THE CAUSAL RELATIONSHIP BETWEEN SELECTED MACROECONOMIC VARIABLES AND TAX ON INCOME, PROFIT AND CAPITAL GAINS IN NAMIBIA

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ABSTRACT

This study examined the causal relationship between taxes on income, profits and capital gains and other macroeconomic variables such as real output, agriculture value added, manufacturing value added and imports. In this regard, pairwise Granger causality technique was applied on quarterly data for the period 1990 to 2015. The results show a unidirectional causal relationship running from taxes on income, profits and capital gains to economic activity. Moreover, the findings also show a bidirectional causal relationship running manufacturing value added to taxes on income, profits and capital gains and vice versa.

Keywords: Tax, macroeconomic, income.

INTRODUCTION

The effects of macroeconomic determinants of tax on income are a major concern to economists and have critical policy implications. Income, profits and capital gains are not only a natural policy targets by themselves but can also be viewed as important factors affecting long run growth.

Thought that taxes change economic growth, has been politically arguable and the question of much debate in the press and among advocacy groups. This is due to the fact that there are contending theories about what motivates economic growth. Contribution is made to Keynesian, demand-side elements, others Neoclassical supply-side factors, while others a combination of the two (McBride, 2012). Ethiopian Chamber of Commerce and Ethiopian Business Development Services Network (2005) indicated that tax is important source of public revenue. As a result, the existence of collective of goods and services necessitates putting some of our income into government hands. An efficient and effective tax system is a necessary requirement for economic growth. Omojemite and Godwin (2012) state that taxes demonstrate the level and speed of economic growth in countries all over the world .Rapid growth is experienced in countries with organized and stable taxation system over the period compared, with those countries that do not have such good individualities. Taxation, effects production and growth. Odusola (2006) examined that government revenue, at some time is motivated by the changes in tax base, tax policies and tax rates .Taxes prevent, household's ability to work, will to work, decisions to save, consumption, labor supply and investment. Tax system of any country also interfere the allocation of resources.

Against this background this paper examines the macroeconomic determinants of tax revenue on income, profit and capital gains in Namibia.

LITERATURE REVIEW

Tax can be defined as financial obligation upon which individuals or property owners finance the government. It is a payment exerted by governmental authority. Tax is not voluntary but a compulsory payment, exacted following a legislative authority and is any contribution imposed by government whether under the name of direct tax or indirect tax. The main role of the tax system is to bring in adequate revenue to meet the growing public sector requirements. Tax incomes are used to run government planned expenditure. Taxes are also imposed by many sub-national entities.

Several studies have also been done on macroeconomic determinants of tax on income due to the fact that, it is an area that deserves attention in economic development. Gura (1997) examined the impact of economic policies and corruption on tax share in GDP using panel data and statistical information about 39 African countries from 1986 to 1995. The author indicated that when political structure is reformed and corruption reduced, the relative decline of agriculture sector share in production, the decline of inflation, and the increase of economy's openness – the relative share of government's tax revenues in GDP substantially increases.

Khattry and Mohan Rao (2002) analyzed the elements of total tax revenue using a fixed-effects regression framework based on a sample of 80 countries over a period covering 1970-98. The results found that structural characteristics, like per capita income and urbanization, have been important in explaining the decline of income tax and trade tax revenues in low-income countries.

Teera (2002) studied the tax system and tax structure of Uganda to explore factors effecting tax revenue in the country. Time series data were used for the period 1970 to 2000 and estimated a model. The results showed that agriculture ratio, population density and tax evasion affect all type of taxes. GDP per capita indicated the unexpected negative sign. Tax evasion and openness showed the substantial negative impact. Aid variable exhibited positive sign since aid in Uganda always supported imports especially raw material so not surprisingly.

Ahsan and Wu (2005) studied the determinants of the share of tax revenue in GDP for developing and developed countries between 1979 and 2002 using panel research method. The results indicated that the coefficients of population growth rate, share of agriculture in GDP and per capita GDP share of trade sector in GDP were positive and significant. Furthermore the coefficient of the share of trade sector in GDP was positive and significant. The coefficient of corruption was negative but insignificant.

Pourmoghim and Sayyed (2005) analyzed the impact of the amount of tax revenues receivable in Iran's tax system using the OLS model from 1959 to 2001. Results pointed out that statistical and social-organizational factors as well as tax policies play an important role in receiving tax revenues. As a result of lack of tax indexation for the inflation structure of Iran's economy, tax

revenue is translated into tax loss. Hence, to address the problem, tax revenues must be enumerated (disinflation) in proportion to the general level of prices.

Ghamtari and Eslamlouian (2007) examined Iran's tax capacity and evaluated it to 14 other selected developing countries. Tax ratio pattern was estimated in the same article using the Seemingly Unrelated Regression (SUR) method between 1994 and 2002. Based on the results, there is a positive significant relationship between tax ratio and the value-added share of industry, services, and foreign trade sectors' share of GDP. Furthermore, the share of the agriculture sector's value-added of GDP, the ratio of foreign loans to GDP, and inflation rate leave negative effects on tax ratio.

Mahdavi (2008) utilized a modified model with a number of explanatory variables based on 43 developing countries over the time period 1973-2002, using the GMM method with cross-section fixed effects. Total tax revenue was positively linked to the degree of international trade, relative size of the urban population, adult literacy rate, and the level of development approximated by per capita income. Conversely, an increase in foreign aid, relative share of old-age population, population density, the degree of monetization, and the rate of inflation lead to lower tax revenue.

Ahmad and Mohammad (2010) investigated the determinants of tax resilience of 25 developing countries by using the cross section data for the year 1998 to 2008 and pooled least square method for result analysis. The agriculture sector it exhibited insignificant effect and for services sector it showed positive and significant effect instead of past insignificant result of many researches. Budget deficit and monetization exhibited positive influence while growth in grants showed negative impact on tax buoyancy.

METHODOLOGY

In analyzing the causal relationship between taxes on income, profits and capital gain with macroeconomic variables, this study used the pairwise Granger causality tests. This is due to the fact that in general, different hypotheses are assumed and usually unsure about variables' cause and effect relationship. To cater for this Granger (1969) developed model based on lead and lag relations in forecasting. Granger causality test is considered a useful technique for determining whether one time series is good for forecasting the other. There are different situations under which Granger causality test can be applied. These include;
(a) A simple bivariate Granger causality where there are two variables and their lags.
(b) A multivariate Granger causality where more than two variables are considered and it is most applicable where more than one variable can influence the results.
(c) Granger causality can also be tested in a Vector Autoregressive (VAR) framework where a multivariate model is extended to test for simultaneity of all included variables.
Granger used twin factors of VAR to find variables' causal relationship. The VAR can be considered as a means of conducting causality tests, or more specifically Granger causality tests. It assumes two series X_t and Y_t that define those messages set.

$$X_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} X_{t-1} + \sum_{i=1}^{k} \alpha_{2i} Y_{t-1} + \varepsilon_{1t} \quad \ldots 3$$

$$Y_t = \beta_0 + \sum_{i=1}^{k} \beta_{1i} X_{t-1} + \sum_{i=1}^{k} \beta_{2i} Y_{t-1} + \varepsilon_{2t} \quad \ldots 4$$

To determine the variables' relationship the following test are conducted on the coefficients.

(i) $\alpha_{2i} \neq 0 \; and \; \alpha_{1i} = 0$: meaning Y lead X or X lag Y.

(ii) $\beta_{1i} \neq 0 \; and \; \beta_{2i} = 0$: meaning X lead Y or Y lag X.

(iii) $\alpha_{2i} = 0 \; and \; \beta_{1i} = 0$: meaning both variables are independent.

(iv) $\alpha_{2i} \neq 0 \; and \; \beta_{1i} \neq 0$: meaning both variables are interactive each other and have feedback relationship.

However, this study uses a simple bivariate Granger causality where there are two variables and their lags.

Data and Data Sources

This study use quarterly annual time-series data covering the period 1990-2015. The variables included are TX: tax on income, profits and capital gain; RY: real output; AV: agriculture value added; MV: manufacturing value added and IP: imports. All data were transformed to natural logarithms. The data series for both variables were obtained from the World Bank's website.

EMPIRICAL FINDINGS

Pairwise Granger Causality

The final step is to test for causality among the variables. It follows that, the presence of a long-run relationship as it was found in the previous section would imply that there is causality at least in one direction too.

Table 1: Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
LNRY does not Granger Cause LNTX	83	1.93538	0.1512
LNTX does not Granger Cause LNRY		2.41527	0.0960
LNAV does not Granger Cause LNTX	83	2.19077	0.1187
LNTX does not Granger Cause LNAV		2.24952	0.1122
LNMV does not Granger Cause LNTX	83	2.79108	0.0675
LNTX does not Granger Cause LNMV		3.44142	0.0370
LNIP does not Granger Cause LNTX	83	1.33825	0.2683
LNTX does not Granger Cause LNIP		2.20082	0.1175
LNAV does not Granger Cause LNRY	99	2.55700	0.0829
LNRY does not Granger Cause LNAV		0.49936	0.6085
LNMV does not Granger Cause LNRY	99	1.67479	0.1929
LNRY does not Granger Cause LNMV		0.13528	0.8736
LNIP does not Granger Cause LNRY	99	1.02627	0.3623
LNRY does not Granger Cause LNIP		7.46512	0.0010

LNMV does not Granger Cause LNAV	99	0.23221	0.7932
LNAV does not Granger Cause LNMV		0.67068	0.5138
LNIP does not Granger Cause LNAV	99	1.41475	0.2481
LNAV does not Granger Cause LNIP		1.58516	0.2103
LNIP does not Granger Cause LNMV	99	0.52156	0.5953
LNMV does not Granger Cause LNIP		3.76325	0.0268

Table 1 presents the result of Granger causality. The variables of interest are the predictability of taxes on income, profits and capital gains by other macroeconomic variables or vice versa. The results show a unidirectional causal relationship running from taxes on income, profits and capital gains to economic activity. This is because the probability value of 0.09, is less than 0.10 level of significance, allowing for the rejection of the null hypothesis. Moreover, the findings also show a bidirectional causal relationship running manufacturing value added to taxes on income, profits and capital gains and vice versa. This is show by the probability values of 0.06 and 0.03 respectively, with the former being less than 0.10 and the latter being less than 0.05 levels of significance respectively, implying a rejection of the null hypotheses. The results also showed other causal relationship among the variables, for example, there is a unidirectional causal relationship running for agriculture value added to economic activity. Similarly, there is also unidirectional causal relationship running from economic activity to imports and from manufacturing value added to imports.

CONCLUSION

This study examined the causal relationship between taxes on income, profits and capital gains and other macroeconomic variables such as real output, agriculture value added, manufacturing value added and imports. The results show a unidirectional causal relationship running from taxes on income, profits and capital gains to economic activity. This is because the probability value of 0.09, is less than 0.10 level of significance, allowing for the rejection of the null hypothesis. Moreover, the findings also show a bidirectional causal relationship running manufacturing value added to taxes on income, profits and capital gains and vice versa. This is show by the probability values of 0.06 and 0.03 respectively, with the former being less than 0.10 and the latter being less than 0.05 levels of significance respectively, implying a rejection of the null hypotheses.

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