Slovak Economic Growth and the Consistency of the Balance-of-payments Constraint Approach[1]

Elias SOUKIAZIS* – Eva MUCHOVÁ – Ján LISÝ**

Abstract

The present study aims at verifying whether the balance-of-payments constrained growth approach is suitable for explaining the Slovak growth performance after 1993. We use Thirlwall's Law to predict actual growth of the Slovak economy based on the estimation of the income elasticities of demand for imports and exports, respectively. The income elasticity of demand for imports is obtained by employing 2SLS assuming that domestic income is endogenous. It is shown that the Slovak economy grew at a higher rate than the rate consistent with the balance-of-payments equilibrium at the cost of accumulating current account deficits. A sustainable solution should be focused on reducing the income elasticity of the demand for imports and increasing exports growth. In order the country not to fall into a balance-of-payments constrained growth trap policies must be designed to reduce the country´s dependence on imports by producing higher quality tradable goods.

Keywords: *balance-of-payments equilibrium growth rate, price and income elasticities of foreign trade, 2SLS regressions*

JEL Classification: C13, E12, F43, O24

1. Introduction

In the core of the debate between the supply-constrained and the demand-led growth stands the very relevant contribution of Thirlwall (1979), under the Post--Keynesian framework, through what has become known as 'Thirlwall's Law'.

* Elias SOUKIAZIS, University of Coimbra, Faculty of Economics, Av. Dias da Silva, 165, 3004-512 Coimbra, Portugal; e-mail: elias@fe.uc.pt

** Eva MUCHOVÁ – Ján LISÝ, University of Economics in Bratislava, Faculty of National Economy, Department of Economic Theory, Dolnozemská cesta 1, 852 35 Bratislava, Slovak Republic; e-mail: eva.muchova@euba.sk; jan.lisy@euba.sk

The growth of an economy is ultimately determined by effective demand, especially external demand, and not by the accumulation of factor inputs as the neoclassical theory assumes. The balance-of-payments equilibrium growth rate is determined by the growth of exports over the income elasticity of the demand for imports, and this is related to the Harrod foreign trade multiplier (Thirlwall, 1982) when it is expressed in a dynamic form.

The general proposition of 'Thirlwall's Law' is that whenever an economy grows at a rate higher than that consistent with the balance-of-payments equilibrium, it will run into external deficits which are not sustainable in the long-term, unless capital inflows can finance the ever growing imbalances. In case a country falls into such a trap, domestic income must be adjusted downwards resulting in higher unemployment. It is income that is adjusted to bring the economy back to equilibrium and not relative prices as orthodox balance-of-payments adjustment theory assumes. Competitive devaluations are not the solution, since in the long-run they aggravate domestic inflation, lowering competitiveness and worsening even further external imbalances. Structural solutions are needed to make exports more attractive in external markets and imports less sensitive to changes in domestic income.

The aim of this paper is to analyse whether 'Thirlwall's Law' is suitable for explaining actual growth of the Slovak economy over the period 1993 – 2011, a study that has not been done before for this country. Although this methodology is not new, it is still widely used in the empirical growth literature to predict actual growth. Additionally, the income elasticity of the demand for imports which is the crucial parameter to estimate in order to implement 'Thirlwall's Law', is derived from the *2SLS* approach contrary to the main studies that use *OLS*.[2] It is shown that *OLS* sub-estimates the income elasticity of imports when domestic income is treated as exogenous.

The paper is structured as follows: In section 2 we reconsider the model developed by Thirlwall to predict a country's actual growth. In section 3 we explain the variables and the data used over the time period considered. The export and import demand functions are estimated in section 4, to provide the income elasticities of demand for imports and exports necessary to test the validity of 'Thirlwall's Law'. In section 5 we compute the growth rates consistent with balance-of-payments equilibrium, and compare them to the actual growth rates achieved by the Slovak economy. The final section concludes on the accuracy of 'Thirlwall's Law' as a tool for predicting actual growth in Slovakia.

---

[2] Few exceptions are Léon-Ledesma (1999) and Soukiazis and Antunes (2012).

2. 'Thirlwall's Law' Reconsidered

In this section we focus on the original version of 'Thirlwall's Law' (Thirlwall, 1979) assuming both that the trade balance[3] is initially in equilibrium and that relative prices are neutral, at least in the long-run analysis. Thirlwall and Hussain (1982) also consider a model starting from disequilibrium on the current account, implying the existence of capital inflows. There is an interesting theoretical analysis on this topic by Barbosa-Filho (2002), who considers the balanced trade, the unbalanced trade and the sustainable debt versions of the balance-of-payments constrained growth models, analysing the implications for trade, growth and real exchange rates. In line with Moreno-Brid (1998 – 1999), the author shows that in the case of small open economies which usually have income-elastic imports (higher than one), Thirlwall's original model (Thirwall, 1979) is more likely to be the valid one.

We will not adopt the extended version in the present study because, although capital inflows can be important in the short-run for adjusting external imbalances, in the long-run their impact on growth is dubious. As Blecker (2009) argues, increasing capital inflows can at most be a temporary way of relaxing the balance-of-payments constraint, but they do not allow a country to grow at the export-led cumulative growth rate in the long-term. What matters in the long-term analysis of growth is the growth of exports. In Thirlwall's original model, exports and the income elasticity of imports play a crucial role in determining the long-run growth because faster growth of exports allows faster growth of revenues needed to pay the import content of other components of demand.

The model can be described in three equations, where all variables are expressed in growth rates:[4]

$$m_t = \pi\, y_t + \psi\left(pd_t - pf_t - e_t \right) \qquad \text{Import growth equation} \qquad (1)$$

$$x_t = \varepsilon\, z_t + \eta\left(pd_t - pf_t - e_t \right) \qquad \text{Export growth equation} \qquad (2)$$

---

[3] Although 'Thirlwall's Law' refers to the balance-of-payments equilibrium on current account, in the empirical literature what is usually used is trade balance of goods and services because this item shows the real competitiveness of the economy.

[4] The original model with variables in levels (upper case letters) is the following:

$$M_t = a Y_t^{\pi}\left(\frac{PD}{E*PF} \right)_t^{\psi}$$

$$X_t = b Z_t^{\varepsilon}\left(\frac{PD}{E*PF} \right)_t^{\eta}$$

$$PD_t * X_t = PF_t * E_t * M_t$$

$$pd_t + x_t = pf_t + e_t + m_t \qquad \text{Trade balance equilibrium} \quad (3)$$

where m_t, x_t, y_t and z_t (lower case letters) are the rates of growth of real imports, exports, domestic and foreign income, respectively.[5] As for the remaining variables, pd_t and pf_t are the rates of growth of domestic and import prices, respectively, and e_t is the rate of change of the nominal exchange rate. In addition, π and ε are the income elasticities of demand for imports and exports, respectively, both expected to be positive and ψ and η are the price elasticities of demand for imports and exports with $\psi > 0$ and $\eta < 0$.

Substituting equations (1) and (2) into (3) and solving for y_t, we obtain the economy's rate of growth consistent with the balance-of-payments equilibrium $y_{BP,t}$, given by:

$$y_{BP,t} = \frac{(1+\eta-\psi)(pd_t - pf_t - e_t) + \varepsilon(z_t)}{\pi} \qquad (4)$$

Assuming that relative prices remain unchanged in the long-run, that is ($pd_t - pf_t - e_t = 0$), the expression (4) simplifies to:

$$y_{BP,t} = \frac{\varepsilon(z_t)}{\pi} \qquad (5a)$$

or

$$y_{BP,t} = \frac{x_t}{\pi} \qquad (5b)^{[6]}$$

Generally speaking, a country's growth rate is approximately given by the ratio of export growth relative to the income elasticity of demand for imports (5b).[7] According to this simple rule, it is income growth that adjusts to preserve equilibrium and not relative prices, which are constant in the long-term. If a country wishes to control external trade deficits when $y > y_{BP}$ it must decrease the constraint on the balance-of-payments, either by increasing export growth (x) or by reducing the income elasticity of the demand for imports (π), or combining both.

Alternatively, equation (5a) can be rewritten as:

$$\frac{y_{BP,t}}{z_t} = \frac{\varepsilon}{\pi} \qquad (5c)$$

This expression tells us that relative income growth between a country and the rest of the world is given by the ratio of the income elasticity of demand for exports over the income elasticity of demand for imports of the domestic economy. In other words, a country can grow faster than the rest of the world (that is $y_{BP} > z$) without creating balance-of-payments problems only when its income elasticity of the demand of exports exceeds that of its imports (that is $\varepsilon > \pi$). This interpretation is interesting and related to the concept of convergence or catching-up, where "competitiveness" is the key factor for such tendency to occur. In terms of policy, the country must improve the supply characteristics of the goods and services produced and turn the economy more "competitive" in international markets. These supply characteristics (which are captured in the income elasticities of the demand for imports and exports) are related to the quality, design, product differentiation, innovation, post-sale services, etc., which determine the non-price competitiveness of the economy.

The hypothesis of constant relative prices has been criticised in the literature (e.g. McGregor and Swales, 1985; 1991; Alonso and Garcimartín, 1998 – 1999; López and Cruz, 2000 among others). By adopting this specification in the present study we do not assume that relative prices do not mater in international trade performance; only that it is of minor significance in the long-run since the role of the exchange rate is to bring in line external and internal price level. In most empirical studies in this field relative prices have been shown to be statistically insignificant and even when they are significant the price elasticities with respect to imports and exports are very low in magnitude when compared to the income elasticities, showing that imports and exports are less sensitive to price changes than to income changes. Blecker (2009) argues that it is safe to conclude that the longer the time period considered the most likely is that relative prices remain constant.
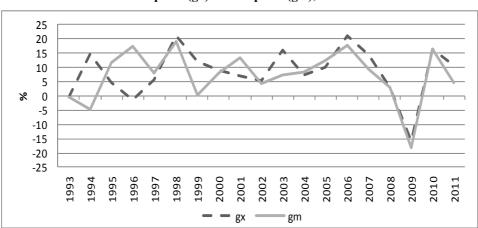
In this present study, when relative prices of the Slovak economy are regressed on a time trend, no significant relationship is found during the period of analysis (1993 – 2011) showing that the hypothesis of constant relative prices in the long-run is plausible. On the other hand the average value of the growth rate of relative prices for the same period is around 0.66, which is close to zero (see Table 1, in the Appendix). Additionally, Chart 3 (see section 3) shows that the growth pattern of export and import prices is similar and Chart 4 reveals that the movement of relative prices has been stabilized after 2001 around zero. All these can be taken as evidence of the one price hypothesis in the long-term analysis.
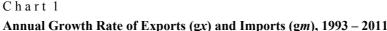
'Thirlwall's Law', as has been defined in equations (5a) and (5b), will be tested empirically for the Slovak economy over the period 1993 – 2011 in the following sections.

3. Variables and Data Analysis

The period of analysis uses 19 annual observations which we consider to be long enough to accommodate the assumptions of the model. Our aim is to examine whether the balance-of-payments constrained growth approach is adequate to explain the performance of the Slovak economy over this period. Despite the controversy involving the type of variables to be used – levels or growth rates – we opt for the latter to avoid the existence of spurious relations, since it is more likely that variables in growth rates are stationary.[8] Thus, the option for dynamic import and export demand functions is suitable and in line with other studies, as in Bairam (1993).

The first step is to analyse informally the temporal evolution of the variables to detect whether some regular tendencies occur in the whole period. Combining the information given on Table 1, in the Appendix (descriptive statistics) and Chart 1 below, we observe that the annual average growth rate of real exports (8.46%) is higher than that of imports (7.26%) over the whole period showing that the Slovak economy is gaining competitiveness over time. However, the gap between exports and imports growth is reduced after 2003 giving evidence that the external trade is moving into equilibrium. From the standard deviation values of Table 1 (in the Appendix) we can assert that the growth volatility of imports and exports is relatively high.

C h a r t 1

Annual Growth Rate of Exports (g*x*) and Imports (g*m*), 1993 – 2011
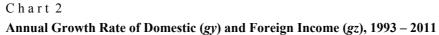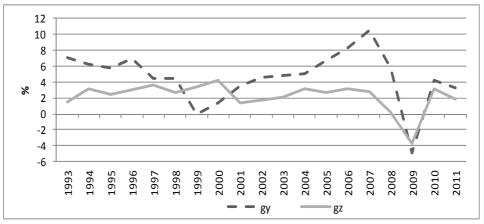

Source: European Commission (2002; 2009; 2012).

---

[8] As can be seen from Table 1 (in the Appendix), the ADF test for testing the unit root hypothesis of the series in all cases is rejected at a 5% significance level.

From the analysis of Table 1 (rows 3 and 4) in the Appendix and mostly from Chart 2 below, it is shown that the Slovak economy (*gy*) grew at faster rates than the average OECD countries[9] (*gz*), except for the years 1999 and 2009, the latter growth decline explained by the financial crisis started in 2008. The slowdown of economic growth in 1999 was due to measures taken by the government for the elimination of macroeconomic imbalances and the stabilization of the economy.[10] On average the Slovak economy grew by 4.64% per annum, almost twice higher than the 2.22% OECD average, showing evidence of convergence and catching up tendencies. In general, the data shows that Slovakia grew on average at a higher rate than that of the rest of the world (the OECD countries) and for that to be feasible, according to equation (5c), the income elasticity of demand for exports (ε) must be higher than that of imports (π).

C h a r t 2

Annual Growth Rate of Domestic (*gy*) and Foreign Income (*gz*), 1993 – 2011

Source: European Commission (2002; 2009; 2012) and OECD (2012).

Turning to the analysis of relative prices of trade in Chart 3 (and Table 1, rows 8 and 9 in the Appendix), the annual growth rate of import prices (*gpm*) and export prices (*gpx*) follow a close movement to each other and reveal a more
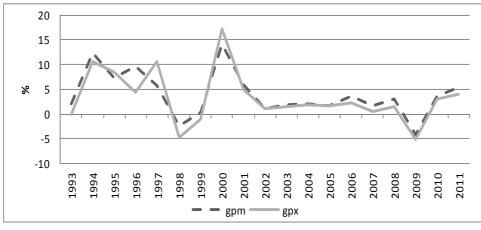
---

[9] Foreign income in this study is approximated by the growth rate of the OECD countries. This is a reasonable proxy, since 86.4% of Slovak exports and 61.4% of imports – according to the Slovak Statistical Office – are traded with these countries. For details on the computation of the variable *gz*, see the Appendix.

[10] To solve the problem of economic instability (particularly the fiscal deficit and the shortfall in the current account of BP), the Government adopted a strategy for the acceleration of economic reforms in May 1999. The strategy was designed to improve budgetary performance in public finances and to reduce the dynamics of domestic demand by freezing the level of wages in public administration, adjusting the lower rate of value-added tax, and raising excise duties (National Bank of Slovakia, 1999).

stable path beyond 2001. The stabilization of relative prices after 2001 can be attributed to the effort made by the country to become a euro-zone member, a goal that was achieved in 2009. The variation of relative prices around zero (except the crisis year 2009) shows that the Slovak economy is becoming more price-competitive in international markets in this late period.

C h a r t 3

Annual Growth Rate of Import Prices (*gpm*) and Export Prices (*gpx*), 1993 – 2011

Source: European Commission (2002; 2009; 2012).

C h a r t 4

Annual Growth Rate of Relative Prices (*grp* = *gpx* – *gpm*), 1993 – 2011

Source: European Commission (2002; 2009; 2012).

The same information is given in Chart 4 below, showing that there is a long-
-run movement of relative prices (*gpx* – *gpm*) towards zero, most verified after 2001. This can be taken as evidence that relative prices tend to be constant in the

long-run ($pd_t - pf_t - e_t = 0$) thus justifying the use of equations (5a) or (5b) for predicting actual growth in Slovakia. On the other hand, after 2001, the Slovak economy shows gains in price competitiveness relatively to its competitors in international markets implying *gpx < gpm*.
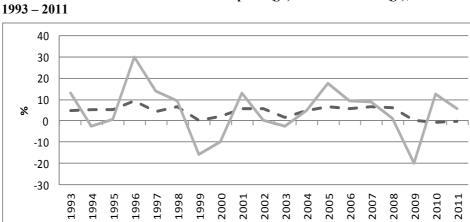
Private consumption (*gc*) and investment (*gi*) growth rates will be used as instruments for domestic growth in the *2SLS* estimation of the import demand function. This is the reason why these two variables also appear in Table 1 (rows 5 and 6 in the Appendix) and they exhibit different growth behaviour. As Chart 5 shows, consumption growth pattern is more or less stable (with an average growth rate equal to 4.23%), although in the last years is declining towards zero. By contrast, investment shows a more irregular path with ups and downs over the whole period. The most important drops of investment with negative growth rates are registered in the years 1994, 1999 and 2009 with a fall by –20% when the financial crisis hit all over the European economies in 2009. The downturn in investment (–18.2%) in 1999 was linked with the complicated financial situation in the corporate sector and the worsened conditions for obtaining domestic and foreign loans. The upward picks in investment occurred in 1996, 2001, 2005 and 2010 the first year showing the most remarkable increase in investment by 30%.[11] The average annual growth of investment for the whole period was 4.73% which can explain in part the high growth rates attained by the Slovak economy after its separation from the former Czechoslovakia in 1993. However, as the report of the National Bank of Slovakia stresses, investments were directed largely to non-productive sectors (highways, infrastructure, hydro-electric and other power projects), the implementation of which is not directly reflected in quality improvement and production structure, while their indirect effects on the economy will be possible to evaluate only on a long-term basis.

The last row of Table 1 (see in the Appendix) reports the current account average (as a percentage of GDP) for the whole period considered in this study. The current account is always negative except for the years 1994, 1995 and 2011 where a trade surplus is recorded. Despite the average rate being negative in the whole period (–4.99 as a percentage of GDP) the trade deficit tends to be lower in the last years and becomes a surplus in 2011. This is an encouraging result and according to 'Thirlwall's Law' the Slovak economy will be capable to grow faster without being constrained by the balance-of-payments. This result is consistent with the good performance of exports relatively to imports as we have

---

[11] The annual report of the National Bank of Slovakia emphasizes that the excess of investment rate over the savings rate, reached 11.1 percentage points in 1996, representing a significant year--on-year increase and exerted pressure on the replenishment of domestic savings from foreign resources. This fact was reflected in the growing deficit in the balance of payments current account as it is shown in Chart 6 below.

seen earlier in Chart 1. The improvement in current account could also explain in great part the growth performance of the Slovak economy which has been higher relative to the OECD countries allowing the country to catch-up. As Chart 6 shows, there is evidence that the Slovak economy grows faster when current account improves, except for 2009 the year the financial crisis hit seriously the country´s economic performance.

C h a r t 5

Annual Growth Rates of Private Consumption (*gc*) and Investment (*gi*), 1993 – 2011

Source: European Commission (2002; 2009; 2012).

C h a r t 6

Growth Rate of Domestic Income (*gy*) and the Current Account (*ca*) as a Percentage of GDP, 1993 – 2011

Source: European Commission (2002; 2009; 2012).

4. Estimation of the Import and Export Demand Functions

For estimation purposes the import demand function is specified as follows:

$$gm_t = a + \pi\,(gy_t) + \psi\,(grpm_t) + \omega_t \tag{6}$$

It is expected that the growth of imports is positively related to both, the growth of domestic income and the growth of relative price of imports (defined as the difference between the growth of export and import prices), therefore $\pi > 0$ and $\psi > 0$.

Analogously, the export demand function is defined as:

$$gx_t = \beta + \varepsilon\,(gz_t) + \eta\,(grpx_t) + \nu_t \tag{7}$$

It is expected that a higher growth of foreign income (OECD countries) stimulates the growth of exports and that relative price of exports (defined as the difference between the growth of export and import prices) has a negative impact on export growth, therefore, $\varepsilon > 0$ and $\eta < 0$.

The first step is to estimate separately each equation by *OLS* and these results are shown in Table 2. The outcomes for the import and export functions reveal positive and statistically significant income elasticities, but the price elasticities despite having their expected sign are not statistically significant at the lower significance level. This is in line with most studies in the relevant literature and also favours the hypothesis that relative prices are neutral in the long-term analysis. An interesting aspect to highlight is that the income elasticity of the demand for exports ($\varepsilon = 3.65$) is higher than that of imports ($\pi = 1.60$) and this justifies our earlier finding from the previous section that Slovakia grew on average at a faster rate than the OECD countries over the whole period, reflecting signs of convergence or catching-up tendency.

Our focus is on the import demand function and we observed that the income and price elasticities of the demand for imports display their expected signs but the later is not statistically significant. However, they may be biased and inconsistent estimates due to the endogeneity of the growth of domestic income. Two reasons can explain this endogeneity, with adverse tendencies: a higher domestic growth may induce more imports and if imports rely on raw materials, machinery and investment equipment, then growth will be induced further. The second reason is from the balance-of-payments perspective: a faster increase in imports relatively to exports will deteriorate the trade balance affecting negatively the growth of domestic income. Thus, instrumental variables are required in order to obtain consistent estimates. The growth of private consumption (gc), investment (gi), exports (gx) and relative prices (grp) are the instruments used for the growth

of domestic income (*gy*). The suitability of these instruments will be tested in the *2SLS* estimation approach.

T a b l e 2

Estimation Results from the Export and Import Demand Functions, Slovakia, 1993 – 2011

	OLS		SUR		2SLS
Variable	*Exports*	*Imports*	*Exports*	*Imports*	*Imports*
gz	3.6486*** (4.062)		3.44148*** (4.198)		
grpx	–0.55139 (–0.745)		–0.5137 (–0.756)		
gy		1.6025** (2.837)		1.5615*** (3.029)	2.5928*** (3.589)
grpm		0.2211 (0.2511)		0.2089 (0.2586)	0.5161 (0.5333)
Constant	–0.01157 (–0.004)	–0.02713 (–0.008)	0.4737 (0.198)	0.1546 (0.054)	–4.429 (–1.164)
Obs	19	19	19 19		19
R-squared	0.508	0.337	0.506	0.336	0.336
F (2,16)	8.26	4.066			6.476
	[0.0034]	[0.0373]			[0.0086]
Autocorrelation $\chi_1^2 = 0.1053$ $\chi_1^2 = 0.4402$ Breush-Godfrey [0.746] [0.507]					
Endogeneity test					$\chi_1^2 = 20.28$ [0.000]
Sargan statistic					$\chi_2^2 = 2.478$ [0.2895]
#Weak instruments					$F_{(3,14)} = 12.55$

Notes: Numbers in parenthesis are t-ratio (for estimated coefficients) and in square brackets are p-values.
*** Coefficient significant at the 1% level. ** Coefficient significant at the 5% level. * Coefficient significant at the 10% level. #A statistic less than 10 indicates that instruments are weak.
Source: Regressions performed in gretl.

Before turning to the instrumental variables estimation, we jointly run the export and import demand functions by the *SUR* (Seemingly Unrelated Regression) estimation technique (see Table 2). In case the error terms across equations are contemporaneously correlated, there are gains in efficiency from using this method in comparison to *OLS*. The drawback is that in *SUR* all regressors are exogenous (contradicting our assumption of *gy* being endogenous). The results from the *SUR* estimation do not differ substantially from those of *OLS* and the correlation between the cross-equation errors is close to zero (0.157). Once more we confirm that the price elasticities in both equations are not statistically significant. Thus, no significant efficiency gains arise from using full information estimation techniques applied to system equations.

Since our aim is to obtain estimates for the income elasticity of demand for imports (π) in order to determine the balance-of-payments equilibrium growth rate relying on the assumption that (*gy*) is endogenous, we estimate the import demand function using the *2SLS* method, as in Bairam (1988), Atesoglu (1993; 1995) and Léon-Ledesma (1999).

The *2SLS* regression results are also presented in Table 2 (last column) and the diagnostic tests are satisfactory. In particular, the endogeneity test for (*gy*) reveals that this variable cannot be treated as exogenous in the import demand function. The Sargan statistic confirms the validity of the instruments set (*gc, gi, gx* and *grp*). Furthermore, the Wald F-statistic indicates that the instruments are not weak. The estimated results confirm again the statistical insignificance of the price elasticity but the income elasticity of demand for imports ($\pi = 2.15$) is now higher than in the *OLS* (1.6) and *SUR* (1.56) methods. Therefore ignoring the problem that *gy* is endogenous the *OLS* and *SUR* estimations under-estimate the income elasticity of demand for imports.

5. Balance-of-payments Equilibrium Growth Rate

After the estimation of the import demand function, it is possible to compute the growth rate consistent with the balance-of-payments equilibrium and compare it with the actual growth rate of the Slovak economy over the period 1993 – 2011. The expressions (5a) and (5b) are used to compute the balance-of-payments constrained growth rate and the results can be seen in Table 3.

T a b l e 3

Evidence on 'Thirlwall's Law' for the Slovak Economy, 1993 – 2011

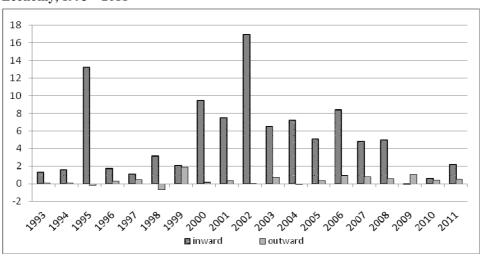| gy	gx	π	ε	gz	$y_{BP} - gx/\pi$	$y_{BP} = \varepsilon[(gz)]/\pi$	$(y_{BP} - gy)$	ca
4.64	8.48	2.59			3.27		−1.37	−4.99
			3.44	2.22		2.95	−1.69	

Notes: gy (growth of GDP), *gx* (growth of exports), *gz* (growth of OECD) and *ca* (current account ratio) are taken from Table 1 (see the Appendix); ε (income elasticity of demand of exports) is taken from the *OLS* estimation and π (income elasticity of demand of imports) is taken from the *2SLS* estimation of Table 2.
Source: Own calculations.

The average annual growth rate of domestic income for the whole period is 4.64% (taken from Table 1), which is higher than the average growth rate consistent with the balance-of-payments equilibrium (3.27%) obtained by using the expression $y_{BP} = (gx)/\pi$. According to 'Thirlwall's Law' this reveals that during the period 1993 – 2011 the Slovak economy was growing faster than the rate allowed by the balance-of-payments equilibrium, accumulating therefore external

trade deficits. In fact, the average current account deficit (as percentage of GDP at market prices) is –4.99% for the whole period. The same picture we get if we use the alternative expression of 'Thirlwall's Law' given by $y_{BP} = [\varepsilon(gz)]/\pi$ showing that the Slovak economy grew at a higher rate ($gy = 4.64\%$) than that predicted by the balance-of-payments constrained hypothesis ($y_{BP} = [\varepsilon(gz)]/\pi = 2.95\%$).

The main question to address then is how the Slovak economy managed to grow faster than the rate consistent with the balance-of-payments equilibrium? Or which turns to be the same thing, how this country financed its external trade deficit? Since we have concluded that relative prices are not playing an important role to equilibrate the balance-of-payments, the answer lies on capital inflows the country received from the EU during the transition period either in the form of structural funds[12] or inflows coming from foreign direct investment (FDI).

As Chart 7 shows below, inward foreign direct investment contributes significantly to GDP with an average share of 5.15% over the period 1993 – 2011, but it is more pronounced from 2000 to 2008, due to government policies aiming to create a more friendly tax environment. However, after the global financial crisis started in 2008, the importance of these inward flows has been decreased drastically which is a matter of concern from the growth and the balance of payments perspectives.

C h a r t 7

Inward and Outward Foreign Direct Investment as a Percentage of GDP Slovak Economy, 1993 – 2011

Source: UNCTADstat.

---

[12] For the period 2007 – 2013, 6 250 network projects were approved in the total amount of 7.8 billion euros and for the period 2004 – 2006 almost 1.5 billion was drawn from structural funds.

Therefore, the main conclusion is that the Slovak economy grew at a faster rate over the period 1993 – 2011 at a cost of accumulating external trade deficits. According to 'Thirlwall's' Law this situation is not sustainable in the long-run unless the country preserves the ability to finance external deficit from capital inflows. Otherwise the country sooner or later will face balance-of-payments problems which will imply contraction on demand and income in order to bring the economy back to equilibrium. The exchange rate is not anymore a mechanism to be used to make such an adjustment since the country became a euro-zone member in 2009. On the other hand, capital inflows cannot be sustained in the long-run for two main reasons: first, structural funds from the EU will be reduced progressively in the near future after the country´s transition period comes to the end; second, capital flows in the form of foreign direct investment are uncertain in the future seeking for higher remuneration and more friendly tax environment elsewhere.

Nevertheless there are two positive signs to highlight that could ensure that the Slovak economy can escape from the balance-of-payments constrained growth trap. The first is, as we have seen from Chart 6 that the current account deficit after 2005 reduces continuously towards equilibrium and in 2011 shows a trade surplus. The second is a less obvious sign, from Chart 1 showing that exports grow at a higher rate than imports in the last two years (2010 and 2011). If these two positive tendencies are preserved in the future the country can grow at a higher rate without deteriorating its balance-of-payments position. However, a structural policy to grow faster should focus on reducing[13] the income elasticity of the demand for imports by producing more tradable goods of higher quality.

Conclusions

The present study analyses whether the demand-orientated approach based on the balance-of-payments constraint hypothesis is suitable for explaining Slovak economic growth over the period 1993 – 2011. The model developed by Thirlwall to compute the balance-of-payments equilibrium growth rate is adopted, assuming constant relative prices in the long-run (a plausible hypothesis) and initial equilibrium on trade balance. The import and export demand functions are estimated to obtain the income elasticities of the demand for imports and exports, which are crucial parameters for computing 'Thirlwall's Law'.

---

[13] However, this is a hard task considering that almost 70% of the Slovak imports represent machinery and transport equipment and almost 20% are manufactured goods (Eurostat data).

The empirical analysis shows that the Slovak economy grew on average at a higher rate than the OECD countries in the period considered, and this is consistent with the empirical finding that the income elasticity of the demand for exports is higher than that of imports, as 'Thirlwall's Law' implies. This corroborates the hypothesis that a country can grow faster than the rest of the world only when its income elasticity of demand for exports exceeds that of imports, as long as capital inflows can compensate external imbalances.

The crucial parameter of the income elasticity of demand for imports is obtained by estimating the import demand function by *2SLS*, with domestic income growth being endogenous. Knowing that parameter, the balance-of-payments equilibrium growth rate is computed for the whole period and is compared to the actual growth rate. Generally it is shown that the Slovak economy grew faster than the rate consistent with the balance-of-payments equilibrium, and this is consistent with the accumulation of current account deficits over the period considered. The higher growth achieved by the Slovak economy above its balance-of-payments equilibrium rate can only be sustained by capital inflows, however this policy is uncertain in the long-term analysis.

For the country to achieve sustainable growth rates exports must increase and import sensitivity to domestic income changes must be reduced, turning the economy more competitive both in domestic and foreign markets and this is compatible with the increase in the balance-of-payments equilibrium growth rate. At the micro level, policies are needed to improve the non-price characteristics of the goods and services associated with quality, design, innovation, product differentiation, marketing and efficient distribution.

A p p e n d i x

- *gx* – Annual growth rate of real exports.
Exports of goods and services at 2000 prices (national currency; annual percentage change).
- *gm* – Annual growth rate of real imports.
Imports of goods and services at 2000 prices (national currency; annual percentage change).
- *gy* – Annual growth rate of real GDP.
GDP at 2000 market prices (national currency; annual percentage change).
- *gc* – Annual growth rate of real private consumption.
Private final consumption expenditure at 2000 prices (national currency; annual percentage change).
- *gi* – Annual growth rate of real investment.
Gross fixed capital formation at 2000 prices (national currency; annual percentage change).

- **gpx** – Annual growth rate of export prices.

Price deflator exports of goods and services (national currency; annual percentage change).

- **gpm** – Annual growth rate of import prices.

Price deflator imports of goods and services (national currency; annual percentage change).

- **grp** – Annual growth rate of the relative price of exports (g*px* – g*pm*).

- **ca** – Balance on current transactions with the rest of the world (% of GDP at market prices).

- **gz** – Average annual growth rate of real GDP of the OECD countries (OECD, 2012).

Notes: Data on g*x*, g*m*, g*y*, g*c*, g*i*, g*px*, g*pm*, and **ca** were taken from European Commission (2002; 2009; 2012).

T a b l e 1

Descriptive Statistics of Variables, Slovak Economy, 1993 – 2011

Variable	ADF	Obs	Mean	Std. Deviation	Min	Max
(1) *gm* % Imports	−4.315^c (0.0039)	19	7.26	8.97	−18.1	19.1
(2) *gx* % Exports	−4.153^c (0.0055)	19	8.46	8.70	−15.9	21.0
(3) *gy* % Domestic income	−4.396^c (0.0001)	19	4.64	3.29	−4.90	10.5
(4) *gz* % Foreign income	−3.352^c (0.027)	19	2.22	1.74	−3.78	4.17
(5) *gc* % Consumption	−5.698^{ct} (0.000)	19	4.23	2.82	−0.70	9.30
(6) *gi* % Investment	−4.358^c (0.0003)	19	4.73	11.85	−19.7	30.0
(7) *grpr* % Relative prices	−4.802^c (0.000)	19	0.66	2.11	−4.90	5.30
(8) *gpx* % Price of exports	−4.066^c (0.0065)	19	3.28	5.42	−5.10	17.30
(9) *gpm* % Price of imports	−4.669^{ct} (0.0007)	19	3.94	4.57	−4.10	14.10
(10) *ca* Current account		19	−4.99	4.07	−9.50	5.30

Notes: Variables (1) to (9) are annual growth rates; Variable (10) is current account as a percentage of GDP at market prices; (^{c}) indicates that the estimated ADF equation for testing the unit root hypothesis of the series includes an intercept and (^{ct}) the equation includes an intercept and trend. Numbers in brackets are p-values of the unit root tests.

Source: European Commission (2002; 2009; 2012) and OECD (2012).

References

ALONSO, J. – GARCIMARTÍN, C. (1998 – 1999): A New Approach to Balance-of-payments Constraint: Some Empirical Evidence. Journal of Post Keynesian Economics, *21*, No. 2, pp. 259 – 282.

ATESOGLU, H. (1993): Balance-of-payments Constrained Growth – Evidence from the United States. Journal of Post Keynesian Economics, *15,* No. 4, pp. 507 – 514.

ATESOGLU, H. (1995): An Explanation of the Slowdown in US Economic Growth. Applied Economic Letters, *2*, No. 4, pp. 91 – 94.

BAIRAM, E. (1988): Balance-of-payments, the Harrod Foreign Trade Multiplier and Economic Growth: The European and North American Experience, 1970 – 1985. Applied Economics, *20*, No. 12, pp. 1635 – 1642.

BAIRAM, E. (1993): Static versus Dynamic Specifications and the Harrod Foreign Trade Multiplier. Applied Economics, *25*, No. 6, pp. 739 – 742.

BARBOSA-FILHO, N. (2002): The balance-of-payments Constraint: From Balanced Trade to Sustainable Debt. [Working Paper 2001.06, January.] New York: CEPA.

BLECKER, R. (2009): Long-run Growth in Open Economies: Export-led Cumulative Causation or a Balance-of-payments Constraint? [Paper presented at the 2nd Summer School on Keynesian Macroeconomics and European Economic Policies, 2nd – 9th August.] Berlin.

EUROPEAN COMMISSION (2002; 2009; 2012): Statistical Annex of European Economy. Directorate General Economic and Financial Affairs (Spring 2002; 2009 and 2012).

LÉON-LEDESMA, M. (1999): An Application of Thirlwall's Law to the Spanish Economy. Journal of Post Keynesian Economics, *21*, No. 3, pp. 431 – 439.

LÓPEZ, J. – CRUZ, A. (2000): Thirlwall's Law and Beyond: The Latin American Experience. Journal of Post Keynesian Economics, *22*, No. 3, pp. 477 – 495.

McGREGOR, P. – SWALES, J. (1985): Professor Thirlwall and the Balance-of-payments Constrained Growth. Applied Economics, *17*, No. 1, pp. 17 – 32.

McGREGOR, P. – SWALES, J. (1991): Thirlwall's Law and Balance-of-payments Constrained Growth: Further Comment on the Debate. Applied Economics, *23*, No. 1, pp. 9 – 20.

MORENO-BRID, J. C. (1998 – 1999): On Capital Flows and the Balance-of-payments Constrained Growth Model. Journal of Post Keynesian Economics, *21*, No. 2, pp. 283 – 298.

OECD (2012): National Accounts – Main Aggregates. Paris: Organization for Economic Cooperation and Development.

SOUKIAZIS, E. – ANTUNES, M. (2012): Application of the Balance of Payments Constrained Growth Model to Portugal, 1965 – 2008. Journal of Post Keynesian Economics, *34*, No. 2, pp. 353 – 379.

TEREK, M. (2013): Interpretácia štatistiky a dát. 2nd edition. Košice: Equilibria. ISBN 978-80-8143-100-5.

THIRLWALL, A. (1979): The Balance-of-payments Constraint as an Explanation of International Growth Rate Differences. Banca Nazionale del Lavoro, *32*, No. 128, pp. 45 – 53.

THIRLWALL, A. (1982): The Harrod Trade Multiplier and the Importance of Export-led Growth. Pakistan Journal of Applied Economics, *1*, No. 1, pp. 1 – 21.

THIRLWALL, A. – HUSSAIN, N. (1982): The Balance-of-payments Constraint, Capital Flows and Growth Rate Differences between Developing Countries. Oxford Economic Papers, *34*, No. 3, pp. 498 – 510.

NATIONAL BANK OF SLOVAKIA (1996; 1999): Annual Reports. Available at: <http://www.nbs.sk/en/publications-issued-by-the-nbs/nbs-publications/annual-report>.

STATISTICAL OFFICE OF THE SLOVAK REPUBLIC. Available at: <http://portal.statistics.sk/showdoc.do?docid=359>.