We are living on the cost of our children

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2011

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Abstract

The strict assumptions of Ricardian Equivalence Hypothesis hoist the debates on this issue among different school of thoughts. Its validity entails certain assumptions which raise the doubts on its validity especially in the context of developing countries like Pakistan. The aim of this study is to check the validity of Ricardian Equivalence Hypothesis and its sources of deviation in case of Pakistan. The study use annual data for the period of 1973-2009. Engle and Granger and Johansen cointegration approaches depicts the long run relationship among variables. Generalized Method of Moment results shows that the presence of liquidity constraints and infinite horizons are the sources of failure of Ricardian Equivalence Hypothesis. These findings illustrate concentration towards the importance of fiscal policies in raising private consumption and controlling budget deficits, which are the prime goals of stabilization policies.

Key words: Fiscal policy, Ricardian Equivalence, Pakistan

1. Introduction

External sector's structural imbalances and fiscal slippages pushed the economy towards persistent budget and current account deficit. The sustainability and consequences of these deficits are great challenge for policy makers of developing and developed countries. Pakistan has a bad history regarding budget deficits as a result borrow money from national and international sources. Along with other borrowing sources, Pakistan borrows from international monetary fund (IMF). Since 1988, Pakistan signed eleven loans agreements with IMF, in which seven of them were signed in the regime of Peoples Party Parliamentarian, two were in Pakistan Muslim League (N) and two were in Mushraf regime.

We are sleeping like rabbit and seem to be unaware of that thing that we have to repay this loan plus its interest rate. In the future when the loan maturity ends the government definitely levied new taxes on people for the repayment of this loan. Hence, the burden of loan will transfer to our next generation. The question arise here that are we enjoying our present on the cost of our children or we keep in mind the welfare of our children.

This thought receives fame after the work of Barro (1974) on Ricardian Equivalence Hypothesis (REH). A tax-cut will not increase consumer's private consumption expenditure because he deals government debt in the context of future tax liabilities. Hence, aggregate demand will be unaffected and private savings will increase. Consumers are rational and think about the welfare of their children's in mind. That's why they purchase bonds and does not consider them as a net wealth. They behave like this because they don't want to transfer the burden of debt on their children. They purchase bonds because after the loan maturity their children sell bonds and give the tax. This theory works in the presence of certain assumption like, infinite life horizons, lump-sum taxes, perfect capital markets, perfect substitutability among taxes & bonds, and consumers are rational & farsighted.

The other school of thought is of view that consumer's prefer present on future and neglect the welfare of their children. So, in response to tax-cut they will increase consumption expenditures while, private savings will remain unaffected.

These two approaches actually enlighten about the effectiveness of fiscal policy. If consumers are Ricardian fiscal policy is ineffective and if they behave like Keynesian, fiscal policy is effective, but all this influence depends how consumer treat government debt in the context of net wealth. Therefore in order to design stabilization program a comprehensive research on the issue of REH is very essential. This study investigates the validity of REH and its main sources of failure[1] in case of Pakistan.

The rest balance of study is planned as: part two explains the model specification, part three discuss about data and empirical methodology, part four investigates and interprets the empirical results. Finally, part five presents the conclusions of the study and also provides some policy implications.

2. Various Specifications of the REH

Ricardian equivalence hypothesis, by estimating structural consumption function has been criticized because of the use of current income rather than permanent income. Permanent income is used in some studies but they used one lag of current income as a proxy for permanent income. Secondly, this approach is failed to coexist with utility maximization problem and rational expectations. Flavin (1987) argues that first order condition from consumer optimization problem is compulsory condition to hold REH. Euler equation approach has a plus point because it is based on intertemporal optimization problem. From this approach REH is tested under two conditions, finiteness of planning horizon and excess sensitivity of consumption to current income. After criticizing Feldstein methodology Aschauer (1985) use first order condition and derived consumption function which is based on microeconomic model. Life time wealth is not measured in Aschauer's model, which is actually a hard task. Moreover, Hall's (1978) idea is adapted by Aschauer to measure permanent income, which states that one lag period deals as a permanent income. Aschauer's consumption function is as follow;

$$C_t = \alpha + \beta C_{t-1} - \theta E_{t-1} G_t + u_t$$

with

1 Diamond (1965) said that this will be only possible if consumer lives forever, if consumer realizes that government will collect the tax after his death his consumption pattern definitely will changed. Bernheim (1987), King's (1983) and Con and Jappeli (1990) results showed that consumer's behavior is changed due to liquidity constraints. Feldstein (1988) said that uncertainty in parent's future income fails REH.

$$G_t = \gamma + \varepsilon_1 G_{t-1} + \ldots\ldots\ldots + \varepsilon_n G_{t-n} + \omega_1 D_1 + \ldots\ldots\ldots + \omega_m D_m + v_t$$

C, G and D are per capita consumer expenditure, government expenditure and government deficit, respectively. Whereas, v and u are unexpected shocks and measures the substitution between per capita consumption expenditure and per capita government expenditure. By using this consumption function Aschauer indicate that there is a substitution between government expenditure and private consumption expenditure. Moreover, REH and rational expectation holds.

Graham (1993) criticizes Aschauer and argues that government spending is not used as aggregate measure because private consumption can be influence by government spending. Moreover, disposable income must be used in the model. Graham then introduce following model, in which in case of $\lambda = 0$ REH is accepted. The Δ shows first difference lag and error term is shown by e.

$$\Delta C_t = \alpha - \theta \Delta G_t + \lambda \Delta Y_t + e_t$$

By using above equation Graham shows that Aschauer findings are only valid during certain time period. He found that REH does not hold because there is a significant relationship between disposable income and private consumption. The coefficient of θ has a wide range during test period. The wide range of θ may be due to different types of government purchases.

Aschauer replied in response to Graham comments that his emphasizes is to determine whether there is substitutability between government spending and private consumption or not. He also refuse the Graham's assertion that change in disposable income will change private consumption is enough for supporting Keynesian view.

Aschauer developed another model in which he tried to highlight that whether change in taxes will change private consumption or not.

$$\Delta C_t = \alpha - \theta \Delta G_t + \lambda \Delta Y_t - \phi \Delta T_t + \varepsilon_t$$

Where C shows private consumption, G shows government spending, Y is gross income and T is level of taxes. By using same instruments used by Graham he concluded that their is narrow range of θ and variable tax is less statistically significant then aggregate government spending variable hence, REH is accepted.

In 1985 Blanchard includes both Ricardian and non-Ricardian case through parameter ρ . Different values of ρ shows different behaviors of the family. If ρ equal to zero then successive generations of the family behaves in a continuous manner hence, exhibits REH. If ρ is positive the expected life of an agent is finite and considers debt as a net wealth. He use total wealth (A), marginal propensity to consume with respect to total wealth (α), constant real rate of interest (r) and real labor income after tax (Y^l) to check REH. His function is as follow

$$CP_t = \alpha \left[(1+r) A_{t-1} + \sum_{j=0}^{\infty} \left(\frac{1-p}{1+r} \right)^j E_t Y_{t+j}{}^l \right]$$

With budget constraint

$$A_t = (1+r) A_{t-1} + Y_t^l - CP_t$$

Evans (1988) eliminates human wealth and introduces following consumption function, deduced from Blanchard's (1985) model.

$$CP_t = \left(\frac{1+r}{1-p}\right)(1-\alpha)CP_{t-1} - \alpha p\left(\frac{1+r}{1-p}\right)A_{t-1} + \alpha U_t$$

Where, key parameter is ρ and $\rho > 0$ this shows finite horizons.

Himarious (1995) argue that not only the finite horizons but also the existence of liquidity constraints is necessary for existence of REH. He modified Evan's model and incorporate the possibilities of there being a percentage of family are the subject to liquidity constraints. In case of imperfect markets, the equation is as follow.

$$CP_t = \left(\frac{1+r}{1-p}\right)(1-\alpha)CP_{t-1} - \alpha p\left(\frac{1+r}{1-p}\right)A_{t-1} + \lambda Y_t^l - \lambda\left(\frac{1+r}{1-p}\right)(1-r)Y^l{}_{t-1} + U_t$$

The $\rho > 0$ and $1 > \lambda > 0$ shows the finite horizon and liquidity constraints respectively.

Haug (1996) included government and family budget constraints in Blanchard's (1985) model and derive new consumption function to check REH. Again parameter ρ is the tool to check REH.

If $\rho \neq 0$ then RE holds. Haug estimates following consumption function.

$$\log\left(\frac{CP_t}{Y_t - GP_t}\right) = \vartheta + \rho\frac{D_t}{Y_t - GP_t} + \frac{\alpha}{1-\alpha}\left(\frac{W_t - (Y_t - GP_t)}{CP_t}\right) + u_t$$

By using different specifications some studies favored REH[2], while some rejected[3] REH. The study firstly estimate Graham model (1993) in order to estimate the degree of substitutability between government expenditure and private consumption. Secondly, in order to investigate the validity of REH and its sources of deviation the Evans (1988) and Himirious (1995) models are used. These models investigate the two sources of deviation from Ricardian equivalence; finite horizons and liquidity constraints.

3. Data and Methodology

The study used time series data of Pakistan for the time period of 1973-2009, collected from international financial statistics (IFS) and different Economic Surveys of Pakistan. Government expenditure, private consumption expenditure, tax revenue, government debt, disposable income[4], government budget deficit and wealth[5] are the variables used in this analysis. All the variables are transformed into real per capita.

Before the estimation of time series analysis it is necessary to check the stationarity, long run and short run dynamics of the variables. To check the stationarity of data the study utilized Augmented Dickey Fuller (ADF), The Phillips-Perron (PP), and The Kwiatkowski,

2 Khalid (1996), Rockerbie (1997), Cardia (1997), Lucke (1999), Drakos (2001,2003), Sachsida and Carneiro (2001), Giorgioni and Holden (2001), Walker (2002), Kaadu and Usukula (2004), Safa and Siddiq (2005), Cuaresma and Reitschuler (2007).

3 Haq and Montiel (1987), Whelan (1991), Kazmi (1992, 1994), Ghatak and Ghatak (1996), Abimanyu (1998), Carlos (2001), Khan and Ashraf (2003), Ricciuti and Laurea (2003), Malengier and Pozzi (2004), Gray and Stone (2005), Gracia and Ramajo (2005), Nipple (2006), Apergis and Lyroudi (2006), Afonso (2008), Siddiki (2008), George and Vassilios (2008).

4 A proxy variable of Gross National Income.

5 By following Garcia and Ramajo (2003) this is a proxy variable computed by adding Government debt and M2.

Phillips, Schmidt, and Shin test (KPSS) Unit Root Test. In econometric literature there are lots of uni-variate[6] and multi-variate[7] cointegration techniques. The study used Engle and Granger and Johansen cointegration approaches to identify the log run and short run dynamics among variables.

To check the goodness of fit, diagnostic test like Serial correlation, functional form, normality and heteroskedasticity tests and stability test like Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMsq.) are performed. The study used generalized method of moment (GMM) technique for estimation, introduced by Hansen (1982). This technique is based on assumption that there is no correlation among equation disturbances and instrumental variables. This method picks that parameters in which the correlation among equation disturbances and instrumental variables are as close to zero as possible. It does not require the exact information about the disturbances distribution.

4. Empirical Findings

4.1 Unit root results

To hold off the specious findings the study test the variables for unit root. Three methods of unit root are adopted, ADF, PP, and KPSS. The study test the stationarity of the variables under two models, with intercept and trend and secondly with intercept and no trend. All the variables are *I*(1) under ADF test, except government expenditure. PP test result indicates that all the variables are *I*(1). This time government expenditure is stationary at first difference. In the next model, which considers no trend in data, all the variables are *I*(1) under ADF and PP tests. Under KPSS in the first model, with intercept and trend, all the variables are stationary *I*(1). In the second model, with intercept but no trend, government expenditures, debt, budget deficit and wealth are stationary at *I*(1). Keeping in view the results of three unit roots tests the study deals the variable at *I*(1). (See table 4.1)

After checking the stationarity of data we come to know that all the variables are *I*(1), so Johansen and Juselius (1990) cointegration technique is applied. In JJ approach the first step is to identify the order of VAR. On the basis of AIC and SBC lag length of VAR is selected.

6 Engle&Granger, (1987) and Phillips& Hansen's FMOLS procedures (1990).

7 Johansen, (1988), Johansen & Juselius, (1990),and Johansen's (1995) and Auto-Regressive Distributed Lag (ARDL), proposed by Pesaran& Shin, (1995, 1998), Pesaran et.al., (1996), and Pesaran et.al., (2001).

Table 4.1: Unit root results

Variables	ADF				PP				KPSS			
With trend												
	Level	**P***	**Difference**	**P***	**Level**	**Q***	**Difference**	**Q***	**Level**	**K***	**Difference**	**K***
PC	-0.858332	1	-4.515745***	1	-0.584438	4	-5.147105***	3	0.406519	4	0.128003***	0
GE	-1.342801	2	-2.784593	3	-2.304910	3	-8.870639***	2	0.250744	4	0.078382***	6
YD	-2.747007	2	-4.522433***	3	-3.218326*	4	-7.297097***	3	0.216572	3	0.040134***	3
TR	-1.271937	1	-3.659333**	1	-1.561125	1	-6.420874***	1	0.271975	5	0.096148***	2
DEF	-2.683816	2	-4.230137***	3	-2.983838	2	-7.110698***	3	0.234915	3	0.130042***	9
DEBT	-1.613855	1	-4.518221***	2	-1.588650	4	-4.795103***	2	0.217202	4	0.129368***	5
WEALTH	-1.650663	2	-4.727188***	3	-1.654569	3	-4.813364***	3	0.229953	4	0.143383***	5
Without trend												
PC	1.184270	2	-4.054984***	1	1.284736	5	-4.820169***	3	0.705003	5	0.282753	2
GE	-1.632770	1	-2.744416**	3	-2.240563	3	-8.875123***	2	0.343645	4	0.136109***	5
YD	-1.958120	3	-4.583472***	2	-2.465852	4	-7.396841***	3	0.501016	4	0.52193	3
TR	-1.899120	2	-3.380204***	3	-2.053105	1	-6.235366***	1	0.382604	5	0.273508	3
DEF	-2.727850	3	-4.291479***	1	-3.033944	3	-7.226039***	4	0.167980***	3	0.139215***	9
DEBT	-1.223381	1	-4.414068***	3	-0.891449	1	-4.857441***	3	0.564027	5	0.133827***	5
WEALTH	-1.180424	2	-4.545826***	4	-0.766281	4	-4.837684***	4	0.631965	5	0.146994***	4

Notes: PC is real per capita private consumption; GE is real per capita Government expenditure; YD is real per capita disposable income; TR is real per capita tax revenue; DEF is real per capita budget deficit; DEBT is real per capita debt; WEALTH is real per capita wealth. P* shows the maximum lag length, as determined by using AIC. Under PP test Q* and K* in KPSS test shows Newey-West Bandwith, as determined by Bartlett-Kernel

*** shows 1% significance level; ** shows 5% significance level and * represents 10% significance level.

4.2 Euler equation

4.2.1: Graham Model

In order to check that whether government expenditure and private consumption are substitutes or complements, Graham introduced following function.

$C_t = \alpha - \theta G_t + \lambda Y_t + e_t$

To hold REH the restriction ($\lambda = 0$) must be fulfill. The sign of θ indicate whether government expenditures and private consumption are compliments or substitutes.

Variables used in the Graham model are *I*(1), so we apply Johansen and Juselius (1990) cointegration technique. Based on the AIC lag length of VAR are four but under SBC lag length of VAR are three. The study preferred SBC and set the lag length of VAR three.

Table 4.2: Lag length selection criterion

Order	LL	AIC	SBC	LR test	Adjusted LR
0	-463.80	-466.80	-469.04	19.33[0.22]	11.72[0.00]
1	-390.08	-402.08	-411.05	44.49[0.00]	26.96[0.00]
2	-382.59	-403.59	-419.30	59.47[0.00]	36.04[0.00]
3	-370.01	-400.01	-422.46	206.91[0.00]	125.40[0.00]
4	-360.34	-399.34	-428.52		

Pantula Principal is used to identify the model of cointegration. The model with unrestricted intercept and no trend is selected, among the five cointegration models.

Both Eigen value and Trace statistic reject the null hypothesis of no cointegration. Eigen values and Trace statistics showed that there is one cointegrating vector.

Table 4.3: Johansen Maximum Likelihood Test for Cointegration

Hypotheses	Trace test	5% critical values	Prob-value	Hypotheses	Max-Eigen Statistic	5% critical value	Prob-value
$R = 0$	36.21	31.54	28.78	$R = 0$	26.53	21.12	19.02
$R \leq 1$	9.68	17.86	15.75	$R = 1$	6.71	14.88	12.98
$R \leq 2$	2.96	8.07	6.50	$R = 2$	2.96	8.07	6.50

Error correction model is estimated to dig out the short run dynamics among variables. Error correction term shows the slow speed of convergence towards equilibrium. Moreover, disposable income and government expenditures are positively significantly related with private consumption.

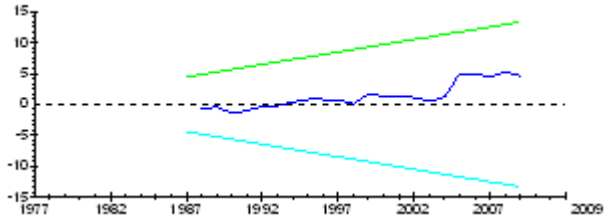
Table 4.4: ECM regression results

Variables	Coefficients	t-values	Prob-value
Constant	11.864	1.5656	0.132
Δ YD	0.0156	3.4166	0.000
Δ GE	0.5471	1.6286	0.115
Δ ECM(-1)	-0.4314	2.5077	0.000
R-Squared	0.399	Adjusted R-Squared	0.364
S.E. of Regression	4.496	DW-statistic	2.083
Log-likelihood	364.77	F-stat	3.547[0.038]

Following graphs of CUSUM CUSUMSQ shows the stability of model for whole sample because the residuals are within 5% critical bonds.

Fig 4.1: Cumulative Sum of Recursive Residual

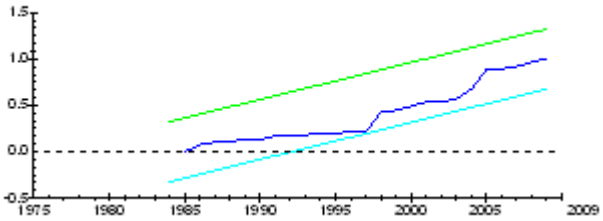
Plot of Cumulative Sum of Recursive Residual



The straight line represent critical bonds at 5% significance level

Fig 4.2: Cumulative Sum of Square Recursive Residual

Plot of Cumulative Sum of Square Recursive Residual



The straight line represent critical bonds at 5% significance level

The study used a constant and the variables PC, GE and YD lagged by first periods, as instruments. The null hypothesis that model is over identified is not rejected by the J-test. The restriction of the model is rejected by the data, hence REH does not hold in Pakistan's economy. The variable of government expenditure is negatively significantly related with private consumption which means that government spending and private spending are the substitutes to each other. Moreover, disposable income is positively significantly related with private consumption, which states that when the disposable income of the consumer increases he will increase his consumption expenditures and behave as opponents of REH.

Table 4.5: Graham Models Results

Variables	Coefficients	Std. Error	t-value
ΔPC is dependant variable			
Constant	3.657	0.925	3.953
ΔYD	0.012	0.006	2.000
ΔGE	-0.858	0.299	2.869
$\lambda = 0$ $\lambda^2(1) = 8.36$ [0.005]			
R-square	0.481	D.W	1.803
SER	9.602	J-test Prob.-value	0.026
F-stat	9.563 [0.000]		

4.2.2: Evans Model

In order to find the sources of deviation from the study utilize following Evans model.

$$CP_t = \left(\frac{1+r}{1-p}\right)(1-\alpha)\,CP_{t-1} - \alpha p\left(\frac{1+r}{1-p}\right)A_{t-1} + \alpha U_t$$

Where, key parameter is ρ . To test REH $\rho > 0$ this shows finite horizons.

In Evans model all the variables are *I*(1). Engle-Granger (1987) cointegration approach is adopted to check the cointegration among variables. This approach is divided into three steps. In first step cointegration equation is estimated by using OLS and residuals of regression are used to find out the cointegration. In second step stationarity test is applied in the residuals. The study use ADF test and rejected the null of no cointegration which concludes that there is cointegration among variables.

Table 4.6: Engle-Granger cointegration result

ADF Test Statistic -4.516 [0.000]		1% Critical Value*	-4.250
		5% Critical Value	-3.546
		10% Critical Value	-3.205
R-squared	0.469	F-statistic	8.852 [0.000]
Adjusted R-squared	0.416	Durbin-Watson stat	1.916
S.E. of regression	7.716		

*MacKinnon critical values for rejection of hypothesis of a unit root.
Null Hypothesis: RES has a unit root

The third step of EG approach is to find out the short run dynamics of variables. Results show that private wealth is positively significantly related with private consumption.

Table 4.7: ECM regression results

Variable	Coefficient	t-Statistic	Prob.
Constant	3.402	2.067	0.047
DW(-1)	0.070	1.669	0.118
ECM(-1)	-0.082	5.493	0.000
R-squared	0.367	F-statistic	4.719
Adjusted R-squared	0.320	Prob(F-statistic)	0.000
S.E. of regression	8.027	Durbin-Watson stat	1.977

Dependent variable is DPC.

The study used a constant and variables PC, W, and DEF as instruments[8]. The null hypothesis that model is over-identified is not rejected by the J-test. Durbin-*h* statistic rejects the null hypothesis of autocorrelation. The results imply the presence of finite planning horizons because the null hypothesis of finite horizon is not rejected. These results are in line with the literature on developing countries (Ghatak and Ghatak, 1996; Khalid, 1996). Wealth is negatively significantly related with private consumption. Permanent income is positively related private consumption which depicts that as permanent income of consumer increases his consumption expenditures also will increase. Hence in case of Pakistan finite horizon is one of the sources of deviation of REH.

Table 4.8: Evans Models Results

Variables	Coefficients	Std. Error	t-value
ΔPC is dependant variable			
Constant	3.127	2.113	1.479
ΔPC(-1)	0.373	0.177	2.107
ΔW	-0.202	0.099	2.040
$\rho > 0$ $\lambda^2(5) = 0.462$ [0.496]			

R-square	0.290	Durbin-*h*	0.369
SER	9.142	J-test Prob.-value	0.016
F-stat	5.666 [0.000]		

4.2.3: Himarios Model

The beauty of Himarios model is that it indicates the two sources of deviations of REH, finite horizons and liquidity constraints. By using GMM technique the study estimates following model.

$$CP_t = \left(\frac{1+r}{1-p}\right)(1-\alpha)CP_{t-1} - \alpha p\left(\frac{1+r}{1-p}\right)A_{t-1} + \lambda Y_t^l - \lambda\left(\frac{1+r}{1-p}\right)(1-r)Y^l{}_{t-1} + U_t$$

8 Lagged by first period.

In Himarios model all the variables are $I(1)$, so Johansen and Juselius (1990) cointegration technique is applied. AIC shows that the lag length of VAR should be four but SBC shows that it should be two. By using SBC lag length of VAR is selected.

Table 4.9: Lag length selection criterion

Order	LL	AIC	SBC	LR test	Adjusted LR
0	-528.41	-531.41	-533.65	242.69[0.00]	147.09[0.00]
1	-428.30	-440.30	-449.28	42.47[0.03]	25.74[0.53]
2	-422.65	-443.65	-459.36	31.17[0.02]	18.89[0.39]
3	-418.42	-448.42	-470.87	22.72[0.00]	13.77[0.14]
4	-407.06	439.06	-475.24	----------	----------

By using Pantula Principal the model with unrestricted intercept and no trend is selected, among the five Cointegration models. Both Eigen value and Trace statistic reject the null hypothesis of no Cointegration. There is one cointegrating vector, based on the Eigen values and Trace statistics.

Table 4.10: Johansen Maximum Likelihood Test for Cointegration

Hypotheses	Trace test	5% critical values	1% critical values	Hypotheses	Max-Eigen Statistic	5% critical value	1% critical values
$R = 0$	37.13	31.54	28.78	$R = 0$	23.24	21.12	19.02
$R \leq 1$	13.88	17.86	15.75	$R = 1$	12.51	14.88	12.98
$R \leq 2$	1.37	8.07	6.50	$R = 2$	1.37	8.07	6.500

ECM model results indicate that disposable income is negatively insignificantly related to private consumption, while wealth is positively insignificantly related to private consumption. Error correction term is significant at 10% significance level and shows the fast speed of convergence towards equilibrium.

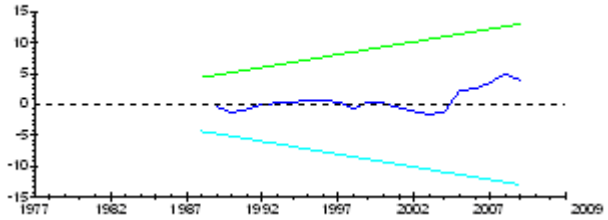
Table 4.11: ECM regression results

Variables	Coefficients	t-values	Prob-value
Constant	3.225	0.761	0.454
Δ YD	-0.018	0.573	0.572
Δ WEALTH	0.064	0.508	0.616
Δ ECM(-1)	-0.898	1.782	0.199
R-Squared	0.297	Adjusted R-Squared	0.266
S.E. of Regression	8.503	DW-statistic	2.089
Log-likelihood	414.006	F-stat	3.542[0.041]

Graphs of CUSUM CUSUMSQ show the stability of model for whole sample because the residuals are within 5% critical bonds.

Fig 4.3: Cumulative Sum of Recursive Residual

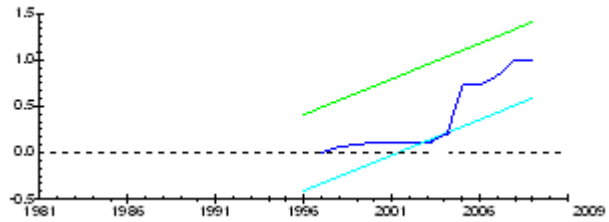
Plot of Cumulative Sum of Recursive Residual



The straight line represent critical bonds at 5% significance level

Fig 4.4: Cumulative Sum of Square Recursive Residual

Plot of Cumulative Sum of Square Recursive Residual



The straight line represent critical bonds at 5% significance level

Following table shows the results of Himarios model, with instruments a constant and variables PC, W, YD, and DEF by first lag. The null hypothesis that model is over identified is not rejected by the J-test. All the variables are significant and Durbin-*h* statistic reject the null hypothesis of autocorrelation. Wald test results shows that the null hypotheses of finite horizon and liquidity constraints are not rejected. These results validates the result of Evans model that finite horizon is one of reasons of deviation from REH. Himarios model investigate that not only the finite horizons but the imperfect capital markets distress the Pakistani consumer to not being a Ricardian. With the existing text on developing countries these results are in line with Haque, 1988; Ghatak and Ghatak, 1996; and Khalid, 1996.

Table 4.12: Himarios Models Results

Variables	Coefficients	t-values	Prob-value
ΔPC is dependant variable			
Constant	-0.193	0.117	0.894
ΔPC(-1)	0.734	2.360	0.000
ΔW	0.346	2.907	0.000
ΔYD	0.044	1.761	0.200
ΔYD(-1)	-0.036	1.384	0.356
$\rho > 0$	$\lambda^2(1) = 1.779$ [0.182]		
$1 > \lambda > 0$	$\lambda^2(1) = 1.869$ [0.171]		
R-square	0.762	Durbin-*h*	0.214
SER	8.22	J-Prob.value	0.008
F-stat	7.894 [0.000]		

5. Conclusion and Policy Options

The aim of this study is to inspect the REH and its sources of failure by using the annual data of Pakistan from 1973-2009. Graham (1993), Evans (1988) and Himarios (1995) models are used to investigate the sources of deviation from REH. ADF, PP and KPSS unit root results shows that all the variables are *I*(1). JJ and EG approaches of cointegration investigates the long run relationship among the variables. Evans (1988) and Himarios (1995) model results shows that the finite planning horizons and the imperfect capital markets distress the Pakistani consumer to not being a Ricardian.

The findings of the study confirm the effectiveness of fiscal policy because consumers treat government debt as a net wealth. Thus fiscal policies should be used as major policy instruments in order to boost private consumption and control trade deficits, which are the prime goal of stabilization policies in Pakistan. Moreover, the issuance of bonds for Public Works Programs is fruitful because consumers treat government bonds as a net wealth. The findings, about the crowding out consequence or substitutability among public and private expenditure show that the public spending either has no crowding out effect or is a poor substitute for private consumption. This advocates the possibility of expansionary effects of government spending on aggregate demand even if the Ricardian Equivalence holds.

References

Afonso, A. 2007. Euler Testing Ricardo and Barro in the EU. *Economic Bulletin*. 5:1-14.

Abimanyu, Y. 1998. Using Indonesia's Real Exchange Rate to Test Ricardian Equivalence. *International Economic Journal*. 12:17-29.

Apergis, N. and Lyroudi, K. 2008. Private and Government Consumption in Transitional Economies: A Panel Data Analysis. *Journal of Economic Development*. 33:.

Aschauer, D. 1985. Fiscal Policy and Aggregate Demand. *The American Economic Review*. 75:117-127.

Aschauer, D. 1988. The Equilibrium Approach to Fiscal Policy. *Journal of Money, Credit and Banking*. 20:41-62.

Aschauer, D. 1989. Is Public Expenditure Productive? *Journal of Monetary Economics*. 23:177-200.

Aschauer, D. 1993. Fiscal Policy and Aggregate Demand : Reply.*The American Economic Review*. 83:667-669.

Barro, R. 1974. Are Government Bonds Net Wealth? *The Journal of Political Economy*. 82:1095-1117.

Barro, R. 1979. On the Determination of the Public Debt. *The Journal of Political Economy*. 87:940-971.

Barro, R. 1980. Federal Deficit Policy and the Effects of Public Debt Shocks. *Journal of Money, Credit, and Banking* 12: 747–761.

Barro, R. 1989. The Ricardian Approach to Budget Deficits.*The Journal of Economic Perspectives*. 3:37-54.

Bernheim, D. 1987. Ricardian Equivalence: An Evaluation of Theory and Evidence. *NBER*, Macroeconomics Annual.263-315.

Cardia, E. 1997. Replicating Ricardian equivalence Tests with Simulated Series. *The American Economic Review*. 87:65-79.

Cuaresma, J. C. and Reitschuler, G. 2007. Is Ricardian Equivalence Ricardian Proposition an 'Aerie Fairy Theory for Europe? *Economica*. 74:682-694.

Diamond, P. 1965. National Debt in a Neoclassical Growth Model. *The American Economic Review*. 55:1126-1150.

Drakos, K. 2001. Testing Ricardian Equivalence Theorem: Time Series Evidence From Greece. *Journal of Economic Development*. 26:1-12.

Drakos, K. 2003. Testing the Ricardian equivalence proposition: Panel data Evidence From the EU. Working Paper, Department of Economics. University of Rome.

Eisner, E. 1989. Budget Deficits: Rhetoric and Realities. *The Journal of Economic Prespectives*. 3:73-93.

Evans, P. 1985. Do Large Deficits Produce High Interest Rates? *The American Economic Review*. 75:66-87.

Evans, P. 1988. Are Consumers Ricardian? Evidence for the United States. *The Journal of Political Economy*. 96:583-1004.

Evans, P. 1993. Consumers are not Ricardian: Evidence from Nineteen Countries. *Economic Inquiry*. 31:534–548.

Evans, P. 2001. Consumer Behaviour in the United States: Implications for Social Security Reform. *Economic Inquiry*. 39:568–582.

Feldstein, M. 1982. Government Deficits and Aggregate Demand.*Journal of Monetary Economics*. 9:1-20.
Feldstein, M. 1988. The Effects of Fiscal Policies When Incomes Are Uncertain : A Contradiction to Ricardian Equivalence. *The American Economic Review*. 78:14-23.
Feldstein, M. and Douglas, E. 1990. Government Debt, Government Spending, and Private-Sector Behavior Revisited: Comment. *The American Economic Review*. 80:589-599.
Garcia, A. and Ramajo, J. 2003. Fiscal Policy and Private Consumption Behaviour: The Spanish Case. *Empirical Economics*. 30:115–135.
Ghatak, A. and Ghatak, S. 1996. Budgetary Deficits and Ricardian Equivalence: The Case of India. *Journal of Public Economics*. 60:267-282.
Giorioni, G and Holden, K. 2001. Does the Ricardian Equivalence Proposition Hold in Less Developed Countries. *International Review of Applied Economics*. 17:209-221.
Giorioni, G. and Holden, K. 2001. Some Further International Evidence on Ricardian equivalence: A VECM Approach. Working Paper, Center for International Banking, Economics and Finance.
Graham, F. and Himarios, D. 1993. Consumption, Wealth, and Finite Horizons: Tests of Ricardian Equivalence. *Economic Inquiry*. 34:527-544.
Graham, F. 1993. Fiscal Policy and Aggregate Demand: Comment. *The American Economic Review*. 83:659-666.
Graham, F. 1995. Government Debt, Government Spending, and Private-Sector Behavior: Comment. *The American Economic Review*. 85:1348-1356.
Gray, J. and Stone, J.A. 2005. Ricardian equivalence For Sub National States. University of Oregon Eugene.
Hall, R. 1978. Stochastic Implications of the Life Cycle/Permanent Income Hypothesis: Theory and Evidence. *Journal of Political Economy*. 86:971 987.
Haug, A. 1996. Blanchard's Model of Consumption: An Empirical Study. *Journal of Business and Economic Statistics*. 14:169–177.
Haque, N. U. and Montiel, P. 1987. Ricardian Equivalence, Liquidity Constraints, and the Yari-Blanchard Effect: Tests for Developing Countries. IMF Working Paper.
Haque, N. U. and Montiel, P. 1989. Consumption in Developing Countries: Tests for Liquidity Constraints and Finite Horizons. *The Review of Economics and Statistics*. 71:408-415.
Hayashi, F. 1985. The Effect of Liquidity Constraints on Consumption: A Croos-Sectional Analysis. *Quarterly Journal of Economics*. 100:183-206.
Hayashi, F. 1985. Tests for Liquidity Constraints: A Critical Survey. *NBER,* Working Paper, No. w1720.1-46.
Himarios, D. 1995. Euler Equations Test of Ricardian Equivalence. *Economic Letters*. 48:165–171.
Kaadu, H. and Uuskula, L. 2004. Liquidity Constraints and Ricardian Equivalence in Estonia. Working Papers of Eesti Pank, No.7.
Kazmi, A.A. 1991.Saving, Consumption and Ricardian equivalence: A Macro Econometric Analysis of Pakistan. Ph.D. Dissertation, Boston University, Boston, U.S.A.
Kazmi, A.A. 1992.Ricardian equivalence: Some Macro Econometric Tests For Pakistan. *The Pakistan Development Review*. 31:743-758.

Kazmi, A.A. 2001.Ricardian Equivalence Hypothesis: Some Empirical Tests for Pakistan Based on Blanchard-Evans Models. *The Lahore Journal of Economics*. 6:75-92.
Khalid, A.M. 1996. Ricardian Equivalence: Empirical Evidence from Developing Economies. *Journal of Development Economics*. 51:413-432.
Kormendi, R. 1983. Fiscal Policy and Aggregate Demand. *The American Economic Review*. 73:994-1010.
Kormendi, R. and Meguire, P. 1986. Government Debt, Government Spending, and Private Sector Behaviour: Reply. *American Economic Review*. 76:1180–1187.
Kormendi, R. and Meguire, P. 1990. Government Debt, Government Spending, and Private Sector Behaviour: Reply and Update. *American Economic Review* 80:604–617.
Kormendi, R. and Meguire, P. 1986. Government Debt, Government Spending, and Private Sector Behaviour: Reply. *American Economic Review*. 85:1357–1361.
Lucke, B. 1999. Econometric Tests of Ricardian Equivalence: Results for Germany. Universität Hamburg. Fachbereich Wirtschaftswissenschaft. Institut für Wachstum und Konjunktur.
Leiderman, L. 1987. Testing Ricardian Neutrality with an Intertemporal Stochastic Model. *NBER*, Working Paper No. 2258.
Malengier, G. and Poozi, L. 2004. Examining Ricardian Equivalence by Estimating and Bootstrapping a Non-linear Dynamic Panel Model. Money Macro and Finance Research Group Confrence.
Marinheiro, C.F. 2001. Ricardian equivalence:An Empirical Application to Portuguese Economy. Katholieke University Leuven Workshop in International Economics.
Modigliani, F. and Sterling, A. 1986. Government Debt, Government Spending, and Private Sector Behaviour: Comment. *American Economic Review*. 76:1168–1179.
Modigliani, F. and Arlie, S. 1990. Government Debt, Government Spending, and Private Sector Behavior: A Further Comment. *The American Economic Review*. 80:600-603.
Mohabbat, K.A. and Ashraf, A. 2003. Ricardian equivalence: Evidence form South American Countries. *International Business and Economic Research Journal*. 2:
Niple, K. 2006. Are We Ricardian? Evidence form U.S Countries. *Issues in Political Economy*. 15:
Pemberton, J. 2004. Ricardian Consumers with Non-Keynesian (and possible Ricardian) Propensities. *Scottish Journal of Political Economy*. 51:95-104.
Reitschuler, G. and Jesús, C.C. 2004. Ricardian Equivalence Revisited: Evidence from OECD countries. *Economics Bulletin.* 5:1−10.
Ricciuti, R. and Laurea, D. D. 2003. An Experimental Analysis of Two Departures Form Ricardian equivalence. *Eonomic Bulletin* 8:1-11.
Robert, R.B., Mankiw, N.G., and Zeldes, S.P. 1987. Ricardian Consumer with Keynesian Propensities. *American Economic Review*. 76:676-691.
Rockerbie, D.W. 1997. Are Consumers Ricardian When Some Are Liquidity Constrianed? *Applied Economics*. 29:821-827.
Sachsida, A. and Carneiro, P. E. 2001. Capital Stock, Saving and Public Debt: Are Brazilians Ricardian? Catholic University of Brasilia; Institute for Applied Economic Research.
Safa, M. F. and Siddiq, F. K. 2005. Assessment of the Canadian Experience. Third Annual Meeting of The Atlantic Canada Economic Association.
Seater, J. 1993. Ricardian Equivalence. *Journal of Economic Literature*. 31:142-190.

Seater, J. and Roberto, M. 1985. New Tests of the Life Cycle and Tax Discounting Hypotheses. *Journal of Monetary Economics*. 15:198-215.
Siddiki, J.U. 2008. The Ricardian Equivalence Hypothesis: Evidence from Bangaldesh. *Applied Economics*. 42:1419–1435.
Vamvoukas, A.G. and Gargalas, N.V. 2008. Testing Keynesian Proposition and Ricardian Equivalence: More Evidence on the Debate. *Journal of Business and Economics Research*. 6:67-76.
Walker, W. C. 2002. Ricardian Equivalence and Fiscal Policy Effectiveness in Japan. *Asian Economic Journal*. 16:285-302.
Whelan, K. 1991. Ricardian Equivalence and the Irish Consumption Function: The Evidence Re-examined. *The Economic and Social Review*. 22:229-238.