Is Pakistan's Economic Growth Balance of Payments Constrained?

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Abstract

This study provides empirical evidence in support of Balance of Payments Constrained Growth hypothesis. The cointgrating vectors obtained from Johansen analysis are used to study the dynamics of the trade variables. The average growth rates predicted by Balance of Payments Constrained Growth hypothesis are not significantly different from the actual average growth rates over the period 1973-2005. The study calls for a strong need to increase Pakistan's exports, the only way to relax the constraint in the long-run.

Key words: Balance of Payments constrained growth, external imbalances, elasticity of import demand, elasticity of export demand, terms of trade

1. Introduction

This paper is an attempt to explain the growth performance of Pakistan's economy from Balance of Payments point of view. The popular method in economic literature to explain the growth performance of an economy is the one based on the idea formulated by Solow (1956) where supply side factors determine the long-term growth trajectory of an economy while it is assumed that the demand side of the economy will automatically adjust to the new supply conditions. On the other hand, the main focus of this paper is Balance of Payments (BOP) link with the growth rate of an economy. The roots of BOP constrained growth model can be traced from the seminal work of Harrod (1939) where supply adjusts itself in response to demand rather than the other way round.

The formalized version of the BOP constrained growth model was presented by Thirlwall (1979) and has since been the basis of several works e.g. Thirlwall and Hussain (1982), Bairam (1988), McCombie and Thirlwall (1994) and Morino-Brid (1999). This growth model states that an economy's long run growth path cannot be inconsistent from the growth path warranted by the balance of payments equilibrium. In other words, export performance and import behavior of an economy determine its long-term growth trajectory. More significantly, this theory shows that the rate of growth of national income that is consistent with the BOP equilibrium is equal to the ratio of export growth and income elasticity of import demand of an economy.

The expansion in GDP for that matter is constrained by the need to maintain the balance of payments equilibrium. In this connection, the rate of GDP growth that countries can realize is the rate that is consistent with their balance of payments equilibrium. So, "countries' performance in the overseas markets and the response of the world financial markets to this performance contains the rate of growth of the economy to a rate which is below that internal conditions would warrant" (McCombie and Thirlwal, 1994). Mainly due to this factor, the countries are considered to be balance of payments constrained.

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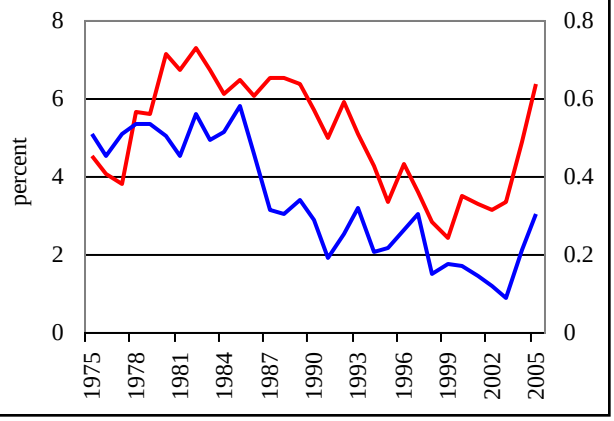
As far as the Pakistan's economy is concerned, the consistent and gradual widening of the trade deficit is mainly reflected in the deteriorating export performance and a constant rise in the import demand especially in recent years. **Figure 1** shows exports performance ratio[3] (EPR) as the deviation from GDP and the actual GDP growth.

It is very important to note from the figure that the GDP growth has followed the export performance ratio throughout the period under review. The deterioration of the external sector performance has always translated into the decline in the overall GDP growth rate.

On the basis of the visible trends in **Figure 1**, the export performance as depicted by EPR curve can be categorized into three distinct phases during 1975-2005.

The first phase during 1975-85 can be characterized as a high export performance era that led to a relatively high GDP growth. The boom in the domestic markets coupled with greater share in the international markets mainly due to Afghan war helped Pakistan to remove its major foreign exchange constraints in that time period.

Figure 1: Export Performance Ratio and the GDP growth



The second phase during 1985-2000 can be considered as a difficult period for Pakistan's economy with declining export performance and the falling average growth rates. The major factors responsible for worsening of external sector performance include the increase in competition in the international market, recession in the domestic economy, gradual decline in the foreign inflows, and economic embargoes after 1998 nuclear detonations.

The third period from 2001-2006 can be considered as a relatively easing period for Pakistan's economy in terms of foreign inflows. Export performance improved significantly because of supportive domestic policies, rising external demand due to robust global growth and enhancement in market share granted to Pakistani exportables[4]. In addition to this, robust increase in foreign remittances due to global crackdown on informal money transfer networks, low interest rate environment with stable inflation in the domestic economy and improvement in the macroeconomic indicators helped to somewhat ease the balance of payments constraints.

Keeping in view all the above discussion, it is important to empirically analyze whether Pakistan's long-term GDP growth rate is balance of payments constrained or not. The rest of the paper is divided into following sections.

Section (II) is a brief literature review of the topic, section (III) provides the theoretical model; section (IV) contains empirical analysis; section (V) describes some implications of the analysis for Pakistan; and final section concludes the analysis.

[3] Export performance ratio (EPR) is measured by the ratio of exports to the average propensity to import. When the exports are equal to imports, the export performance ratio is equal to GDP. EPR can also be computed in terms of percent deviation from GDP. A value of 0 indicates a state of external equilibrium while a value greater than 0 indicates the percentage deviation of the external account from its equilibrium value.

[4] The European Union increased the quota ceiling by 5.6 and 9.4 percent for 2003 and 2004 respectively, the ceiling for US market rose by 8.1 and 15.2 percent during these years. For further details see SBP Annual Report for FY04, p. 137.

2. Literature Review

The BOPCG *(Balance of Payments Constrained Growth)* model is an explanation of the growth process from a demand-oriented perspective of Keynesian economics. This approach stands in contrast to supply oriented framework of neoclassical economics normally utilized to explain the growth rate differences among the countries. Early exposition of this demand-oriented approach to economic growth is found in the works of Harrod (1939), and Kaldor (1957). However, it was Thirlwall's (1979) seminal paper that persuasively put forward the idea that the key factor in determining the growth of a country is the growth of the exogenous component of demand, that is, exports. In this sense, Thirlwall's law is in fact a dynamic analogue of Harrod's (1933) (static) foreign trade multiplier.

A large number of studies have investigated the empirical relevance of the BOPCG model. The technique used by these studies is to calculate the equilibrium growth rate of the economy on the basis of the estimated import demand function. These equilibrium growth rates are then compared to the actual growth rates to test the validity of the BOPCG model. No heed was paid to econometric issues in these earlier studies.

In recent years, however, Astesoglu (1993; 1994) and Bairam (1988 and 1993) have employed cointegration techniques to evaluate the model. Both concluded that BOP constrained growth model is supported by the data. There are various studies that apply the BOP constrained growth model to a set of countries and to individual countries. For example, Hieke (1997) reconsiders the evidence for the law by applying on US economy. Atesoglu (1997) also provides evidence for the law by checking cointegration between real national income and real exports. A comprehensive survey of various empirical issues and methodologies used to evaluate the law is given by McCombie (1997).

Revuelta and Fidalgo (2000) by using Thirlwal's law analyzed the role played by the external trade balance in the determination of economic growth. While using cointegration technique in the classical and the Keynesian framework separately, the authors conclude that the external constraint plays an important role in determining economic growth, but not as important as Thirwall proposes because of relative price differentials across countries.

Filho (2002) extended the balance of payments constraint on growth to incorporate unbalanced trade and debt accumulation. While assuming that small open economies face a liquidity constraint, the paper chalks out the growth and real-exchange-rate policy rules that are consistent with a stable ratio of net exports to income. Given such rules, the results show that the trade balance of a small open economy is residually determined by the ratio of foreign debt to income allowed by international conditions.

Kvedaras and Hansen (2004) examine the prospects for economic growth in the three Baltic countries in the framework of a balance of payments constrained growth model. Based on an estimation of income elasticities of imports and export growth, GDP growth rates consistent with balance of payments equilibrium were calculated. The results of the study show that the calculated rates of growth for Estonia and Lithuania are lower than the growth rates predicted from traditional supply side oriented growth models and these countries face serious balance of payments constraints as far as their GDP growth rates are concerned.

Lopez and Thirlwall (2005) for the seventeen Latin American countries estimated whether the trade liberalization, by allowing the countries to grow faster without sacrificing foreign exchange has improved the trade-off between GDP growth and the trade balance or not? The results of the study show that in the aftermath of liberalization, the majority of countries did grow faster, but

this expansion in their domestic market was at the expense of a deteriorating trade balance. In a full model of trade balance determination, the authors find that trade-off has unequivocally improved only in Chile and Venezuela. In other countries there has been a significant deterioration or no change.

3. The Model

Thirlwall (1979) develops a model for determining the long-run rate of growth of income of a country. The model is based on the balance of payment equilibrium condition:

$$PX = P^{*}M \tag{1}$$

where P and P* are prices of exports (X) and imports (M) respectively.
Taking natural logs and then differentiating equation (1) with respect to time we can write:

$$p + x = p^{*} + m \tag{2}$$

where lower case letters indicate growth rates of corresponding variables in (1).
According to standard economic theory, growth of export depends upon relative price of exports and growth of world income. Similarly, growth of imports can be regarded as a function of relative price of imports and growth rate of home country national income. Thus, we can write:

$$x = \alpha(p - p^{*}) + \omega y^{*}$$
$$m = \gamma(p^{*} - p) + \pi y \tag{3}$$

Where α and γ are price elasticities of exports and imports respectively and ω and π are income elasticities of exports and imports respectively.

To get the equilibrium growth rate (i.e. the growth rate consistent with the balance of payments equilibrium) we must put equation (3) into (2) to get:

$$y_b = \frac{\left[(1 + \alpha + \gamma)(p - p^{*}) + \omega y\right]}{\pi} \tag{4}$$

According to Thirlwall, if we assume that "Marshall-Lerner condition is just satisfied or if relative prices measured in a common currency do not change over the long-run"[5] equation (4) will reduce to

$$y_b = \frac{\omega y}{\pi} \tag{5}$$

Equation (5) is the key equation of the model. Using equation (3) we can also write it as

$$y_b = \frac{x}{\pi} \tag{6}$$

Equation (6) states that growth rate of national income consistent with the BOP equilibrium is equal to the ratio of export growth and income elasticity of imports.

[5] Thirlwall, (1979), pp.49.

Our task in rest of the paper is to estimate the required elasticities in the first step and compute the equilibrium growth rates of Pakistan's national income on the basis of these estimates and then compare the actual growth rates of national income with equilibrium growth over different periods, which will be our third step.

4. Empirical Analysis

For empirical analysis, we make use of the cointegration technique to test the long-term correlation of the export growth and the growth rate of GDP. It is a preferred practice in the literature on BOP constrained growth models to use annual data. The reason is that the topic is primarily associated with the finding of long-term trend of the data, which is more appropriately captured by the annual time series data. For the present study, the data set covers the period from 1972 to 2005[6]. However, the structure of Pakistan's economy has undergone a marked change after 1988, primarily due to two reasons: (a) the economy started moving toward liberalization, deregulation and privatization; (b) Pakistan has availed the structural adjustment facility with its far reaching repercussions in the coming years. In fact, the period from 1988 to late nineties has been termed as 'Era of Structural Adjustment Program' by many economists[7]. To incorporate the effect of this structural change we not only apply the cointegration technique to 1973-2005 sample but also to sub-samples ranging from1973-1988 and from 1988 to 2005. This practice has also been followed by many researchers[8] as it helped in assessing the change in income elasticity of import that is associated with the level of development.

4.1 Unit Root Tests

To check the order of stationarity of the series of GDP, Imports, Exports and Terms of trade we applied Augmented Dickey Fuller test. All the series came out to be integrated of order one, I (1), or first difference stationary (The results of augmented dickey fuller test are shown in **appendix 1**). These results imply that we can estimate the import demand function in levels for cointegration.

4.2 Cointegration results

We employ the Johansen (1988) technique to test the cointegration between difference variables. This procedure is a maximum likelihood approach in which all the unknowns in cointegrating equations are estimated simultaneously. In the first step we test the level of cointegration among logs of imports (Limp), terms of trade (Ltot) and GDP (Lgdp). Based upon the Schwartz information criteria we choose the lag length of 2 in levels. It seems reasonable given the fact that we are using annual data and searching out a long-run relationship. The closed form, unrestricted vector error correction model (VECM) yield results as shown in Table 3 in the appendix.

It is obvious from the table 2, that no matter what specification we adopt, data exhibits at least one cointegrating relationship. As we can expect that long-run relationship probably does not have any trends, thus we adopt the assumption of linear trend in data with intercept and no trend in cointegration equations. The Eigen-value test indicates two cointegrating equations.

Table 3 in the appendix indicates the results of restricted Johansen cointegration test normalized on real imports. It is important to note that the coefficients of both the variables are significant.

[6] All the series are using 2000 as base year. All the data is taken from IFS.

[7] See Zaidi (1999).

[8] see minisymposium on Thirlwall's law in Journal of Post Keynesian Economics (spring,1997).

The error correction coefficients are also significant. The results show that real GDP and terms of trade adjusts more than real imports. It was an expected result because the real imports have inelastic demand especially when the economy is in a developing phase. Moreover, two out of the three error correction coefficients are significant. Therefore, in the short-run there are both quantity and price adjustments that strengthen the evidence of the long-run equilibrating relationship among these three series. These results indicate the existence of cointegration among real imports, terms of trade and real GDP.

To gather further evidence, we examine the existence of cointegration between real GDP and real exports. The results of the closed form unrestricted vector error correction model are reported in Table 4 in the appendix. On the basis of these results we choose the specification of no trend in data, and intercept and no trend in cointegrating equation. The application of Johansen test to this specification rejects the hypothesis of no cointegration at 1 percent level of significance.

Table 5 in the appendix indicates the VECM for cointegration between LGDP and LX. It is important to note that the sign of exports is in line with our prior theoretical expectations validating the relation between exports growth and growth of GDP. Error correction coefficients indicate the existence of adjustment but error correction coefficient of LGDP is insignificant. However, more than 85 percent of the burden of adjustment is on real exports. The other short-run dynamics are insignificant.

To estimate the BOP constrained GDP growth rate of the economy, we need the income elasticity of imports. For that purpose we use Hieke's (1997) import demand function specification.

$$\ln M = a + \gamma \ln(TOT) + \pi \ln Y \qquad (7)$$

Where TOT is defined as the real terms of trade while γ and π are defined as before. Once we estimate the value of π and γ through OLS, the task remains to compute the equilibrium growth rates by putting the value of π in equation (6) of the model.

TABLE 1: Actual GDP growth Vs Equilibrium GDP growth

Sample	Actual GGDP	*Eq GGDP	Deviation	Remarks
1972-2005	5.28	5.51	-0.23	constrained
1972-1988	6.22	6.34	-0.12	constrained
1988-2005	4.57	4.48	0.09	constrained

*Eq GGDP= equilibrium growth rate of GDP

As Table 1 indicates, the actual and predicted or equilibrium values of GDP are not notably different, the close proximity of the actual growth rate and the growth rate consistent with the BOP equilibrium implies that Pakistan's economic growth is BOP constrained. However, in order to make our analysis more robust we follow the Thirlwall's suggestion of applying a parametric test to verify our conclusion. To this end, we make a comparison between the actual values of income elasticity of import demand with its equilibrium values which are computed by

equating $y = y_b$. The equilibrium values of growth rate of gross domestic product (EQ GGDP) along with its actual values are shown in table 1.

The actual values are very close to equilibrium values and all the estimated values of π are significant. Similarly, the deviations of GDP growth rate from the predicted growth rate are also very small. These estimates indicate that Thirlwall law holds and the GDP growth rate is balance of payments constrained in the case of Pakistan.

5. Policy Implications

The main issue for a BOP constrained economy is how to change the ratio of the import and export elasticities in order to increase the pace of economic expansion. There are three competing hypotheses in the literature regarding the determinants of import and export elasticities.

The first, based on well-known Prebish-Singer hypothesis, relates the size of the elasticity parameters to the manufacturing and technological content of the exported and imported products. According to this reasoning the elasticity of exports increases as the exportables become more sophisticated, that is, requiring medium and high skill and technological intensity.

The second hypothesis states that a booming world economy can increase the pace of development of a small developing country by positively affecting its external sector. The improvement in the performance of the external sector will have a positive impact on the overall GDP growth and may favorably change the import and export elasticities of the country.

The third hypothesis states that changes in said income elasticities are brought about by shifts in the commercial policy and/or through measures designed to transfer liquidity among countries. Changes in commercial policy involve changes in trade barriers. Measures to recycle liquidity comprise the increase in surplus nation's imports and unilateral transfers from the surplus to the deficit nations (Davidson, 1992, p.153)

Given the huge reservoir of human resources, a developing country like Pakistan can increase the skill and technological intensity by making its human resources more productive. The examples of India and China provide evidence to it as both economies managed to become a part of Information Technology revolution of the 1990s on the basis of their efficient manpower. Consequently, the lifting up of trade barriers opened the flood gates of foreign investment in these two countries which resulted in a huge exodus of exportables out of these economies. Pakistan on the other hand, has never formulated a long-term plan for the management of its human resources. The result is that we are still relying on the exports that are dominantly based on textiles and agriculture. We could not maintain our high economic growth rates either because of skill shortages or breakdown in exportables because of their weather dependent nature.

Alternative to the above prescription to overcome the BOP constraint is to attract foreign savings. That is the policy focus of many developing countries including Pakistan in recent years. Increased foreign investment in last couple of years indicates that this policy can prove effective in removing the BOP constraint.

Nonetheless, whatever policy Pakistan may adopt, we strongly believe that in the absence of an effective policy to harness the potential of vast human resources of Pakistan, it is extremely unlikely that our economy could maintain its pace of economic growth.

6. Conclusion

The paper tests the application of Thirlwall's law on Pakistan's economy and concludes that law holds for Pakistan. Using Johansen's cointegration test on two separate groups of time series, we found support for stable long-run equilibrium relationship in the series of both the groups. The cointegrating vectors obtained from the Johansen analysis are then used to study the dynamics of the variables. In the case of group-1 variables (i.e. LM, LTOT, LGDP), it comes out that all these three variables adjust in the short-run.

However, speed of adjustment of the terms of trade and imports are greater than that of real GDP. Similarly, in group two variables (i.e. LGDP and LX) the speed of adjustment of real exports is far greater than speed of adjustment of real GDP. It is clear that income elasticity of import demand is not constant in two sub samples. Rather it shows an increase in more recent time period.

The main conclusion of the paper as Thirlwall (2002) very elegantly puts is that "the only sure and long-term solution to raising a country's growth rate consistent with BOP equilibrium on current account is structural change to raise income elasticity of demand for exports and to reduce income elasticity of the demand for imports".

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Appendix

Table 1: Unit root Tests on differenced series

GDP			
ADF Test Statistic	-4.177474	1% Critical Value*	-3.6496
		5% Critical Value	-2.9558
		10% Critical Value	-2.6164
Imports			
ADF Test Statistic	-5.196655	1% Critical Value*	-3.6496
		5% Critical Value	-2.9558
		10% Critical Value	-2.6164
Terms of Trade			
ADF Test Statistic	-5.602314	1% Critical Value*	-3.6496
		5% Critical Value	-2.9558
		10% Critical Value	-2.6164
Exports			
ADF Test Statistic	-8.555535	1% Critical Value*	-3.6576
		5% Critical Value	-2.9591
		10% Critical Value	-2.6181

*MacKinnon critical values for rejection of hypothesis of a unit root.

Table 2: Rank test for co integration equations

Data Trend:	None	None	Linear	Linear	Quadratic
Rank order	No Intercept	Intercept	Intercept	Intercept	Intercept
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend
L.R. Test:	Rank = 1	Rank = 2	Rank = 1	Rank = 1	Rank = 1

Table 3.Vector Error Correction for LM, LTOT and LGDP

Sample(adjusted): 1974 2005

Included observations: 32 after adjusting endpoints

Standard errors & t-statistics in parentheses

Co integrating Esq.	CointEq1		
LM(-1)	1		
LTOT(-1)	-0.903116		
	-0.37145		
	(-2.43131)		
LGDP(-1)	-1.187906		
	-0.12169		
	(-9.76167)		
C	0.742728		
Error Correction:	D(LM)	D(LTOT)	D(LGDP)
CointEq1	-0.017032	0.314254	0.050733
	(-0.09094)	(-0.11963)	(0.02071)
	(-0.18730)	(-2.62689)	(-2.44948)
D(LM(-1))	0.07589	-0.40145	-0.019204
	(-0.17946)	(-0.23609)	(-0.04088)
	(-0.42287)	(-1.70039)	(-0.46981)
D(LTOT(-1))	0.132397	0.208035	0.037938
	(-0.12837)	(-0.16888)	(-0.02924)
	(-1.03135)	(-1.23186)	(-1.29754)
D(LGDP(-1))	0.586159	-1.444034	0.169306
	(-0.81797)	(-1.07608)	(-0.18631)
	(-0.7166)	(-1.34194)	(-0.90875)
C	0.025456	0.074657	0.043961
	(-0.04291)	(-0.05645)	(-0.00977)
	(-0.59319)	(-1.32242)	(-4.49767)
R-squared	0.07946	0.267116	0.274281
Adj. R-squared	-0.056916	0.158541	0.166767
Sum sq. resids	0.167286	0.289516	0.008678
S.E. equation	0.078713	0.103551	0.017928

Table 4. Johansson test for LGDP and LX

Test assumption: No deterministic trend in the data
Series: LGDP LX
Lags interval: 1 to 1

Eigen value	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.443642	25.1943	19.96	24.6	None **
0.182071	6.43134	9.24	12.97	At most 1

*(**) denotes rejection of the hypothesis at 5%(1%) significance level
L.R. test indicates 1 co integrating equation(s) at 5% significance level

Table 5: Vector Error Correction for LGDP and LX
Standard errors & t-statistics in parentheses

Co integrating Eq.	CointEq1	
LGDP(-1)	1	
LX(-1)	-0.793633	
	-0.03951	
	(-20.0864)	
C	-0.911738	
Error Correction:	D(LGDP)	D(LX)
CointEq1	-0.06165	0.856141
	(-0.04055)	(-0.30451)
	(-1.52021)	(-2.8115)
D(LGDP(-1))	0.276446	2.514266
	(-0.17682)	(-1.32769)
	(-1.56347)	(-1.89371)
D(LX(-1))	-0.038161	-0.108887
	(-0.02619)	(-0.19664)
	(-1.45724)	(-0.55374)
C	0.038732	-0.064185
	(-0.00972)	(-0.07302)
	(-3.9829)	(-0.87899)
R-squared	0.181908	0.405051
Adj. R-squared	0.094256	0.341307
Sum sq. resids	0.009783	0.551602
S.E. equation	0.018692	0.140357