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Government debt and budget deficit nexus in Pakistan: Evidence from Ricardian Equivalence Hypothesis.

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ABSTRACT

We checked the validity of Ricardian Equivalence Hypothesis in Pakistan by using structural consumption and saving function. By using ordinary least square method we checked the restrictions of Ricardian equivalence hypothesis that has been rejected by the value of Wald test. The Engel-Granger causality approach explored uni-directional causality between Government Debt & Private Consumption and Government Debt & Private Saving whereas Bidirectional Causality exists between Government Budget Deficit & Private Saving. Hence, we concluded that fiscal policy is effective in case of Pakistan because Ricardian Equivalence does not hold in Pakistan that indicated the policy makers to use fiscal policy as a stabilizing policy of the economy.

Key words: Budget Deficit, Government Debt, Pakistan

JEL Classification: H62, H87

1. Introduction

Investigating the consequences of fiscal policy actions has become one of the debatable issues among policy makers and researchers after the work of Barro on Ricardian Equivalence Hypothesis (REH). Among stabilizations policies, fiscal policy has its own importance because it is comprised on two tools taxes and government spending. In case of REH debt financed tax cut policy is ineffective because consumers are forward looking and does not increase the aggregate demand due to tax cut. Consumers save this extra tax cut for future tax obligations and do not increase consumption expenditures. Hence, fiscal policy remains ineffective in this case. The opponents of REH, the Keynesian are of view that consumers do not care about their future generations and consume this extra tax cut and do consumption expenditures that further reduces budget deficit. Hence, fiscal policy is the best stabilizations policy tool.

Therefore it is very important to evaluate the consequences of fiscal policy actions because otherwise it is very difficult for the government to adopt best policy to achieve its objectives. Ricardian equivalence

holds in the presence of following assumptions (Malengier and Pozzi, 2004): Consumers are infinitely lived, Rationality, No liquidity constraints faced by Consumers, Taxes are lump-sum and perfectly informed

On the other side, high indebtedness causes problems for both developed but especially for developing countries. At the start of 21st century, the major challenge faced by developing countries is successful management of public debt. From past few years Pakistan is facing the problem of budget deficit. Pakistan's government is financing its deficit and developmental projects with public debt from past few years but due to high indebtedness country is facing problems like circular debt, high debt outstanding etc. In Pakistan, domestic debt also raises due to decline in external debt in past few years. The scenario of domestic debt is totally transformed from a high reliance on unfunded debt to high reliance on short term floating debt.

Barro (1974) further extended the concept of Ricardo (1817) about the relationship of debt and private consumption and savings and its impact on macroeconomic variables. several studies have tried to check the validity of REH like the study by Afonso (2008), Barro (1989, 1998), Buchanan (1976), Cardia (1997), Cunningham and Harberger (2005), Drakos (2001), Laurea and Ricciuti (2003), Giorgioni and Holden (2001,2001), Kazmi (1992, 1993, 2001), Malengier and Pozzi (2004), Oseni and Olomola (2013), Gumus (2003), Kasa (1994), Kotlikoff et al. (1990), Haque and Montiel (1987), Waqas and Awan (2011, 2012), Waqas et al. (2011), Saeed and Khan (2012), Ricciuti (2001), Vamvoukas (1997), Whelan (1991) and Barro (1974, 1998).

The present study intends to check the relationship between government debt and budget deficit with private consumption and private savings, hence the existence of Ricardian equivalence hypothesis in Pakistan.

Rest of the study is balanced as, second section discusses the review of previous literature and third section explains about the data and methodology. Section four presents the findings of the study and last section gives conclusion suggests some policy options.

2. Review of Literature

After Barro's seminal paper (1974), many researchers tried to examine the existence of REH in different countries. Some studies check the validity of REH theoretically and some check empirically. Some studies used time series data and other used cross sectional data sets. Panel data is also used in some studies. Some studies construct different forms of consumption functions and other used saving functions for estimation. Different univariate and multivariate methods are used for estimation in these studies. Most of the studies reject the existence of REH in developing countries and some studies accept it.

Haque and Montiel (1987) tried to check the practical importance of REH and explain the significance of fiscal policy in stabilizing the economy. This study simplifies Razin and Leiderman studies and separately checks the effects of Yaari-Blanchard and liquidity constraints for sample of 16 developing countries and rejected the existence of full REH in 15 developing countries out of 16. Whelan (1991) argued with the Moore's views in support of Ricardian Equivalence. This paper indicates that Moore's views are not strong enough to prove Ricardian Equivalence valid. This study re estimated the Moore's Equation and update the tests and rejected the Ricardian Equivalence hypothesis. Kasa (1994) found that there exists a considerable relationship between trade and budget deficits in selected countries keeping government expenditure and expected changes in GNP constant while implied planning horizons are different in all three countries. Cardia (1997) found that taxation has not very strong effects on consumption because actual tests have some weaknesses and give confusing results. The estimates of income, wealth and government spending of simulated series of consumption function give strong results while estimates of tax revenue and government debt are not strong. Vamvoukas (1997)

explored one-way causality among budget deficit and trade deficit of Greek economy. Drakos (2001) inspected the long run relationship among private saving and government domestic borrowing using quarterly time series data for the period 1981:1 to 1996:3. The results depict that raise in government domestic borrowing causes private saving to rise. Yet the increased private saving is not equal to increased government debt. Results also suggest that consumer treat government bond as a net wealth for certain point and as a result raise their consumption. The paper rejects the existence of REH in Greece due to liquidity constraint and uncertainty about future taxes.

In case of Pakistan the study by Kazmi (1992) failed to accept the REH and shows the absence of debt neutrality hypothesis. Kazmi (1993) concluded that there exists 50% difference between the national saving rate of India and Pakistan using demographic and human resource development factors. Kazmi (1994) also rejected the existence of debt neutrality in Pakistan. The estimated consumption function of Pakistan favors the Kormendi-Feldstein and non Ricardian opinion rather than Modigliani and Ricardian opinion. The study by Kazmi (2001) used Blanchard-Evans Models and rejected the existence of REH in Pakistan. The study by Waqas and Awan (2011) by using structural consumption function also rejected the existence of REH because fiscal policy is quite efficient in Pakistan. Waqas et al. (2011) found that REH does not hold in Pakistan because of the presence of infinite horizon and liquidity constraint. Waqas and Awan (2012) investigated the validity of Ricardian equivalence hypothesis in Pakistan using time series data from 1973 to 2010. The study utilized the ARDL cointegration approach in order to find out the short run and long run relationship among variables. Wald test is applied to check restrictions on REH. Result of Wald test rejects these restrictions and study found no evidence of Ricardian equivalence Hypothesis in Pakistan. Saeed and Khan (2012) also found no evidence in favor of REH.

Giorgioni and Holden (2001) concludes that as Government revenue increases, private consumption does not fall significantly while in Israel, Singapore, Italy, Tanzania and Korea, real private consumption increases instead. In case of Israel and Tanzania, private consumption increases due to increase in real public expenditure. This study supports the REP and concludes that deficit has no positive impact on private consumption. Laurea and Ricciuti (2003) try to test the deviation from Ricardian equivalence through creating an overlapping generation experiment. The paper consists of three steps. First step consists of theoretical model, which is ideal for Ricardian equivalence. Therefore this accepts the Ricardian equivalence hypothesis. According to theory, there are two main reasons of rejection of the Ricardian equivalence, presence of liquidity constrained consumers and insecurity about future income. That's why second step included liquidity constrained consumers in the model and third step introduced insecurity of future income in the model. Second and third step reject the validation of Ricardian equivalence hypothesis. Malengier and Pozzi (2004) explores the validity of Ricardian Equivalence proposition using panel data for the period 1980-1997. The data is collected for the 19 OECD countries. They construct a nonlinear consumption function with two types of consumers. The consumer who focuses on current income called rule of thumb consumers and the consumers who consider budget limitations of government called permanent income consumers. By using moment conditions, Generalized Method of Moments (GMM) is estimated. One-level and two-level bootstraps are applied to check this estimator. The results show that in OECD countries, 25% consumers are rule-of-thumb consumers and remaining 75% are permanent income consumers. The study concludes that first type of consumers fails to accept the Ricardian Equivalence proposition while second type also rejects the hypothesis if government asks these consumers to consume less and save more as precautionary measure from their permanent income. Barro (2005) has examined the effects of changes in government purchases on price level, interest rates, budget deficits and quantity of money. He used British data from early 1700s to World War I. This paper concludes that there exists positive relationships between increases in government Purchases and long term interest rates. During this time period, two time gold standards was suspended, from the period 1797 to 1821 and 1914 to 1918. The relationship between government purchases and quantity of money was remains positive only in those periods. The paper also concludes that government spending has no effect on monetary growth. The study identifies that budget deficit and public debt to GNP increases due to increase in government purchases during the war times. Oseni and Olomola (2013) tried to check the empirical existence of

REH in Nigeria using time series data for the period 1981-2011. A model based on permanent income hypothesis (PIH) is estimated. Results supported the existence of REH in Nigeria with respect to the coefficient of government expenditure. According to the results relationship between Government debt and wealth also supports the existence of REH whereas signs of personal income and taxes do not support REH in Nigeria. Afonso (2008) rejected the existence of debt neutrality hypothesis in EU countries and concludes that private consumption decreases due to high government indebtedness.

3. Data and Methodology

Annual time series data from 1978 to 2013 has been used to explore the effects of different variables on Private consumption (PC) and Private saving (PS) in Pakistan. Variables included in the model are Private saving (PS), Private consumption (PC), Tax Revenue (TR), Government budget deficit (GBD), Government debt (GD), disposable income¹ (DI) and wealth² (W). Data sources are IFS, Hand book of statistics on Pakistan Economy 2010 and different years of Economic surveys of Pakistan.

We followed Shamsi and Waqas (2016) and Waqas and Awan (2011) to formulate the structural consumption in order to check the validity of REH in case of Pakistan:

$$PC = \beta_0 + \beta_1 \times TR + \beta_2 \times GD + \beta_3 \times DI + \beta_4 \times W + \mu \quad (1)$$

Where, PC stands for Private consumption

TR indicates Tax revenue

GD is Government debt

DI indicates Disposable income

W stands for Wealth.

Consumption function has following restrictions, which must be fulfilled for the acceptance of REH:

$$\beta_1 = 0, \quad \beta_2 = 0, \quad \beta_3 = \beta_4 \quad (2)$$

First two restrictions explains that tax revenue (TR) and government debt(GD) both must be equal to zero which affirms that private consumption does not affected by changes in TR and GD. While government debt and wealth must be equal which affirms that amount of consumers purchased bonds and government's deficit financing are same.

Similar to the structural consumption function, we followed Shamsi and Waqas (2016) and Kazmi (1994) to formulate the following structural saving function in order to check the validity of REH in case of Pakistan.

$$PS = \beta_0 + \beta_1 \times TR + \beta_2 \times GBD + \beta_3 \times GD + \beta_4 \times DI + \mu \quad (3)$$

Where, PS stands for private saving

TR indicates Tax revenue

GBD stands for Government budget deficit,

GD indicates Government debt

DI indicates Disposable income

¹ A proxy variable of Gross National Income

² Proxy variable is calculated by adding Government debt and M2 by following Waqas and Awan (2011)

Saving function has following restrictions:

$$\beta_2 = \beta_3, \quad \beta_1 + \beta_3 = 0, \quad \beta_1 + \beta_4 = 0 \quad (4)$$

First restriction states that government debt and Government budget deficit must be equal which affirms that amount of Government issued bonds and budget deficit is same. Second restriction explains addition of tax revenue and Government debt must be equal to zero. Third restriction explains that addition of tax revenue and disposable income must also be equal to zero.

4. Empirical Findings

Time series data is non-stationary in nature which provides spurious results (Asteriou and Hall, 2011). Therefore it is required to check the stationarity of variables. This study used Kwiatkowski, Phillips, Schmidt, and Shin Test (KPSS) unit root test.

Table 1: Unit Root Results

VARIABLES	ADF		KPSS	
	TREND AND INTERCEPT		INTERCEPT	
	Level	Difference	Level	Difference
PC	1.869	-4.602*	0.790*	0.412**
PS	4.464*	0.292	0.634*	0.693*
TR	10.447*	1.633	0.698*	0.599*
GBD	7.071*	3.446**	0.597*	0.541*
GD	4.912*	-0.954	0.638*	0.442**
DI	6.991*	8.228*	0.604*	0.229***
W	4.386*	-0.954	0.622*	0.571*

Source: authors 'computation. Note: PC is private consumption; PS is private saving; DI is disposable income; TR is tax revenue; GBD is Government budget deficit; GD is Government debt and W stands for wealth. * shows the significance level at 1% and ** shows at 5% and *** at 10% level. This is taken from Mankinon (1996) one-sided p-values)

Normally time series have trend and intercept, but we estimated the stationarity test by using both situations: with trend and without trend. The result of KPSS test under trend and intercept shows all variables are stationary at level³.

According to OLS results, there exist negative relationship between Tax revenue and private consumption. While, private consumption is positively related with disposable income, wealth and government debt. Hence there is absolute disagreement between our results and theory of REH. Therefore REH does not hold in Pakistan. The results are presented in Table. 4.2.

³ The variable private saving is stationary at 10 percent level of significance.

Table 2: Test of REH Theory for Structural Consumption Function

Variables	Coefficients	t-value	
Constant	1483542	23.348	
Δ TR	-3.518	-2.012	
Δ GD	0.959	3.557	
Δ DI	0.223	-3.271	
Δ W	0.691	2.050	
$\beta_1 = 0, \beta_2 = 0, \beta_3 = \beta_4$ F-statistic = 42.856 [0.000]			
R-Square	0.970	D.W	0.709
SER	249089.5	F-Statistics	252.219
Adjusted R-Square	0.966		

Source: authors' computation

Our results are in line with the Kazmi (1992), Waqas and Awan (2011, 2012), Waqas et al. (2011), Saeed and Khan (2012) and Shamsi and Waqas(2016).

According to OLS results, there exist negative relationship between Government debt and private saving. While private saving is positively related with disposable income, tax revenue and government budget deficit. There is partial negation between our results and theory of REH. Therefore REH is also rejected in case of saving function. The results are presented in Table 4.3.

Table 3: Test of REH Theory for structural saving function

Variables	Coefficients	t-value	
Constant	216.678	.0067[.995]	
DTR	1.661	3.381[.002]	
DGBD	.484	1.676[.104]	
DGD	-.266	-1.801[.081]	
DDI	.072	3.390[.002]	
$\beta_2 = \beta_3, \beta_1 + \beta_3 = 0, \beta_1 + \beta_4 = 0$ F-statistic = 16.440[0.000]			
R-Square	.965	D.W	1.485
SER	130010.0	F-Statistics	218.333[.000]
Adjusted R-Square			

Source: authors' computation

According to OLS results, there exist negative relationship between Government debt and private saving. While private saving is positively related with disposable income, tax revenue and government budget deficit. There is partial negation between our results and theory of REH. Therefore REH is also rejected in case of saving function. Our results are in line with the Kazmi (1991, 1993, 1995) and Shamsi and Waqas (2016).

Granger causality test is used to check the causality among different variables. Causality refers to the ability of one variable to predict (cause) the other variable. Results shows uni-directional causality between Government Debt & Private Consumption, Private Consumption & Tax Revenue, Wealth & Private Consumption, Private Saving & Private Consumption, Government Budget Deficit & Private Saving, Disposable Income & Government Debt, Tax Revenue & Government Debt and between Government Budget Deficit & Wealth whereas there exists Bidirectional Causality between Private Consumption & Private Saving, Disposable Income & Private Consumption, Government Debt & Private Saving, Wealth & Private Saving, Tax Revenue & Private Saving, Tax Revenue & Private Consumption, Wealth & Private Consumption and between Wealth & Tax Revenue (annexure table 1).

5. Conclusion and policy implication

The paper investigates the relationship between government debt and budget deficit with respect to Ricardian Equivalence hypothesis. Two structural form functions are specified: structural consumption function and structural saving function. Variables included in the models are Private saving (PS), Private consumption (PC), Tax Revenue (TR), Government budget deficit (GBD), Government debt (GD), disposable income (DI) and wealth (W). By using ordinary least square method we checked the restrictions of Ricardian equivalence hypothesis that has been rejected by the vale of Wald test. This paper used two unit root tests to check the stationarity of variables; ADF and KPSS. Both functions are estimated using OLS. In case of consumption function, Wald test completely rejects the restrictions on this function and existence of REH in Pakistan. While in case of saving function there exists some deviation between our results and theory of REH and our results partially reject the existence of REH in Pakistan. Finally, Granger causality test is applied to check the causality between different variables. The study found no evidence of Ricardian Equivalence Hypothesis in Pakistan. Therefore the study proves that fiscal policy is effective in case of Pakistan and consumer takes tax cut as a blessings and increase private consumption. Hence Government should expand tax base not tax rate. Expanding the tax base is about creating more assets on the tax rolls (e.g., new business properties, homes, and rental properties) to spread the cost of operations across more entities

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Appendix

Table 1: Result of Granger Causality Test

Null Hypothesis:	F-Statistic	Prob.	Conclusion
PS does not Granger Cause PC	3.93445	0.0308	
PC does not Granger Cause PS	8.95422	0.0009	
DI does not Granger Cause PC	12.7044	0.0001	
PC does not Granger Cause DI	6.81138	0.0038	
GD does not Granger Cause PC	9.99651	0.0005	
PC does not Granger Cause GD	0.54403	0.5862	
GBD does not Granger Cause PC	3.21523	0.0548	
PC does not Granger Cause GBD	0.26794	0.7668	
TR does not Granger Cause PC	3.58868	0.0405	
PC does not Granger Cause TR	7.47583	0.0024	
W does not Granger Cause PC	7.05089	0.0032	
PC does not Granger Cause W	0.18721	0.8303	
DI does not Granger Cause PS	2.91225	0.0704	
PS does not Granger Cause DI	29.6820	1.E-07	
GD does not Granger Cause PS	10.2901	0.0004	
PS does not Granger Cause GD	18.3153	7.E-06	
GBD does not Granger Cause PS	5.79461	0.0076	
PS does not Granger Cause GBD	3.05636	0.0625	
TR does not Granger Cause PS	8.85345	0.0010	
PS does not Granger Cause TR	6.23808	0.0056	
W does not Granger Cause PS	15.8940	2.E-05	
PS does not Granger Cause W	14.3808	5.E-05	

Table 1 (continued)

GD does not Granger Cause DI	3.33654	0.0496	DI→GD
DI does not Granger Cause GD	26.0116	3.E-07	
GBD does not Granger Cause DI	0.30553	0.7391	
DI does not Granger Cause GBD	0.91670	0.4111	
TR does not Granger Cause DI	13.6529	7.E-05	
DI does not Granger Cause TR	28.3434	2.E-07	
W does not Granger Cause DI	18.3565	7.E-06	
DI does not Granger Cause W	28.5428	1.E-07	
GBD does not Granger Cause GD	3.77358	0.0349	
GD does not Granger Cause GBD	0.12890	0.8796	
TR does not Granger Cause GD	7.82589	0.0019	
GD does not Granger Cause TR	1.33326	0.2793	
W does not Granger Cause GD	0.72207	0.4943	
GD does not Granger Cause W	0.61174	0.5493	
TR does not Granger Cause GBD	2.13113	0.1369	
GBD does not Granger Cause TR	1.20326	0.3148	
W does not Granger Cause GBD	2.67870	0.0856	
GBD does not Granger Cause W	7.42548	0.0025	
W does not Granger Cause TR	4.51747	0.0196	
TR does not Granger Cause W	13.1014	9.E-05	