DEPARTMENT OF ECONOMICS WORKING PAPER SERIES

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Working Paper No: 2008-13

May 2008

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The Balance of Payments as a Constraint on Turkey's Growth: 1960-2004

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Abstract

The aim of this study is to test the existence of balance of a payments constraint on the long run economic growth of the Turkish economy. The balance of payments constrained growth (BPCG) model which was developed by Thirlwall (1979) and extended by Thirlwall and Hussain (1982) is tested over the period of 1960-2004 using OLS. Empirical findings of this paper support the BPCG model for the whole period under consideration. For the different sub-periods, there are either different essential economic relations or behaviors behind the BOP constraint.

Keywords: Balance of payments constraint, Turkey, economic growth, international trade, elasticity, neo-liberalism
JEL Classification: F14, F15, F41, F43, E12

1. Introduction

The relationship between trade, growth and the balance of payments (BOP) has been a subject of considerable interest and empirical scrutiny in growth and development economics in recent years. This study takes as its motivation these developments and addresses the following question: "How did trade liberalization affect the growth and the BOP of the Turkish economy over the period of 1960-2004?" The period under consideration is unique in the economic history of Turkey due to the momentous shift from import-substitution to export-promotion under a neo-liberal reform package in 1980.

The links between the BOP, trade and growth are crucial from both an analytical and policy standpoint. Moreover, the analysis of the BOP as a major constraining factor on growth has recently come to be an important research area for growth and development economics. The BOP is essential in any theory of economic growth or trade since it represents an important restricting variable.

The issue of what is the most appropriate growth policy under neo-liberalism has generated considerable controversy. The approach used here for answering this question pays particular attention to the role of the BOP since it is an important variable constraining the growth and trade performance of a country.

The basic theory behind this study is based on the BPCG models developed by Keynesian economists. Especially within the post-Keynesian tradition, external demand is considered to be the major constraint on the long-run growth performance of open economies. The first generation BPCG model, known as Thirlwall's Law, first developed by Thirlwall (1979), postulates that a country's growth rate is determined by the ratio of the income elasticity of demand for its exports to its income elasticity of demand for

imports multiplied by the growth in world income. Due to its limitations in explaining the growth performance of developing countries, the model was extended by Thirlwall and Hussain (1982), known as second generation BPCG model, to incorporate the impact of foreign capital flows.

Prior research on this topic has confirmed the empirical adequacy of the first and second generation BPCG models for the case of developing countries including the Turkish economy over different time periods using different estimation techniques. Yet there is no recent research looking at the case of Turkey in depth for the period of 1960-2004. With this in mind, this study aims to contribute to the literature in three ways.

First, this paper analyzes the Turkish case in depth, which has not been done in the previous studies. Analyzing Turkey as part of a larger study that examines a group of developing countries remains insufficient to explain the unique characteristics of the Turkish economy. This paper also tests the validity of the model for the sub-periods of the 1960-2004 era in order to analyze the impact of trade liberalization on growth in a more detailed way. Sub-periodization helps analyze the BOP constraint better since there are either different essential economic relations or behaviors in different sub-periods. Hence, this study brings a macroeconomic perspective to the analysis of economic growth, through the examination of the affects on the BOP of trade liberalization, including taking into account the resulting capital flows.

Second, this study compares and contrasts the patterns of the income elasticity of import demand in the pre and post liberal era and discusses the reasons behind these patterns in connection with the neo-liberal economic policies of the latter era.

Finally, the policy implications of the model for the growth and trade policies of the Turkish economy are discussed. Policy suggestions of this study are particularly crucial since there is an extensive literature on the liberalization and its effects on growth.

This paper is composed of six sections. The introduction section is followed by a review of the international trade, economic growth and balance of payments literature on the Turkish economy. Section 3 introduces the economic model. Data sources are explained in Section 4. Section 5 explains the research methodology and summarizes the empirical results and Section 6 concludes.

1. Literature Review

2.1. Empirical Literature on Turkey Regarding Trade, Growth and the Balance of Payments

The Balance of Payments of Turkey has been explored from a number of dimensions in the empirical literature. In his macroeconomic model of the Turkish economy for the period 1960-1988, Civcir (1997) tests the monetary approach to the balance of payments, which states that the changes in the international reserves are determined by the excess supply of money. Boratav, Turel and Yeldan (1996) developed a current account model and found that, in the late 1980s and early 1990s, the impact of the policy component dominated by import liberalization increased the deficit, despite increasing exports and favorable external conditions. There are also applications of intertemporal models, including capital movements, to the current account behavior of Turkey, namely by Selcuk (1997) for the period of 1987-1995 and by Akcay and Ozler (1998) for 1987-1996. Both of these studies emphasize the gap between actual current account deficit and the optimal current account deficit for Turkey. Yucel (2003) analyzes

the determinants of the Turkish current account balance in the medium and short-run, focusing especially on the post-1990 period. She shows that Turkey is a foreign credit-constrained economy with limited access to international financing.

One of the widely analyzed topics in the Turkish economic literature has been *international trade*. Ozmen and Furtun (1998), using co-integration techniques, find no evidence supporting the export-led growth hypothesis from 1970 to 1995. Doganlar and Fisunoglu (1999), in their study of seven Asian countries including Turkey, find a causal relationship between exports and economic growth using an error-correction mechanism. Esen (2000) concludes that contrary to theoretical expectations, the opening of the capital account induced adverse affects on financial intermediation, savings, investment, growth, and foreign debt. Bahmani-Oskooee and Domac (1995) investigate the relationship between economic growth and trade via co-integration and error correction modeling for 1923-90 period. They conclude that there is a long-run relationship between Turkey's exports and its domestic production. Their results provide evidence supporting the bi-directional causality between the two variables. Arslan and Van Wijnbergen (1993) examine the driving forces behind the Turkish export miracle. They conclude that the export boom was triggered by macroeconomic policies and trade reform that allowed for a steady real depreciation of the Turkish Lira. Yeldan (1989) employs a dynamic computable general equilibrium model and argues that an integrated industrialization strategy that combines a domestic-demand-based, wage-goods-oriented public investment program with selective export-promotion scheme promises would be the most appropriate strategy for serving Turkey's long-term industrialization interests. Aydin, Ciplak and Yucel (2004) estimate the export supply and import demand for the Turkish economy

using both single equation and vector auto regression frameworks. They conclude that exports are determined by the unit labor costs, export prices and the national income in a statistically significant manner. Imports are mostly affected by the real exchange rate and national income. Their analysis indicates the real exchange rate as a significant determinant of imports and the trade deficit, but not of exports. Utkulu and Ozdemir (2003) examine the effect of trade liberalization on long-run income per capita and economic growth through endogenous growth theory. They employ a multivariate co-integration analysis and conclude that their causality evidence between the long-run economic growth and a number of indicators of trade liberalization confirms the anticipations of the new growth theory. Tunc and Akbostanci (2002) employ the twin deficit hypothesis and the Ricardian equivalence hypothesis for Turkey for the period between 1987-2001 via a co-integration methodology and by estimating an error correction model. They show that there is a long-run relationship between internal and external deficits. Their short-run model yields that a worsening of the budget balance worsens the trade balance. Therefore they conclude that the twin deficit hypothesis holds and the Ricardian equivalence hypothesis is not valid for Turkey during the period studied.

Finally, there is also a substantial literature on *economic growth* and its determinants. The most significant ones can be summarized as follows: Yeldan and Boratav (2001) argue that sources of growth in the Turkish manufacturing industry in the 1980s are wage reduction, price supports, and the utilization of idle capacity inherited from the pre-crisis period. According to this study, the basic failure of export-led growth was that it depended on the suppression of wages and it could not create sustainable capital accumulation. Although the labor productivity increased after 1980, its effect on

wages did not occur until 1990. Boratav and Turel (1993) find a wage-cycle which is unrelated to productivity, employment, or investment, and show that export-led growth is attributable to the increases in the capacity utilization rates, rather than investments. Yenturk (1997) argues that developing countries have a stagnationist structure in which wage reduction causes unemployment. In order to have a permanent increase in the employment level, one needs a growth trend that is based on investment and productivity. She argues that Turkey, to the contrary, had a growth pattern that was dependent on capacity utilization.

2.2. Available applications of Thirlwall's Law to the Turkish Economy[1]

The most relevant part of the literature for the scope of this study concerns the *available applications of Thirlwall's Law to the Turkish economy*. Hussain and Thirlwall (1982) proved the validity of the first and second generation BPCG models for the case of twenty developing countries including Turkey over the period of 1960-73. Bariam (1988) applied the first generation BPCG model for nineteen European and North American countries including Turkey over the period of 1970-85. Based on the annual time series data and two-stage Least Square technique, regression results of this study supported Thirlwall's Law. In a later study, Bairam (1990) employed Thirlwall's Law for 15 oil exporting and other developing countries for various dates between 1961 and 1985. In nine of the 15 countries, the model's predictive power was satisfactory, while he obtained adverse results in the case of oil exporting countries. The results of testing the model for Turkey over the period of 1973-83 by Bairam (1990) supported its validity. Bairam and Dempster (1991) applied the model to eleven Asian countries including Turkey over the period of 1963-73, and their test results further supported Thirlwall's hypothesis. Perraton

[1] See Appendix II for a summary the related past research on Turkey.

(2003) utilized the first version of Thirlwall's Law over the period of 1973-1995 for a large sample of developing countries including Turkey, and obtained support for it.

2. The Model

Mainstream growth theory describes the growth rate differences across countries through the differences in the growth of factor supplies and productivity. Orthodox growth theory uses production functions as tools in explaining growth from a supply-based perspective. Keynesian models take a more demand-oriented view, in which the growth rate differences are explained by the differences in the growth of demand because demand is a constraint on growth. According to the BPCG model, which is also known as Thirlwall's Law, the main constraint on the demand is the balance of payments. The major premise of this model is that no country can grow faster than a rate which is coherent with the balance of payments equilibrium on the current account unless it can finance ever-growing deficits. It is hypothesized that a country's growth rate is equal to the ratio of the income elasticity of demand for its exports to its income elasticity of demand for imports multiplied by world income growth.

3.1. First Generation BPCG Model[2]

The BPCG growth model was originally developed by Thirlwall (1979). Thirlwall's Law imposes the balanced trade as a necessary long-run constraint on growth. The balance of payments equilibrium is

$$P_d X = P_f ME \qquad (1)$$

[2] See McCombie and Thirlwall (1994) for the detailed derivation of the model, its assumptions, implications, testing and applications.

where the variables X, P_d , M , P_f and E are the quantity of exports, the price of exports in the home currency, the quantity of imports the price of imports in foreign currency; and the exchange rate, namely the home price of foreign currency, respectively.

The condition for balance of payments equilibrium is then

$$p_d + x = p_f + m + e \tag{2}$$

where lower-case letters show rates of change in variables. This condition states that the rate of growth of the value of exports equals the rate of growth of the value of imports.

The import function is

$$M = a\left(\frac{P_f E}{P_d}\right)^{\psi} Y^{\pi} \tag{3}$$

where a, ψ, Y and π are a constant, the price elasticity of the demand for imports, the domestic income and the income elasticity of the demand for imports, respectively.

The rate of growth of imports is then

$$m = \psi(p_f + e - p_d) + \pi y \tag{4}$$

where again lower-case letters stand for continuous changes of the variables. In other words, import growth depends on:

- How fast import prices are changing relative to domestic substitutes, taking into account variations in the exchange rate, multiplied by the price elasticity of the demand for imports
- How fast domestic income is changing together with the income elasticity of the demand for imports. [3]

The export function is

[3] McCombie and Thirlwall (1994), p.234-236.

$$X = b\left(\frac{P_d}{P_f E}\right)^{\eta} Z^{\varepsilon} \qquad (5)$$

where b, ε, Z and η are a constant, the income elasticity of the demand for exports, the world income and the price elasticity of demand for exports, respectively.

The rate of growth of exports is then

$$x = \eta(p_d - p_f - e) + \varepsilon z \qquad (6)$$

In other words, export growth depends on:

- How fast domestic prices are changing relative to foreign prices, taking into account variations in the exchange rate, multiplied by the price elasticity of the demand for exports
- How fast world income is changing, together with the value of the income elasticity of the demand for exports.[4]

Now if we substitute the rate of growth of imports (4) and the rate of growth of exports (6) into the balance of payments equilibrium condition (2), we get the balance of payments equilibrium growth rate

$$y_1 = \frac{(1+\eta+\psi)(p_d - p_f - e) + \varepsilon z}{\pi} \qquad (7)$$

3.1.1. A first assumption of the model[5]

- $\psi < 0$, $\pi > 0$, $\eta < 0$, $\varepsilon > 0$

These are all simply assumptions of normal price and income responses.

3.1.2 Economic propositions[6]

[4] Ibid.
[5] See Alonso and Garcimartin (1998-99) for the significance of distinction between price adjustment and income adjustment. See Blecker (1998) and Pugno (1998) for the criticisms of price assumptions underlying the model.

Under the standard assumptions on elasticities just made, one has that according to this model a country's growth rate depends on the following factors:

- Prices: If $|\eta + \psi| \succ 1$, then inflation in the home country will lower the y_1.
- Currency depreciation: If $|\eta + \psi| \succ 1$, then continuous depreciation of currency (e>o) will improve y_1.
- World income: The faster the growth of world income (z) the great the GDP growth y_1 through a greater demand for the country's goods. The sensitivity of the rate of growth of the given country to the growth of the world income depends on the ε. This income elasticity of the demand for exports depends on the tastes of foreign consumers, the characteristics of the goods, and a whole host of non-price factors that determine the demand for goods in international trade.
- The country's appetite for imports: As the income elasticity of demand for imports (π) increases, y_1 decreases.
- Terms of trade effect: The pure terms of trade effect in the above is the "1" from the first term times the change in the terms of trade (p_d- p_f-e). Hence an improvement in the real terms of trade, (p_d- p_f-e) >0, will give a positive contribution from the pure terms of trade effect to a country's growth rate, consistent with a balance of payments equilibrium.
- Price elasticities effects. The change cased by a change in the relative prices not only acts though the "1" discussed in the last point, the pure terms of trade effect, but also through the price elasticities η and ψ (both normally negative, recall). Under the assumption made in this section on the size of these

[6] See Thirlwall 2003b p.575.

elasticities $|\eta + \psi| \succ 1$, they overwhelm the pure trade effect and then the net effect of a relative price change (p_d- p_f-e) >0 will be to lower the rate of growth of national income. On the other hand if the price elasticities were smaller than that (or in the abnormal case of their being positive), then the improvement in the terms of trade (p_d- p_f-e) >0 would still improve the rate of growth of national income.

3.1.3. An additional assumption

If one further assumes

- $p_d=p_f$ + e, relative prices measured in a common currency do not change over the long-run

then the balance of payments equilibrium growth rate transform into[7]:

$$y_1 = \frac{\varepsilon z}{\pi} \qquad (8)$$

If we look back at equation (6), we see this same last assumption gives εz=x. This turns out to be very useful in practice, since one ahs good data for x but poor data for z. Using this relation, the balance of payments equilibrium growth rate becomes:

$$y_1 = \frac{x}{\pi} \qquad (8.1)$$

3.2. Second Generation BPCG model

It was recognized that the Thirlwall's Law performs moderately differently in the case of developing countries than it does in the developed ones. This difference required a modification of the model so as to explain the unique characteristics and experiences of developing countries. Hence, Thirlwall and Hussain (1982) developed a model

[7] See Ocampo and Parra (2003) for a detailed survey of discussions on terms of trade trends.

incorporating capital flows through which developing countries often financed their ever-growing current account deficits.

Thirlwall and Hussain's (1982) model is as follows. The balance of payments in its initial current account disequilibrium is

$$P_d X + F = P_f ME \tag{9}$$

where P_d is the domestic price of exports, X is the volume of exports, M is the volume of imports, P_f is the foreign price of imports, E is the exchange rate and F is the value of nominal capital flows measured in domestic currency. F>0 indicates capital inflows and F<0 indicates capital outflows. In the rate of change form this becomes

$$\theta(p_d + x) + (1-\theta)f = p_f + m + e \tag{10}$$

where again the lower-case letters represent rates of growth of the variables and θ equals the share of exports and (1-θ) shows the share of capital flows, both as a proportion of total receipts. Hence θ= P_d X/R where R is the total overseas receipts, R= P_d X +F, and (1-θ)= F/R.

If we substitute the rate of growth form of the import (4) and export functions (6) into the rate of change form of the current account disequilibrium (10), we get the balance of payments constrained growth rate in this case (calling it now y_2):

$$y_2 = \frac{(\theta\eta + \psi)(p_d - e - p_f) + (p_d - e - p_f) + \theta\varepsilon z + (1-\theta)(f - p_d)}{\pi} \tag{11}$$

Under the assumption we made above of constant relative prices, $p_d = p_f + e$, equation (11) reduces to:

$$y_2 = \frac{\theta\varepsilon z + (1-\theta)(f - p_d)}{\pi} \tag{12}$$

As before, this same assumption reduces equation (6) εz=x, and so we can re-write (12) as:

$$y_2 = \frac{\theta x + (1-\theta)(f - p_d)}{\pi} \qquad (13)$$

3. Data

This study uses three main data sources: the national accounts of the OECD (Organization for Economic Cooperation and Development) countries, Volume II, Detailed tables published by the OECD; the balance of payments statistics prepared by the CBRT (Central Bank of the Republic of Turkey) and Statistical Indicators (1923-2004) published by the TSI (Turkish Statistical Institute). All statistics are in time series format, in million Turkish Liras (TL), and cover the 1960-2004 period. The total number of observations is 45.

Two main limitations of the data set are the following. The balance of payments statistics for the pre-1975 period were taken from the TSI. However, several changes were introduced to the definition of the sub items of the BOP in the post-1975 era. Some items either totally disappeared (i.e. NATO infrastructure and off-shore) or were moved under different sections of the BOP (i.e. Special drawing rights). The post-1975 era BOP statistics were taken from the CBRT. The shift in the data in 1975 limited the analysis of sub-items of BOP. Second, since the data is annual, the number of observations is small. The ideal data set would be a quarterly one.[8]

[8] See Appendix I for the data source of each variable used in the study.

4. Empirical results

As was mentioned in the literature review in Section 2, a number of studies of the BPCG model with a large number of countries have included Turkey. However, none of these studies focused on Turkey in depth. This section will analyze the Turkish economy within the framework of the first and second generation models of Thirlwall's Law over the period 1960-2004. The period under consideration is not only different but also longer than the periods chosen by the previous studies. This detailed analysis of the Turkish economy gives us the opportunity to compare the pre-liberalization and post-liberalization periods from a balance of payments based perspective. In this section, the validity of the Thirlwall's Law for the two sub-periods of the 1980-2004 period will also be checked. The sub-periodization is done based on the significant shifts in the history of the Turkish economy regarding the steps taken towards liberalization. The post-liberal era (1980-2004) was divided into two periods. The first was the 1980-1989 period, in which Turkey moved from ISI (import substitution industrialization) to an export-led growth strategy and liberalized its trade, which is called early liberalization. The second was the 1990-2004 period, in which the financial system was also liberalized and Turkey moved towards a fully-liberalized phase, which is called full-liberalization.

When one looks at the empirical results from the studies of Hussain and Thirlwall (1982), Bairam (1988), Bairam (1990), Bairam and Dempster (1991) and Perraton (2003), one sees that beyond the variation in the model resulting from the different generations, which was discussed in Section 2, the time periods, the data sources and the operational definitions of some theoretical concepts differ between the studies.

The first step in testing the validity of Thirlwall's Law is to estimate the income elasticity of import demand. The import demand function that I will estimate is (3) above, which I will rewrite here for convenience:

$$M = a\left(\frac{P_f E}{P_d}\right)^{\psi} Y^{\pi} \qquad (3)$$

where as before M and Y are the real values of imports and income respectively, P_d is a doestic price index, P_f is the foreign price of imports and E is the exchange rate.[9] I will use the import demand function in its logarithmic form as Thirlwall and Hussain (1982) did in their study. My estimation results will be fully based on the OECD data for the estimation of the first generation BPCG model. Such data series very often exhibit serial correlation. In line with the work of Bairam (1990) and Bairam and Demspter (1991) on the first generation models, I will consider the effects of serial correlation in the series and do the correction via the Cochrane-Orcutt procedure.

In the second step, based on the estimated income elasticity of imports, I will calculate balance of payments constrained growth rates for both the first and the second generation models of Thirlwall's Law. In regards to the econometric techniques used, several different ways have appeared in the literature to test the validity of the model.

5.1. Application of First Generation Balance of Payments Constrained Growth Model

In Section 3, the first and second generation BPCG models were introduced and the derivations of formulas were explained. For purposes of estimation, as just indicated I will rewrite equation (3) in log form as

[9] See Perraton (2003) for a disscussion on the drawbacks of using this standard form of import demand function especially for developing countries.

$$\log M = c + \pi \log Y + \psi \log(\frac{EP_f}{P_d}) \qquad (3.1)$$

where M is real imports, Y is national income and EP_f/P_d is the ratio of domestic prices to foreign prices in domestic currency. The income elasticity of imports is shown by π and the price elasticity of imports is shown by ψ.

Import demand function for Turkey is estimated for the whole period and its sub-periods. The estimation of equation 3.1 for Turkey using OLS and the OECD data shows that the disturbance terms in the estimated equation are serially correlated. Due to the existence of serial correlation, the data was corrected using the Cochrane-Orcutt procedure. As can be seen from the tables below, following the correction procedure the null-hypothesis - no serial correlation - is accepted at the 0.99 confidence level, for all sub-periods. This can be seen by comparing the critical values for the Durbin – Watson test presented in Table 2 with the Durbin - Watson statistics shown in Table 1. In Table 3 the t-statistic and its p-value for π are shown.

Table 1 Empirical Estimates, First Generation BPCG Model

Periods	Years	Actual y	Actual x	Π	y_1	DW	R^2
Whole period	1960-2004	0.044	0.089	2.074	0.043	1.635	0.987
Pre-liberalization	1960-1979	0.051	0.054	1.304	0.042	1.475	0.917
Early liberalization	1980-1989	0.039	0.140	1.062	0.132	2.113	0.915
Full-liberalization	1990-2004	0.039	0.093	2.746	0.034	2.021	0.990

Table 2 Durbin-Watson Statistics

Durbin -Watson d-statistics at 0.99 confidence level			
obs no	k	d_L	d_U
45	2	1.245	1.423
20	2	0.863	1.271
15	2	0.7	1.252
10	2	0.466	1.333

Table 3 t-statistic and probability of t-statistic for π

	For π	
Years	t-statistic	p-value of t-statistic
1960-2004	14.258	0.00
1960-1979	2.876	0.01
1980-1989	3.177	0.02
1990-2004	25.509	0.00

With π now estimated free from serial correlation distortions, I get:

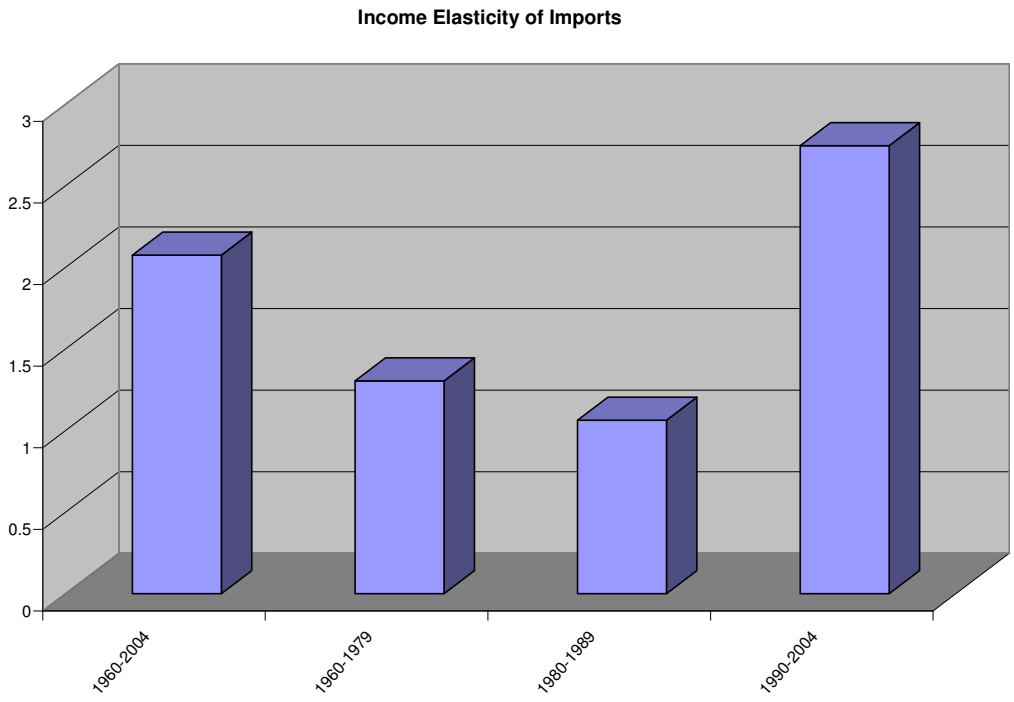

Figure1 Income elasticity of import demand, π

Figure 1 reflects two results that one would expect *a priori* from general economic reasoning. First, one sees the period of full liberalization alone (1990 – 2004) has a higher elasticity for imports than the value averaged over all the periods (1960 – 2004). This increasing pattern is what one would expect shifting from the planned import substitution industrialization (ISI) policies to the export-led growth accompanied by liberalization policies subsequent to 1980. Second, one sees that in the liberal era, income elasticity of

import demand grows as one moves from the early liberalization period (1980-1989) to the full liberalization period (1990-2004). This trend can be explained by the restrictions on the actual trade, particularly on the imports, until the early 1990s. Even though the Turkish economy took significant steps toward liberalization with the decisions of January 24, 1980, the full-implementation of the program took longer. Hence, the actual impact of imports was not observed in the Turkish economy until the early 1990s. The one result that is not what one might expect *a priori* is that the elasticity under the period of partial liberalization is lower than it was in the pre-liberalization period. A possible explanation for is that the change in 1980 was precipitated by a balance of payments crisis, and so although they liberalized a number of things (particularly those that they thought would promote exports), they retained barriers to imports as well as the more discussed capital restrictions.

Based on these estimations of π, as discussed in section 3, predicted growth rates (also called the balance of payments constrained growth rate) are calculated based on the average growth rate of exports (x), divided by the income elasticity of imports (π).

$$y_1 = x / \pi \qquad (8)$$

As it is presented in the Table 1, the actual growth rates (y) and the predicted growth rates under the first generation BPCG model (y_1) are close, and for the whole period almost identical. The only exception is the 1980-1989 sub-period. One possible explanation for this difference could be the influx of capital flows. Since the extended version of Thirlwall's Law includes capital flows as a factor relaxing the balance of payments constraint, if the influx of capital flows is indeed the cause for the poor performance of the first generation model for this period, it could be expected that the

second generation model would do better in this period, which will be analyzed in the following section.

5.2. Application of Second Generation Balance of Payments Constrained Growth Model

The empirical results in this section are based on the results of the estimation of the income elasticities that I already obtained in the previous section. In addition to that, I will measure the impact of capital flows. There is no agreed upon definition for the net capital flows in the literature. Some studies use only the capital account as the capital flows. A broader more common definition is Net Capital Flows= Capital Account + Change in Foreign Reserves. But for the purposes of our study, "capital flows" is seen as a factor relaxing the X=M identity. Of course the current account deficit in terms of goods and services must be balanced out with the remaining items from the balance of payments account. That is, because "Net Capital Flows" for our purposes is whatever relaxes the X=M trade constraint, we add to the usual definition of Net Capital Flows the Errors and Omissions term, and all the other terms in the Current Account besides the trade balance. Hence, the net capital flows can be defined as follows:

$-(X-M)_{\text{goods and services}}$= Net Capital Flows= Current Transfers+ Capital Account+ Change in Reserves+ Net Error and Omissions+ $(X-M)_{\text{income}}$

. As discussed in section 3, (f) is the growth rate of the "net capital flows," and here like all the other growth variables (f) would become the average over the period under consideration. It is obvious that Turkey experienced significant capital flows under the liberalization regime. However, these relatively larger flows were very unstable or erratic for the case of Turkey in the sense that the net capital flows shifted between deficit and

surplus throughout the whole period. This type of data can, and in fact for my data did, cause a data problem for the type of growth formula which is used here, discussed before. As can be recalled, for the denominator I averaged the beginning and ending values. With this sort of large values that switch sign can lead to a denominator very close to zero, causing such points to become very large and distort the data.

In order to deal with this calculation problem for this model, I altered the calculation of the growth rate of each variable as follows.[10] In this alternative calculation, instead of using the average of the beginning and ending year as the denominator (allowing the problem of a very small value when the two had opposite signs and were roughly of the same magnitude) I used the starting year. Of course, if one has starting years in the data with extremely small capital flows, one will still encounter the same problem. That was not the case for the Turkish data – the period was characterized by significant flows every year, even though sometimes they were surpluses and sometimes they were deficits.

It can also be noticed from the formula below that the price variable on the right hand side of the equation dropped because its amount was small enough to neglect. Hence, formula (13) turned into:

[10] Note that this does not change anything conceptually.

$$y_2 \times \pi = \frac{P_d X}{R}(x_t) + \frac{F}{R}(f - p_{dt})$$

$$y_2 \times \pi = \frac{P_{d\,t-1} X_{t-1}}{R_{t-1}}\left[\frac{X_t - X_{t-1}}{X_{t-1}}\right] + \frac{F_{t-1}}{R_{t-1}}\left[\frac{F_t - F_{t-1}}{F_{t-1}} - \frac{P_t - P_{t-1}}{P_{t-1}}\right]$$

$$y_2 \times \pi = \left[\frac{P_{d\,t-1} X_{t-1}}{R_{t-1}} \times \frac{X_t - X_{t-1}}{X_{t-1}}\right] + \left[\frac{F_{t-1}}{R_{t-1}} \times \frac{F_t - F_{t-1}}{F_{t-1}}\right] - \left[\frac{F_{t-1}}{R_{t-1}} \times \frac{P_t - P_{t-1}}{P_{t-1}}\right]$$

$$y_2 \times \pi = \left(\frac{P_{d\,t-1}(X_t - X_{t-1})}{R_{t-1}}\right) + \left(\frac{F_t - F_{t-1}}{R_{t-1}}\right) - \left(\frac{F_{t-1}}{R_{t-1}} \times \frac{P_t - P_{t-1}}{P_{t-1}}\right)$$

$$y_2 \times \pi = \frac{\left(P_{d\,t-1}(X_t - X_{t-1})\right) + \left(F_t - F_{t-1}\right)}{R_{t-1}}$$

$$y_2 = \frac{\left[\left(P_{d\,t-1}(X_t - X_{t-1}\right) + \left(F_t - F_{t-1}\right)\right] / \left(R_{t-1}\right)}{\pi} \qquad (13.1)$$

Results from the calculation of equation 13.1 are reported in Table 4.

Table 4 Empirical Estimates, Second Generation BPCG Model

Periods	Years	y	Π	y_1	y_2
Whole Period	1960-2004	0.044	2.074	0.043	0.040
Pre-liberalization	1960-1979	0.051	1.304	0.042	0.079
Early-liberalization	1980-1989	0.039	1.062	0.132	0.042
Full-liberalization	1990-2004	0.039	2.746	0.034	0.024

It is shown in Table 4 that for the early liberalization era, actual growth rate (0.039) and the predicted one (0.042) are close, as we expected to obtain in the previous section. Since the amount of capital flows dramatically increased as a result of the opening-up of the Turkish economy, this result is not surprising. Instead, it is consistent with what happened in Turkey over the period of 1980-1989. Hence, due to the influx of capital flows, the second generation BPCG model has more explanatory power than the first generation for the 1980-1989 sub-period.

While the second generation model made a huge improvement in predicting the early liberalization period, in which the first generation model did very poorly, it did significantly worse in all other periods. For the late liberalization period, when one would *a priori* expect even greater capital flows than the early period, it went from under predicting by 13% to under predicting by 38%. While that result is still in line with the quality of many of the prediction results for this type of model in the literature, and much better than the problematic first generation prediction for the early liberalization period, this counterintuitive worsening requires further explanation. Similarly, the pre-liberalization period, notwithstanding the fact that one would expect capital flows to be less important there, likewise needs further explanation for its similar percentage worsening prediction. A possible economic explanation has to do with the fact that one of the most important characteristics of the Turkish economy throughout the 1990s was "unsustainable external debt". It is widely accepted in the literature that the significant amount of capital flows into the Turkish economy created debt, starting from the mid-1980s.[11] Due to the lack of a debt variable in the theoretical model applied here, it is not possible to see the direct influence of this debt on the balance of payments constraint, which literally became a debt-constraint for the Turkish economy in the last fifteen years.

5. Conclusion

In this paper, the long-run economic growth of the Turkish economy is analyzed from the balance of payments perspective. First, I analyzed the estimated income elasticities of import demand for the Turkish economy. Second, I applied first and second generation BPCG models using OLS.

[11] See Yenturk (2003) for a detailed analysis of this argument.

The results show that Thirlwall's Law is valid for the case of the Turkish economy over the period of 1960-2004. I analyzed two models based on Thirlwall's Law and their comparative validity for the sub-periods of 1960-2004 period. I conclude that the economic growth was constrained by the balance of payments in Turkey throughout the whole period under consideration. However, for the sub-periods one model or the other did better depending on crucial economic aspects of the given sub-period.

In this framework, I found out that the first generation BPCG model explains the pre-liberal period with its lack of major capital flows better than the second generation model. Similarly, the growth rate of the early liberal era, with its significant capital flows, is predicted better by the second generation model. Finally, both the first and the second generation BPCG models have strong validity for the full period.

The failure of the second generation model to improve on the first generation model in the period of full liberalization could be related to the issue of debt accumulation.

A summary of my empirical results and my main argument can be seen in Figure 2, in which the trends of the actual and predicted growth rates are presented.

Figure 2 is constructed by using a single π estimate, which is 2.074 for the complete period, and the growth rates associated with that. First, the actual growth rate is calculated for each year. Second, the actual export growth rate is divided by the income elasticity of imports (2.074) in order to get the first generation balance of payments constrained growth rate for each year. Third, the numerator of equation 13.1 is calculated for each year and then divided by the income elasticity of imports (2.074) so as to calculate the second generation BPCG rate.

Figure 2 shows that with some slight exceptions in specific years, the actual and predicted growth rates follow more or less the same pattern. The closeness of the actual and the predicted growth rates also shows the relationship between international trade, economic growth and balance of payments. This relationship is the main research question of this study.

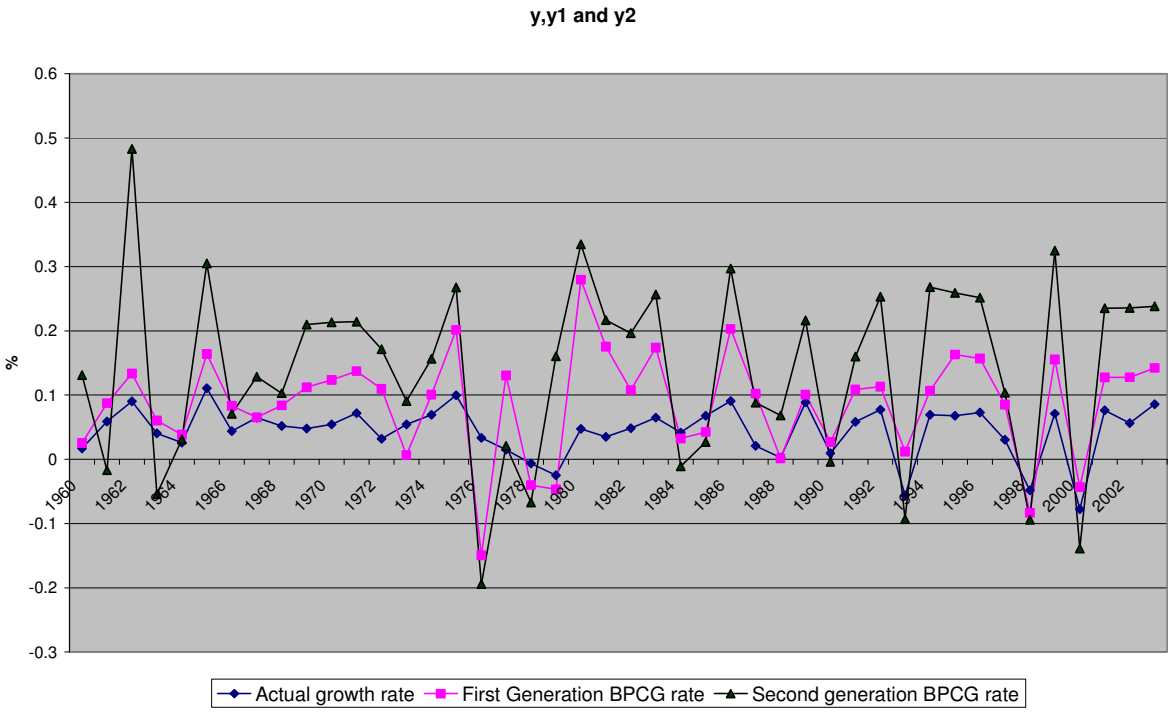

Figure 2 Comparison of actual growth rates with y_1 and y_2, 1960-2004

Looking again at the actual growth rate in the economy in Figure 2, it appears as if the post 1980 liberalization might have slightly slowed the economic growth. But there was in fact no dramatic change; and certainly nor the increased growth promised by supporters of liberalization. The empirical results in this section indicate the importance of one constraint, namely, the balance of payments constraint, as a contributor to the failed

promises of increased growth.[12]The export-led growth strategy of the 1980s reflected itself as a trade deficit in which imports exceeded exports. There is no doubt that in itself export growth functions as an engine of overall economic growth through expanding the national income level. However, the constraint occurs at the point when high income elasticities of demand for imports then transform this into a persistent foreign trade deficit. The post 1980 Turkish liberalization programs led to such a problem.

The policy implication of the model is that an economic policy that reduces income elasticity of demand for imports would relax the BCPG constraint on growth, thus allowing Turkey to achieve more rapid growth. One approach to implement this in Turkey would be to encourage the consumption of more locally produced goods in response to increased income. Coupled with continued export promotion, this would relax the BPCG constraint and increase economic growth. This type of export-based growth can only be done with the help of economic planning. However it is incompatible with the liberal policies that have been pursued for twenty-five years.

[12] This study does not claim that other constraints might not also be important, nor does it attempt to measure the relative importance of other constraints. This paper focuses on only one constraint, i,e, balance of payment constraint.

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Appendix I

Data sources of the variables

Definition of variables (Million TL, annual data)		
Name of the variable	Sign	Data source
K. Gross domestic product (expenditure) REAL	Y	OECD
C. Gross domestic product (expenditure) NOMINAL	Y	OECD
GDP Growth Rate	Y	OECD
GDP Deflator (NOMINAL/REAL)	Pd	OECD
K. Imports of goods and services (REAL)	M	OECD
C. Imports of goods and services (NOMINAL)	M	OECD
Import Growth Rate	M	OECD
Import Deflator(NOMINAL/REAL)	Pf	OECD
Relative Price (GDP Deflator/Import Deflator)	P_d/P_f	OECD
K. Exports of goods and services (REAL)	X	OECD
C. Exports of goods and services(NOMINAL)	X	OECD
Export Growth Rate (m)	X	OECD
Export Deflator(NOMINAL/REAL)	Px	OECD
Exchange rate(import) (TL/$)	E	TSI
Capital Flows	F	TSI & CBRT
Growth Rate of capital flows	F	TSI & CBRT
Total Receipts	R	TSI & CBRT
Share of exports as a proportion of Total Receipts	Θ	TSI & CBRT
Share of capital flows as a proportion of Total Receipts	1-θ	TSI & CBRT
Income Elasticity of Imports	Π	Estimated

Appendix II

Summary of previous applications of Thirlwall's Law to the Turkish economy

Authors	Version	Estimation Technique	Π	Actual y	Predicted y (1)	Predicted y (2)	Period
Hussain and Thirlwall (1982)	1st and 2nd generation	OLS	0.92	5.8	6.1	5.9	1960-1973
Bariam (1988)	1st generation	2SLS	2.68	5.0	6.9	-	1970-1985
Bairam (1990), Bairam and Dempster (1991)	1st generation	OLS	4.1	4.2	5.0	-	1973-1983
Perraton (2003)	Modified 1st generation including terms of trade effect	Cointegration	2.11	4.47	4.77	-	1973-1995