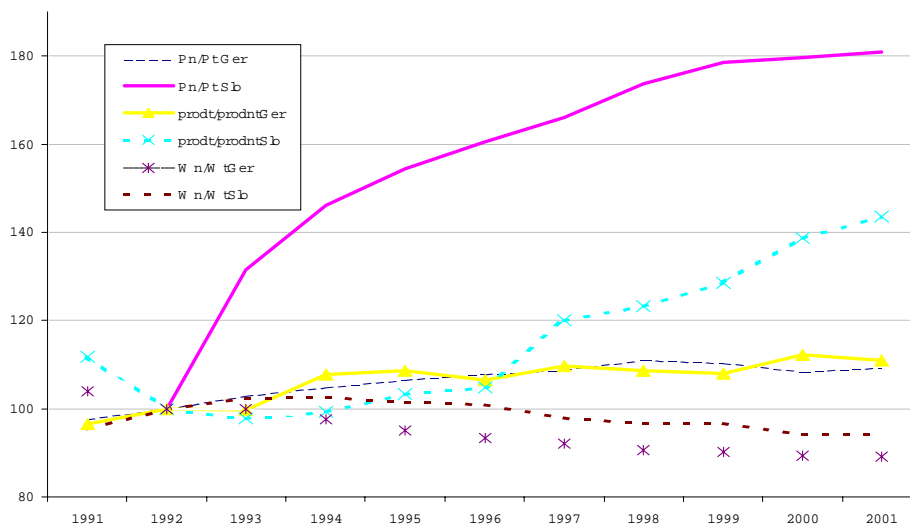
International differences in productivity growth may have impact on relative international prices, that is, on real exchange rate⁹.

Figure 2: Real exchange rate and its components in Slovenia against Germany (1995=100; increase indicates appreciation)



In figure 3 the relative price, relative productivity and relative wage movements in Slovenia and Germany are presented. We observe a rising trend in national price ratios of nontradable to tradable sector in Slovenia and Germany, however in Slovenia much more pronounced. Furthermore, in both countries labour productivity growth in nontradables has been lower than in tradables (a rising trend in national ratios of productivity in tradables to nontradables, but again more pronounced in Slovenia). This was expected and is all according to the theory (see e.g. Obstfeld and Rogoff, 1996).

Figure 3: Relative prices, productivity and wages in Slovenia and Germany (1992=100)



⁹ This is one of the arguments for the failure of the PPP theory, which in its relative form predicts that changes in national price levels tend to equalise in the long run.

Table 2 shows that relative prices (nontradables to tradables) in Slovenia increased more than relative productivity (tradable to nontradable sector), but only in the first sub-period. This was due to fast growth in prices and labour productivity in service industries at the beginning of transition period. The relative price differential between Slovenia and Germany rose on average by 5,8% and the relative productivity differential between Slovenia and Germany by 2,9%. This implies that prices in nontradable sector increased more than just as what can be attributed to the BS effect and that the mark-ups (determined mainly by distribution sector) and other factors (determining the difference between actual (CPI) prices and value added deflators) also contributed to a higher growth in relative prices

Table 2: Relative prices, productivity and wages in Slovenia and Germany
(average annual growth rates; in %)

Nontradable/tradable sector prices (CPI)	1993-1996	1997-2001	1993-2001
Slovenia	12,6	2,4	6,8
Germany	1,9	0,3	1,0
Slovenia/Germany	10,5	2,1	5,8
Tradable/nontradable sector productivity			
Slovenia	1,2	6,5	4,1
Germany	1,6	0,8	1,2
Slovenia/Germany	-0,4	5,7	2,9
Nontradable/tradable sector wages			
Slovenia	0,2	-1,4	-0,7
Germany	-1,7	-1,0	-1,3
Slovenia/Germany	1,9	-0,4	0,6

3.3. Analysis of mark-ups and other factors

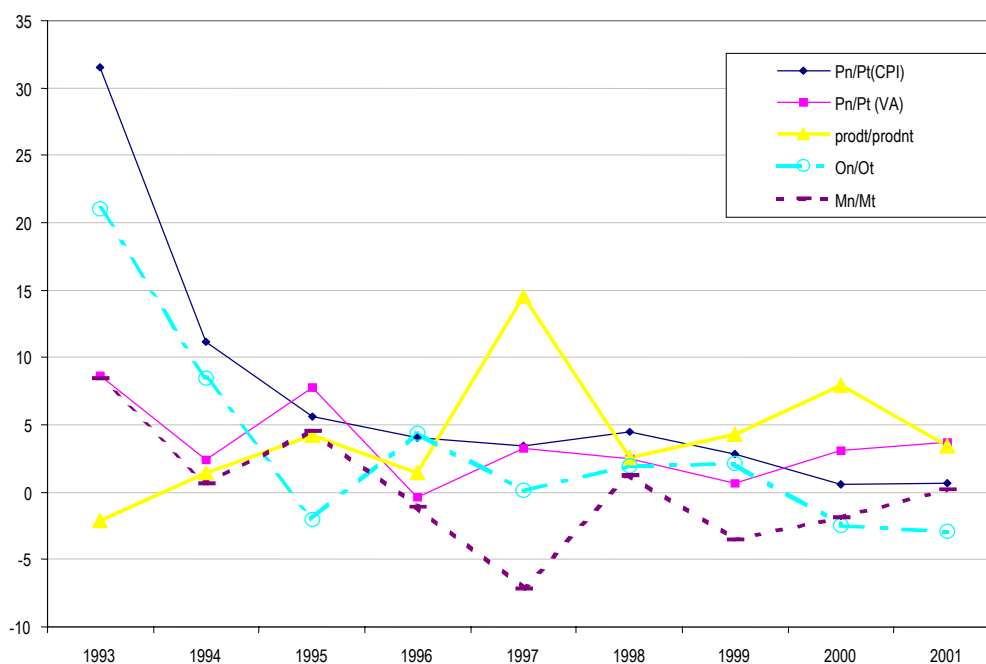
From *table 2* it can be seen that mark-ups and other factors played more important role in determining real exchange rate in Slovenia in the first part of the sample period, suggesting that BS effect became more important after 1997. Though relative price of nontradables increased more in the first period (indicating potential value for BS effect of 1,2% p.a.) there is no estimated BS effect in this period. The reason for such a finding is a much more equal productivity growth in the sectors than in the period after 1997.

In *table 3* the more detailed analysis of mark-ups and other factors obtained from *equation 2* and *equation 3* is summarised. As already seen from *table 2* in the period 1993-1996 the most influential estimated source of relative price movements (nontradable to tradable prices) in Slovenia were other factors, followed by mark-ups. On contrary in the 1997-2001 period this was relative productivity - the mark-ups and other factors increased more in tradable than in nontradable sector, so that they did not contribute to internal real exchange rate appreciation (according to this analysis). Such developments originate in a steady productivity growth in manufacturing whereby the productivity growth in service industries slowed down substantially after 1997. Consequently that led to a higher productivity growth differential between the tradable and nontradable sector in the later period.

Table 3: Relative mark-ups and other factors in Slovenia and Germany (average annual growth rates, in %)

Relative CPI prices (nontradables/tradables)	1993-1996	1997-2001	1993-2001
Slovenia	12,6	2,4	6,8
Slovenia/Germany	10,5	2,1	5,8
Relative value added prices (nontradables/tradables)			
Slovenia	4,6	2,7	3,5
Slovenia/Germany	3,5	2,0	2,6
Mark-ups (nontradables/tradables)			
Slovenia	3,2	-2,2	0,1
Slovenia/Germany	2,0	-3,1	-0,9
Other factors (nontradables/tradables)			
Slovenia	7,7	-0,3	3,2
Slovenia/Germany	6,8	0,1	3,1

Figure 4: Relative mark-ups, other factors, relative prices and productivity in Slovenia (annual percentage growth rates, in %)



In *figure 4* the following series are shown:

Pn/Pt (CPI) – nontradable/tradable prices (based on CPI)

Pn/Pt (VA) - nontradable/tradable prices (based on value added)

prodt/prodnt – productivity in tradable/productivity in nontradable sector

On/Ot – other factors in nontradable/tradable sector

Mn/Mt – mark-ups in nontradable/tradable sector

3.4. Estimation of the BS effect

To estimate the BS effect on CPI inflation differential between Slovenia and Germany, the relative productivity differential between the countries is weighted by the amount of share of nontradables in CPI (average share in period 1993-2001 was 19%). The obtained estimated BS effect in the CPI over the whole observation period amounts to 0,7% per annum. This is the amount by which the equilibrium inflation was above the German level solely due to differences in productivities in the economy. Furthermore we looked in greater detail of how the estimated BS effect developed over time. Inferring to the simple accounting framework used in the above analysis, the estimated BS effect in the period 1993-1996 is 0.0% and 1.4% in the 1997-2001 period. This suggests that the BS effect became more significant as the transition process evolved¹⁰.

4. CONCLUSION

Using a simple accounting framework the estimated BS effect in Slovenia over the 1993-2001 period was 0,7% p.a. Even if one may predict that BS effect was larger at the beginning of transition period (stronger appreciation of internal component of the real exchange rate) it turns out - after a more detailed analysis of factors determining relative price movements in Slovenia, - that other factors than relative productivity induced such movements. By splitting the sample we obtain that BS effect became important determinant of real exchange rate between Slovenia and Germany not until the second part of the analysed period, when the estimated BS effect was 1,4% p.a. This estimate implies by 1,4 percentage points per annum higher equilibrium inflation rate in Slovenia than in Germany (1997-2001 yearly average).

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¹⁰ The conclusions are the same as if all sectors of the economy were included.