Revenue Implications of Trade Liberalization in South Africa

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Abstract

This paper explores the implications of trade liberalization on international trade tax revenue and the macroeconomic implications thereof in the context of the South African economy. The main focus of the paper is on quantitative restrictions in the form of tariffs. In theory the direction of change of revenue as a result of trade reform is ambiguous, depending among other factors on the productivity of trade tax revenue. With these in mind, the paper first establishes the productivity of trade tax revenue in South Africa. This is followed by an econometric analysis of the relationship between tariff revenue and trade liberalization in South Africa. Customs revenue is used as a measure of trade tax revenue. The estimation results show that customs revenue is highly productive. In addition, trade liberalization has a significant influence on customs revenue and that an increase in imports may lead to a reduction in trade tax revenue. On the other hand the results suggest that supportive macroeconomic policies are a prerequisite for successful trade liberalization.

1.0 Introduction

The major concern of GATT has always been to facilitate free trade by encouraging the reduction and elimination of both quantitative and qualitative restrictions of trade. Although it took a while for this strategy to gain popularity, in recent years trade liberalization has become the most common strategy for trade policy among countries. The acceptance of trade liberalization is further enhanced by the wave of globalization.

Reasons for imposing trade restrictions vary among individual economies but range from protection of domestic industries to acquisition of revenue. On the other hand the argument of trade liberalization is premised on the welfare gains that are predicted by theory to result from such measures. In theory trade liberalization is expected to enhance

efficiency in production, international competitiveness and increase the volume of trade (Ebrill et. al., 1999). Among other arguments for trade restrictions, trade revenue is affected by the removal of trade barriers. However in theory the direction of change in revenue is ambiguous. The argument is that the elimination of tariffs may lead to trade reform while preserving revenue by broadening the tax base. According to Pritchett and Sethi (1994) higher tariffs create an incentive for importers to evade tariffs of seek exemptions. In turn, tax evasion affects the productivity of the tax system leading to a less than proportionate increase in tariff revenue. In the same vein, the reduction of tariffs may not always lead to a reduction in revenue. There is a possibility that lower tariffs may lead to an increase in the tax base by lowering the marginal benefit to avoid taxation, hence a rise in revenue following liberalization. Ultimately the elasticity of tariff revenue with respect to tariff rates becomes an important factor in determining the outcome of liberalization. In theory, the final outcome may also depend on factors such as the price elasticity as well as the types of imports. For example, in most developing economies a large portion of imports constitute necessary capital goods, which are unresponsive to changes in their prices. In such cases, a reduction in trade restrictions seldom has any significant influence on the volume of imports in particular. One factor that is important in determining the direction of change in revenue is the substitution and income effects that follow a change in the price of imports as a result of lower tariffs. If residents prefer foreign commodities to domestic commodities and given that markets are open to foreign competition, we can expect the international trade tax base to rise. This in turn may lead to an increase in trade tax revenue following a reduction in trade restrictions.

The effects of trade liberalization on revenue and hence internal macroeconomic policy depend to a large extent on the share of tariff revenue in total revenue. In the case of South Africa, customs revenue accounts for a small percentage of total revenue and has shown a decline since the implementation of trade liberalization policies. However, it is the productivity of such revenue, which has a major stake in how the economy is affected by liberalization.

The South African economy is no exception to the wave of trade liberalization. South Africa has implemented trade liberalization strategies since 1994. This involved among others the reduction and complete removal of tariffs. In South Africa the trade liberalization policy is further complemented by the government's global economic strategy, which aims to extend the existing bilateral, regional and multilateral ties with economies around the world. The EU-RSA-FTA is a recent example of the government's efforts to enhance South Africa's access to international markets. As mush as this policy has its merits, it also has implications for internal economic policy.

This paper seeks to evaluate the implications of the process of trade liberalization on revenue acquired from trade restrictions. The paper focuses primarily on the quantitative restrictions in the form of tariffs. In performing this exercise, the productivity of tariff revenue is South Africa is also established. The specific hypothesis that is tested in this paper is that trade liberalization in South Africa leads to a significant loss in international trade tax revenue

The paper is organized in such a way that we first examine the effects of liberalization on trade revenue from a theoretical point of view. This is followed by an evaluation of the South African trade liberalization policy and the trend of tariff revenues since the commencement of the liberalization policy. The next section outlines the estimation methods used in this exercise. This is followed by an econometric analysis of the productivity of tariff revenue and the relationship between tariff revenues and trade liberalization in South Africa. The paper concludes by making an assessment of the macroeconomic impacts of trade liberalization in South African and making some policy implications.

2.0 Theoretical Underpinnings

In implementing trade liberalization policies, the major focus is on the medium to long term effects. However in the short to medium term the policy is expected to result in a reduction in tax income that accrues from trade. Thus, one of the immediate effects of trade liberalization is felt on the budgetary accounts of government. On the other hand it

is possible that this situation may be turned around in favor of the economy depending on the growth in trade with the new regime.

For economies with a narrow tax base the immediate effect is felt on the debt burden. However for economies that can easily replace trade tax revenues with other sources, the budget position may not be under much strain. Though this argument seems to be adequate, it may not hold for economies in which the productivity of trade tax revenue is high. For such economies, even if the tax base is broad enough, the budget will still be strained at least in the short to medium term.

2.1 Revenue Productivity

The commonly used empirical measures of tax productivity are the buoyancy and elasticity of a given tax system. Of the two, the income elasticity of a tax is difficult to measure as it involves estimation of discretionary changes in tax policy, while an estimate of buoyancy by definition does not control for discretionary changes in tax policy (Osoro, 1993). In theory, tax revenues can change because of changes in the tax rates and rules that are discretionary or form changes in the tax base that are automatic and result from the growth of the tax base. The combined effect of these two factors gives the buoyancy of a tax. The automatic component of the total effect is the elasticity of the tax. On the other hand the buoyancy of a tax measures the responsiveness of tax revenue to changes income without controlling for discretionary changes in tax policy (Osoro, 1993). The following model is often used to estimate the buoyancy of a tax;

$$T = \varphi Y^{\alpha} \varepsilon$$

Where T is trade tax revenue, Y is GDP, α is an estimate of tax buoyancy and ε represents the error term. Since the income elasticity of a tax requires an estimate of the responsiveness of the tax revenue given that the tax structure had remained unchanged, it would involve an account of all discretionary changes in the tax policy during the entire sample period.

3.0 Trade Liberalization in South Africa

The process of trade liberalization in South Africa involved lowering the average tariff level by one third over five years since 1994. As it stood, the agreement was to reduce the level of tariff protection from a weighted average of 30 to 15 percent, to bind 98 percent of tariff lines, to rationalize the tariff structure, to terminate export subsidies and the tariffication of quantitative restrictions in respect of agricultural imports (Calitz, 2000). Lately, more than 10000 tariff lines are being rationalized to less than 6000 and differentiated tariff rates are standardized to six rates ranging from zero to 30 percent (Roberts, 2000). The following table shows the performance of exports and imports and customs revenue in the 1980s and 1990s.

Table 1: Selected indicators of importance of customs revenue

Year	*Exports as % of GDP*	*Imports as % of GDP*	*Customs rev as % of total revenue*	*Customs revenue as % of GDP*	*Budget def/sup as % of GDP*
1988/89	18.99	15.46	3.9	0.43	1.6
1993/94	21.46	19.49	3.6	0.59	4.9
1997/98	25.19	24.04	4.4	1.21	4.4
1999/2000	25.27	22.61	3.5	1.07	3.5

Source: South African Reserve Bank Quarterly Bulletins, various issues

This strategy was backed by strong market-led supply-side measures to facilitate and change the structure of the economy in line with the needs of the economy as outlined in the GEAR program. These included industrial restructuring, technology upgrading, investment and export promotion and SMME development.

4.5 Methodology

Econometric methods of analysis are used to achieve the above objectives.

The following equation, adapted from the work of Osoro (1993) is estimated using the method or ordinary least squares to determine the productivity of trade tax revenue;

$$\ln T = \ln \varphi + \alpha \ln Y + \mu \quad \ldots\ldots (1)$$

where T = customs revenue

Y = GDP

α = a measure of revenue productivity/ tax buoyancy

In order to test the main hypotheses, trade revenue is specified as a function of the import base, the exchange rate, the average tariff rate and a dummy variable representing trade liberalization.

The specific equation to be estimated is;

$$\ln TR = \gamma_0 + \gamma_1 \ln M + \gamma_2 \ln w + \gamma_3 D + \gamma_4 r + \eta \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(2)$$

Where TR is customs revenue as a percentage of GDP, M is imports as a percentage of GDP representing the import base, W is the exchange rate, D is a dummy variable for trade liberalization and r is the average overall tariff rate and η is the error term. The import GDP ratio is included in this equation to isolate the effect of trade liberalization on international trade, which can then be related to the effect on revenue, while the exchange rate is used to represent the macroeconomic effects of this policy. The tariff reform dummy and the average tariff rate will then indicate the direct effect of the reduction in the average tariffs on trade tax revenue.

4.1 Estimation Techniques and data

Ordinary least squares is used to estimate the productivity of trade tax revenue and to establish the effect of trade liberalization on tariff revenue. The equations are estimated in linear logarithmic form. The exchange rate is expressed as Rand per US dollar. This means that an increase in the exchange rate represents a depreciation of the Rand. Customs revenue is used as a proxy for international trade tax revenue. A dummy variable for liberalization is defined as one for the periods of liberalization and zero otherwise. Because of data deficiencies, the overall average tariff rate was calculated from the series on customs revenue and that of the value of imports. Although not all imports are subject to trade restrictions, this measure gives an ideal of the average tariff based on all import commodities. Annual time series data ranging from 1974 to 2000 has been used. All the data has been obtained from several issues of the South African Reserve Bank Quarterly Bulletins. In testing the main hypothesis, the Augmented Dickey Fuller test for unit roots was used to test for stationarity of the data series. All the variables, i.e., the exchange rate, customs revenue as a percentage of GDP and imports as

a percentage of GDP, all in logarithmic form were found to be integrated of order zero, I(0). The series of the average tariff rate was also found to be integrated of zero order. We therefore rejected the null hypothesis of non-stationarity and concluded that all the variables are stationary (see table A1 in appendix for results). With this conclusion we then used ordinary least squares to estimate equation (2).

5.0 Estimation Results

This section presents and discusses the estimation results of the above equations.

Table 2: Estimation results of tariff revenue productivity

Variable	Coefficient	Std. error	t-statistic
Constant	-78.9375	3.8894	-20.2955***
ln GDP	6.5935	0.2968	22.2148***
Sample period : 1974 to 2000			
Adjusted R^2 = 0.9499			
Standard error of regression 0.208			
Diagnostic tests			
Normality	JB(2) = 1.069189	[0.585907]	
Serial correlation	LM(2) = 1.427464	[0.232179]	
Heteroscedasticity	Arch (2) = 0.089236	[0.765151]	
	White (2) = 2.307614	[0.315434]	
Stability	RESET (2) = 0.405454	[0.816501]	

***significance at 1 percent level

Test probabilities in square brackets.

Table 2 shows the estimation results of the productivity of trade tax revenue. According to the diagnostic tests, we conclude that the error term is normally distributed and there are no serial correlation, heteroscedasticity or misspecification errors in this regression. The results exhibit a good fit of 95 percent. The coefficient of GDP is positive and highly significant as expected a priori. This implies that a rise in output will lead to an increase

in international trade tax revenue. A one percent increase in output will increase customs revenue by approximately 7 percent. This coefficient also shows that tax revenue is highly responsive to changes in output.

Table 3: Determinants of trade tax revenue

Variable	Coefficient	Standard error	t-statistic
Constant	-0.4320	0.7611	-0.5677
ln exchange rate	-0.0794	0.1748	-0.4542
ln imports/GDP	-0.6729	0.2566	-2.6226**
Lib dummy	0.49294	0.1624	3.03549**
Tariff rate	0.50303	0.0809	6.21559**
Sample period: 1974 to 2000			
Adjusted R^2 = 0.9627			
Standard error of regression = 0.1541			
Diagnostic Tests			
Normality	JB = 0.348396		[0.840131]
Serial correlation	LM(2) = 4.493232		[0.105757]
Heteroscedasticity	ARCH(1) = 0.453886		[0.500495]
	White (2) = 5.285494		[0.625167]
Stability	RESET(1) = 36.22627		[0.000000]

**significance at 5 percent level

Test probabilities in square brackets.

The estimation results of the determinants of import and trade tax revenues are shown in table 3. The dependent variable in this regression is customs revenue as a percentage of GDP. The diagnostic tests of the regression indicate that the null hypothesis that the coefficients of the variables are jointly equal to zero is rejected. The tests for serial correlation and heteroscedasticity show that he error term is normally distributed and is homoscedastic.

The coefficient of the exchange rate is negative. This result has two implications. Firstly, it means that when the Rand depreciates, the volume of imports falls and hence leads to a loss of trade tax revenue. Secondly however, the fact that this coefficient is not significant in statistical terms implies that the value of imports rises in Rand terms and partially makes up for the loss in revenue resulting from lower trade taxes.

The coefficient of the import-GDP ratio is negative and significant at 5 percent level. A one percent increase in the import-GDP ratio results in a reduction in customs revenue-GDP ratio by approximately 0.67 percent. This indicates that even if the volume and value of imports increase (by a higher proportion that GDP) as a result of trade liberalization, import tax revenue actually falls. This could imply that although a combination of lower tariffs and the depreciation of the current depreciation of the local currency may increase imports both in terms of volume and value, the effect of these two factors on revenue is dampened by the lower value of imports because of lower tariffs. The fact that imports as a percentage of GDP increased after the beginning of liberalization is evident from table 1. Table 1 shows that between 1993/94 and 1997/98 the share of imports in GDP increased from 19.49 percent to 24.02 percent. This may imply that even if the volume of imports increased after the reduction of trade taxes, the increase was not sufficient to offset the loss of revenue as a result of a fall in trade taxes.

The fact that the signs of these coefficients are the same means that their effect reinforce each other. This could imply that even if the exchange rate effect shows an insignificant reduction in revenue, the effect is much more pronounced from the point of view of the import-GDP ratio. This is consistent with a priori expectations considering the fact that most of imports were previously subject to very high tariff rates as a way of protecting domestic industries.

The coefficient of the average tariff rate is positive and significant as expected. This confirms the hypothesis that a reduction in the tariff rates results in a significant loss of customs revenue as indicated by the coefficient of the import GDP ratio.

On the other hand the coefficient of the tariff reform dummy variable is not significantly different from zero. This implies that liberalization policies have not been able to significantly affect international trade tax revenue at least in the short run. In addition, the insignificance of this variable could also imply that the removal of protectionist policies has reduced the marginal benefit of tax evasions. This would then imply that the share of commodities that are subjected to tariffs in total imports rises.

Two main conclusions can be drawn from this analysis. Firstly trade liberalization in the form of tariff reforms has not reduced trade tax revenue significantly. Secondly, macroeconomic policies that support the prevailing macroeconomic environment can significantly facilitate successful trade liberalization. In this regard, the government can take advantage of the depreciation of the Rand to increase exports and thus economic growth while offsetting the reduction in trade revenue due to lower tariffs with higher import values and hence higher trade revenue due to the depreciation.

6.0 Concluding Remarks

This paper set out to establish the effect of trade reform on government revenue. This task is executed by an econometric analysis of the determinants of trade tax revenue. From the analysis, it can be concluded that trade liberalization in South Africa has not led to a significant reduction in trade tax revenue at least in the short run. On the other hand, given the significant negative effect of the import-GDP ratio on customs revenue, it is imperative for government to couple the liberalization policies with other macroeconomic policies such as exchange rate liberalization that would work to mitigate budgetary pressures. One of the important conclusions that can be drawn from the analysis is therefore that a sound macroeconomic policy environment can significantly facilitate successful trade liberalization. In this particular case, prudent exchange rate policies are crucial. Taking advantage of the depreciation of the Rand by increasing import earnings could ensure enough earnings from imports to offset the loss in revenue from trade taxes due to lower taxes.

Appendix

Table A1: Augmented Dickey Fuller Tests for Stationarity of Data Series

Variable	Model	lags	τ_τ, τ_μ, τ	ϕ_3, ϕ_1
lexchrate	Trend and intercept	3	-3.857752**	4.415988**
	Intercept	0	0.187018	0.853218
	None	0	2.467895	
lcustrevgdp	Trend and intercept	0	-3.646929**	7.055126**
	Intercept	3	-1.892803	4.423731
	None	0	-2.938765**	
limpgdp	Trend and intercept	1	-2.00065*	4.281711*
	Intercept	0	-1.462109*	2.137763*
	None	0	-0.1213275	
ltariffrate	Trend and intercept	0	-2.422758*	4.294803*
	Intercept	3	-3.329627**	4.532581**
	None	0	-0.217313	
tariffrate	Trend and intercept	0	-4.000838**	8.003653**
	Intercept	0	-0.905346	0.819651
	None	0	1.027270	

7.0 References

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