Ricardian Equivalence: Some Macro-econometric Tests for Pakistan

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The Ricardian Equivalence Hypothesis (REH) since resurrected by Barro (1974) states that deficit financing and taxation produce the same intertemporal allocation of consumption. To establish his theorem, Barro has to make a number of restrictive assumptions such as: all government revenue is collected by lump-sum taxation, debt is believed to be eventually repaid, capital markets are perfect, there is no uncertainty and agents are 'effectively' infinite-lived. To motivate the last assumption, Barro shows that because of purely altruistic motives, the agents derive utility from the welfare of their children and their grandchildren and so on such that through the inter-generational transfers, they act virtually like the infinitely lived.

With the publication of Barro's seminal paper, a flood of theoretical and empirical literature on Ricardian Equivalence has emerged which was published mostly in the 1970s and 1980s. A complete review of the literature is not possible. However, it must be pointed out that not a single study to the author's knowledge, has appeared dealing with developing countries. Kochin (1974); Aschauer (1985); Kormendi (1983); Leiderman and Razin (1988) have produced empirical support for the Ricardian Equivalence Hypothesis using data on USA, Canada and other developed countries. On the other hand, Buchanan (1986); Brennen (1987); Modigliani, Jappali and Pagano (1985); Feldstein (1976); Feldstein and Elmendorf (1987); Haque (1988); Buiter and Tobin (1980); Poterba and Summers (1988) produce evidence which is generally inconsistent with the basic logic of the Ricardian Equivalence Hypothesis. The overall reviews of the debate are presented in Bernheim (1987); Boskin, Flamming and Gorini (1987); Bernheim (1989) and Leiderman and Blajer (1988), which generally come to the conclusion contradicting the findings of the Ricardian Equivalence Hypothesis. A comprehensive review of REH literature is given in Kazmi (1991).

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The growing literature on the subject can be divided into three categories:

(a) "The Composite Models of REH" which directly measure the relation-ship between fiscal deficit and public debt and the level of consumption and savings;

(b) "The Decomposed Models of REH" which estimate the consumption function taking into account the entire set of variables such as taxes, subsidies, interest payments, public debt and wealth variable etc.; and

(c) "The Euler Equation Models" which analyse the consumer's inter-temporal optimisation behaviour under budget constraints imposed by the comsumer's personal resources as well as the public sector budget constraint.

In the present paper, the results of some of the important "Composite Models of REH" are presented based on macroeconomic data of Pakistan for the year 1960–88. The hallmark of "Composite Models of Ricardian Equivalence" is that they help in testing in clear terms the validity of the competing hypothesis of consumer's behaviour such as the conventional hypothesis, the Life-Cycle Hypothesis and the REH. Most of these models have their origins in Kochin (1974) and Modigliani, Jappali and Pagano (1985). The present model which is developed below is a hybrid of the two and is based on the following variables:

NNP = Net national product;

Yd = Disposable income;

CT = Total consumption expenditure;

Cp = Private sector consumption expenditure;

Sp = Saving of the private sector;

Sg = Saving of the government;

ST = $Sp + Sg$ = National saving;

T = Direct taxes + indirect taxes;

W = Beginning of period wealth of private sector including government debt; and

D = Beginning of period government debt, net of the holdings of the central bank and of the foreign sector.

The following identities are used in the "Composite Models":

$$Yd = NNP - T \qquad \qquad \text{...} \quad \text{...} \quad \text{...} \quad \text{(i)}$$

$$Sp = Yd - Cp \qquad \qquad \text{...} \quad \text{...} \quad \text{...} \quad \text{(ii)}$$

$$NNP = Cp + Cg + Sp + Sg = CT + ST \quad \text{...} \quad \text{...} \quad \text{...} \quad \text{(iii)}$$

$$DEF = -Sg = Cg - T \qquad \qquad \text{...} \quad \text{...} \quad \text{...} \quad \text{(iv)}$$

The REH Model

The income variable that is relevant for a test of Barro's hypothesis is $N\acute{N}P$ minus government spending, the reason being that the intertemporal budget constraint faced by private agents is defined by the total physical output of the economy net of the resources used up by the government – irrespective of whether the government is using debt or taxes to finance the purchase of these resources. For the same reason, D, government debt has to be netted out from the relevant wealth variable:

$$Cp = a \ (NNP{-}Cg) = b \ (W{-}D) = a \ (Yd{-}DEF) +b \ (W - D) \ ... \quad (v)$$
$$St = (1 - a) \ (Yd - DEF) - b \ (W - D) \quad ... \quad ... \quad ... \quad ... \quad (vi)$$

Equation (vi) brings out the implication that in such an economy no crowding-out of investment can result from an increase in government debt, for a given level of government expenditures: a debt-financed decrease in taxes will increase DEF by the same amount as it increases Yd, thereby leaving the total saving of the economy unaffected.

The Conventional Model

This model can be expressed by means of the conventional consumption function:

$$Cp = a \ Yd +b \ W, \quad ... \quad ... \quad ... \quad ... \quad ... \quad ... \quad ... \quad (vii)$$

that can be converted into an equivalent saving function:

$$St = (1 - a) \ Yd - DEF - b \ W \quad ... \quad ... \quad ... \quad ... \quad ... \quad (viii)$$

It is instructive to compare the predictions of (viii) with its Barro-analogue in Equation (vi). According to REH, national saving would not be affected by an equal-expenditure switch from taxes to debt-financing. Equation (viii) instead shows that, according to the conventional models, an equal-expenditure increase in the government deficit (DEF) is expected to reduce total saving by the amount of the DEF (since the direct effect $- DEF$ is partly offset by the indirect effect $(1 - a) \ DEF$ via the increase DEF in after-tax income Yd). This implies that, for given income, the REH would predict that the switch from taxes to debt will not affect investment, whereas the conventional model would imply crowding-out in proportion to the marginal propensity to consume.

The LCH Model

This theory leads to a consumption function that is a hybrid of the REH Equation (v) and of the conventional model of Equation (vii). It implies, in fact,

that consumption depends on income net of taxes and wealth, just like the conventional model. However, the relevant variables are not current income and taxes, but rather the present discounted value of these flows, as anticipated over the balance of life. The expectational elements in the LCH, however, create similarities with the REH model, in that current fiscal policy has implications for future tax flows, which in turn affect consumption.

Similar considerations suggest that the LCH calls for adding to (vii) a term $d\ DEF$, predicted to have a negative coefficient on the ground that, for a given level of current taxes, the presence of deficit signals that future taxes will have to rise to service the interest (and pay back the principal) on new debt issue. Thus the LCH consumption function must be written as:

$$CP\ =\ a\ Yd\ +b\ W\ +\ c\ D\ +\ fDEF \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \text{(ix)}$$

Again, with infinite life (as the REH effectively assumes), the present value of taxes to service DEF is precisely equal to $-\ DEF$ and $f\ =\ -\ a$. Then the first and the last term of (ix) combines into:

$a\ \{[NNP - (T)] - Cg - (T)]\}\ =\ a\ (NNP -\ Cg)$, and (ix) effectively coincides with (v). The LCH instead, moving from the assumption that the planning horizon of consumers may be long but not infinite, suggests that $-1 < f < 0$, where f should probably be close to zero.

The usefulness of the model embodied in (ix) stems from the fact that it provides the basis for a simultaneous test of the three competing hypotheses namely, the conventional hypothesis (which stipulates that private consumption is a function of disposable personal income and wealth), the Ricardian Equivalence hypothesis which incorporates disposable income, deficits, wealth and debt as explanatory variables in the consumption function, and the life-cycle hypothesis which is a hybrid of the two hypotheses. All the three hypotheses imply that the value of a and b should be positive and comparable to those obtained in earlier literature on the consumption function. As for c and f, they are presumed to be non-positive and have values in the interval $[-b, 0]$ and $[-a, 0]$ respectively. The estimated coefficients of the above model help in determining the validity of various hypotheses on consumer behaviour. The values at or close to the upper bound would lend support to the conventional view, value at or close to the lower bound would support the RE hypothesis; whereas the life-cycle hypothesis (LCH) by Modigliani would, in principle, be consistent with any values in the middle, though (LCH) expectations are that they should not be too far from the upper bound.

Beside the above basic model, the following models of consumption have been estimated to judge the robustness of parameters:

$$Cp = a0 + a1\ Yd + a2\ W + aw\ D + a4\ DEF + a5\ DUM = ut$$
$$Cp = a0 + a1\ Yd + a2\ W + a3\ D + a4\ DEF + a5\ (C)\ t{-}1 + ut$$
$$Cp = a0 + a1\ Yd + a2\ DEF + a3\ M + a\ (Cp)\ t{-}1 + ut$$

The OLS estimates of private consumption functions for Pakistan for the period 1960–88 are presented in Table 1. In Equation (1) of the table the signs of the coefficients for disposable income (Yd), net wealth (W), net public debt (D) and public deficit (DEF) are consistent with theory. Whereas W and D have opposite signs, their coefficients have somewhat comparable values. However, the magnitudes of coefficients of Yd and DEF are so divergent from each other that there is hardly any support for the Ricardian Equivalence Hypothesis. Considering the low t-statistic for the coefficient of W, it cannot be regarded as different from zero. Moreover, the coefficient of DEF is significant at 10 percent level only. This further weakens the case for the RE proposition.

The inclusion of the dummy variable (DUM) which has a value of 1 for 1965-66 (the year of war with India) and zero otherwise, does not significantly alter the results of Equation (1). There are only two observable changes in the results of Equation (2) as juxtaposed to those of Equation (1). The value of the coefficient of DEF rises up marginally along with its t-statistics, but despite the increase in its magnitude it remains too low to provide any support for complete tax discounting as envisioned under RE theorem. The value of the Durbin-Watson statistic rises in Equation (2), but still it remains in the indeterminate region.

In Equation (3), the lagged value of dependent variable (Cp) was included to estimate a consumption function close to the permanent income hypothesis. This has significantly reduced the magnitude of the coefficient of DEF, though increased the value of R, DW and F-statistic. The coefficients of D and DEF have negative signs, but taking into account their small t-statistics, they cannot be judged as different from zero. The net impact of the inclusion of lagged consumption is that the regression results show a substantive divergence between the actual operations of fiscal policy in Pakistan and expectations embodied in the pure Ricardian Equivalence theory.

Equation (4) of Table 1 provides an unequivocal proof of absence of complete tax discounting among the consumers of a developing country like Pakistan. The equation which is almost a replication of Kochin's well-known "tax discounting" model helps in getting inferences in a straightforward manner. Since W and D are excluded from the equation, a direct comparison of the coefficients of Yd

(= 0.517) and *DEF* (= –0.205) clearly shows that even if *DEF* has a significant coefficient (its *t*-statistics is only –1.127) the extent of tax discounting would have been only 40 percent *a la* Kochin. From Equations (3) and (5) it is easy to conclude that permanent income models of consumption for Pakistan fail to produce results consistent with Barro's debt-neutrality hypothesis.

Table 1

Composite Models of Ricardian Equivalence Private Consumption Functions for Pakistan: 1960-1988 (OLS Estimation)

	(1)	(2)	(3)	(4)	(5)	(6)
C	18.966	21.799	12.751	26.347	19.525	41.135
	(0.468)	(0.548)	(0.381)	(1.727)	(0.343)	(0.948)
Yd	0.830	0.822	0.506	0.517	0.485	0.465
	(18.891)	(18.92)	(5.106)	(5.175)	(3.432)	(3.084)
W	0.011	0.013	–0.001	–	0.063	0.424
	(0.313)	(0.394)	(–0.03)		(0.263)	(2.562)
D	–0.071	–0.057	–0.072	–	–0.09	–0.017
	(–0.654)	(–0.535)	(–0.818)		(–0.283)	(–0.468)
DEF	–0.317	–0.375	–0.144	–0.205	–0.081	–0.121
	(–1.479)	(1.754)	(–0.786)	(–1.127)	(–0.797)	(–1.131)
M	–	–	–	–0.162	–0.248	–0.398
				(–0.781)	(–1.107)	(–1.765)
$(Cp)^{-1}$	–	–	0.423	0.411	0.020	0.149
			(3.519)	(3.493)	(0.906)	(0.626)
DUM	–	–19.175	–	–	0.386	–
		(–1.403)			(1.977)	
R^{-2}	0.988	0.988	0.992	0.922	0.991	0.989
DW	1.186	1.566	1.671	1.715	405.252	413.610
F	566.439	471.815	670.545	870.193	2579.960	3094.610
SEE	13.183	12.925	10.857	10.655	28	28

Notes: (i) *Yd* is disposable income, *W* is net wealth, *D* is net public debt, *DEF* is deficit, *M* is monetary base, $(Cp)^{-1}$ is lagged private consumption, (real per capita), *DUM* is a dummy variable with a value of 1 for 1965-66 (the year of war with India) and 0 otherwise.
(ii) *t*-statistics are in parentheses.

Equations (5) and (6) of Table 1 were estimated with the inclusion of lagged *Yd* and lagged *DEF* with a view to analysing some of the dynamic properties of the consumption function. Equation (5) also includes the lagged dependent variable as an explanatory variable. The results again are not very encouraging from the RE point of view. In Equation (5) the coefficient has the right sign with the magnitude almost half of the coefficient of *Yd*, but is insignificant at the traditional 5 percent level of significance. When looked at along with the positive but insignificant coefficient of lagged *DEF*, and negative and insignificant coefficients for *W* and *D*, the Equation, despite high R^2 shows substantive departures from the pure RE conditions. The lagged dependent variable was excluded from Equation (5) and the results are given in Equation (6). The regression coefficients assume new values but the signs remain unchanged. The significant and negative coefficient is comparable with the coefficients of *Yd*, and would imply a fairly high level of tax discounting in this case. But if we take the combined magnitude of *DEF* and its lag and compare it with *Yd* and its lag, the Ricardian Equivalence fails to hold in any remote sense.

Saving Functions

The Ricardian Equivalence theorem can also be tested by estimating a savings (private or total) function for an economy. The total saving functions modelled on the pattern of consumption functions have been estimated for Pakistan for the period 1960–88. The results are given in Table 2. In Equation (1) of the table, we find that whereas *Yd* and *W* have positive signs, *DEF* and *D* have negative signs. Only *Yd* has a significant coefficient at the traditional 5 percent level of significance. The insignificance of coefficients of the fiscal variable *DEF* and *D* fails to lend any credence to the RE proposition which postulates that these variables should have significant coefficients with opposite signs as compared to the coefficients of *Yd* and *W* respectively. With *Yd* and *DEF*, on the one hand, and *W* and *D*, on the other, having coefficients equivalent in magnitude. The coefficients of *Yd* and *DEF* in Equation (1) are fairly close to each other in magnitude and also opposite in sign, which *prima facie*, are consistent with the debt-neutrality hypothesis but considering the small value of *t*-statistics equal to –0.876 of the coefficient of *DEF*, it does not differ significantly from zero. As a corollary, it fails to validate the RE proposition which requires that the coefficient be significant at the traditional 5 percent level. Similarly, the insignificance of the coefficient *D* (with $t = -0.32$) fails to lend any support for the RE theorem.

The regression results, however, are altered when we include *DUM* (dummy variable) and *M* (monetary base) as the right-hand variables. In Equation (2),

Table 2

Composite Models of Ricardian Equivalence National Saving Functions for Pakistan: 1960-1988 (OLS Estimation)

	(1)	(2)	(3)
C	–86.947	–81.852	–98.871
	(–2.094)	(–2.215)	(–2.921)
Yd	0.152	0.137	0.126
	(3.368)	(3.402)	(3.458)
W	0.047	0.052	0.020
	(1.347)	(1.660)	(0.651)
D	–0.004	–0.021	–0.160
	(–0.032)	(–0.214)	(–1.414)
DEF	–0.172	–0.278	–0.057
	(–0.786)	(–1.398)	(–0.287)
M	–	–	0.767
			(2.553)
$(ST)^{-1}$	–	–	–
DUM	–	–34.496	–36.283
		(–2.718)	(–3.178)
R^{-2}	0.815	0.854	0.882
DW	1.624	1.245	1.553
F	31.918	33.809	36.023
SEE	12.717	11.999	10.775

Notes: (i) C stands for a constant term; Yd is disposable income, W is net wealth, D is net public debt, DEF is fiscal deficit, M is monetary base, $(ST)^{-1}$ is total savings (dependent variable) lagged by one year, DUM is a dummy variable with a value of 1 for 1965-1966 (war with India) and zero otherwise.
      (ii) t-statistics are in parentheses.

the inclusion of the dummy variable which has a value of 1 for 1965-66 (the year of war with India) and zero otherwise, raises the coefficients of *DEF* and *D* in terms of magnitude while the coefficient of *DEF* becomes significant at the 10 percent level. Moreover, since the magnitude of *DEF* is almost double the coefficient of *Yd*, this suggests that deficits are likely to reduce total savings substantially. In other words, the substitution of taxes with government bonds will result in a

disproportionate decrease in total savings when compared to an induced increase in savings stemming from higher disposable income due to reduced taxes. In this equation the insignificance of the coefficient of D with t-statistics of only -0.214 again fails to produce any support for debt-nautrality whose validation crucially rests on the level of significance and the absolute size of the coefficients of both D and DEF.

The re-estimation of the basic equation after including M and DUM brings about a transformation of results as the coefficient of DEF in Equation (3), becomes insignificant while the coefficient of D is negative and significant at the 10 percent level. From this Equation, it appears that now the adverse effects of the bonds-for-tax swap on total savings operate through the variable of public debt.

Taking the results of the saving functions together, we find hardly any support for the debt-neutrality hypothesis, even though the rejection of the hypothesis is also less than conclusive.

The Unrestricted and Restricted Versions of Consumption and Saving Functions

With a view to determining whether the coefficient of Yd and DEF on the one hand, and the coefficient of W and D, on the other, have equal magnitude, we ran the unrestricted (U) and restricted (R) versions of the various consumption and saving models and applied the F test. We define $Z1 = Yd - DEF$ and $Z2 = W - D$ and give the results of various regressions (unrestricted vs. restricted) in Table 6.3. In the set (1) of consumption function, since $Fc > F^*$, we reject the null-hypothesis of equal coefficients of YD and DEF on the one hand and W and D on the other. The rejection of hypothesised equality of these paired co-efficients provides grounds for rejection of the RE Hypothesis itself.

The results of the unrestricted (U) and restricted (R) versions of the saving models have been presented in Equations (3) to (5) of Table 3. The objective here, as in case of the consumption function, is to determine the equality of magnitude of the coefficients of Yd and DEF on the one hand and those of W and D on the other. Since in all regressions, $Fc < F^*$ at the traditional 5 percent level of significance, we can not reject the hypothesised equality of the paired coefficients. The only reason for these results is that unlike the case of the consumption function, the coefficients of the savings function especially those of the fiscal variables are very imprecisely estimated and cannot really be used to validate the RE theorem. A similar, if not identical problem, was confronted by Buiter and Tobin (1980) when the coefficients of the fiscal variables i.e. g (government purchases functions and services) and *gdef* (government deficit) in their

Table 3

Composite Models of Ricardian Equivalence Unrestricted (U) and Restricted (R)
Versions of Consumption and Saving Functions

$$(Z1 = Yd - DEF \text{ and } Z2 = W - D)$$

Consumption Functions

(1) (U) Cp = $18.97 + 0.83Yd + 0.01 W - 0.07D - 0.32DEF$
                (0.47)   (18.89)   (0.31)   (−0.65)   (−1.48)

SSR = 4171 R^{-2} = 0.99   D.O.F. = 24

(R) Cp = $21.05 + 0.82Z1 + 0.03W - 0.01D$
                (0.48)   (17.21)   (0.73)   (−0.09)

SSR = 5153 R^{-2} = 0.98   D.O.F. = 25
Fc (=5.64)   > F^* (1.24)   (= 4.26)

(2) (U) as in (1) above

(R) Cp = 20.54   +   0.83Z1   +   0.03Z2
                (0.48)   (22.10)   (0.74)

SSR = 5157 R^{-2} = 0.99   D.O.F. = 26
Fc (= 2.833) < F^*2,24 (= 3.40)   at 5 percent level
Fc (= 2.833) > F^*2,24 (= 2.54)   at 10 percent level

Saving Functions

(3) (U) St = $-81.85 + 0.14Yd + 0.05W - 0.28DEF + 0.21D - 34.50DUM$
                  (−2.22)   (3.40)   (1.66)   (−1.40)   (0.21)   (−2.72)

SSR = 3311 R^{-2} = 0.85   D.O.F. = 23

(R) St = $-81.86 + 0.14Z1 + 0.05W - 0.004D - 32.56DUM$
                  (02.26)   (3.60)   (1.57)   (0.45)   (−2.66)

SSR = 3381 R^{-2} = 0.986 D.O.F. = 24

Fc (= 0.556) < F^*(1.23) (= 4.28)

(4) (U) St = $-29.89 + 0.01Yd + 0.05W - 0.02D - 0.11DEF - 0.16(CT)^{-1}$
                  (−1.97)   (0.08)   (1.24) (−0.29)   (−0.49)   (1.23)

SSR = 4089 R^{-2} = 0.81   D.O.F. = 22

(R) St = $-94.17 + 0.27Z1 + 0.05W - 0.034D - 0.014(CT)^{-1}$
                  (−2.03)   (0.24)   (1.22) (−0.30)   (1.17)

SSR = 4142 R^{-2} = 0.81   D.O.F. = 23
Fc (= 0.285)   < F^* (1.22) (= 4.30)

(5) (U) St = $-80.83 + 0.08Yd + 0.05W + 0.02D - 0.26DEF - 0.07(CT)^{-1} - 32.31DUM$
                  (−1.86)   (0.670)   (1.41)   (90.17)   (−1.16)   (0.55)   −2.31

SSR = 3262 R^{-2} = 0.84   D.O.F. = 21

(R) St = $-94.17 + 0.03Z1 + 0.05Z2 - 0.14(CT)^{-1}$
                  (−2.12)   (0.25)   (1.25)   (1.24)

SSR = 4142 R^{-2} = 0.81   D.O.F. = 23
Fc (= 1.86)   < F^*(1.22) (= 3.07)

consumption functions turned out to be insignificant at the 5 percent level. They had to conclude that "the lack of statistical significance of the variables that should reflect the presence or absence of debt neutrality [*g, gdef*] is reflected in our inability to reject the hypothesis that the coefficients on *y* (real income per capita), *t* (taxes net of transfers) and *gdef* (government deficit) are the same, at the 5 percent level of significance. This gives scant comfort to proponents of debt neutrality. However, the coefficients of *g* and *gdef* are statistically insignificantly different from zero, and therefore also differ significantly from values close to zero." The results of our savings function with insignificant coefficients for the critical fiscal variables would lead us to derive conclusions analogous to those of Buiter and Tobin namely the absence of support for the Ricardian Equivalence theorem.

Limitations and Scope for Extension

The major problem in empirical research relating to a developing country like Pakistan is non-availability of reliable data on various macroeconomic variables. In the case of Pakistan, the problem is particularly acute since, with the break-up of the country into two independent states in 1971, consistent time-series data pertaining to fiscal, monetary or balance of payments sectors have not been provided, especially for the period 1947–1972. The major problem lies with the data of wealth and savings (private, public, and aggregate). The data for savings are derived as residuals from the national income accounts but there are no direct estimates of savings in the official documents. On this account, the results of saving functions which cover the period 1959-60 to 1987-88 are not entirely dependable.

Besides data limitations, there are also problems in model specifications, which arise from the issue of external aid and debt. In a developing country like Pakistan, foreign public debt along with domestic public debt, plays a dominant role in the financing of public spending. The situation derives from an entire series of factors, such as difficulty in raising taxes, the tightness of the domestic savings market and underdeveloped financial institutions. The question is whether the reaction of households to an increase in foreign public debt is the same as its reaction to a rise in domestic public debt, when the state becomes indebted to non-resident lenders. Public spending can increase without any corresponding rise in taxes. What is more, nationals, do not need to save in order to purchase public debt bonds. On the contrary, they have at their disposable both the resources that would otherwise have been mobilised by taxation and any transfer resources coming from the state and financed by public debt.

Regardless of whether the public debt is foreign or domestic, it is the households of the country in question that must repay it; and this obligation will absorb a portion of their future available income. The question is whether the fact that households have not subscribed for the securities representing the debt – leads them in the case of a foreign public debt, to fail to consider the future burden of loan payment and thus to build up savings earmarked for such repayments. Furthermore, in a developing country like Pakistan, the grant element in the total external inflows may be substantive which would affect future repayment liabilities as well as the saving-consumption profile of the public. In a more comprehensive model, one could test the relevance of Ricardian Equivalence by incorporating the factors like external debts and thus measure their impact on the propensity of saving in a community.

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"Ricardian Equivalence: Some Macro-econometric Tests for Pakistan"

The paper presented by Dr Kazmi is a very interesting one. It deals with an issue which has commanded great attention in recent years. Whether it matters if a given level of government expenditure is financed by budget deficit or taxation is a central question in public finance. It touches on great debates about fiscal policy, intergenerational transfer of burden of debt, and appropriate theories of consumption and saving behaviour of economic agents.

The central interest of Dr Kazmi's paper is in testing the Ricardian Equivalence Hypothesis in the case of Pakistan using annual time series data for 1960–88. In essence, he uses a nested model of aggregate consumption wherein the conventional or Keynesian, the Neo-classical or Life-Cycle Hypothesis and Ricardian Equivalence Hypothesis fall out as special cases. Deficits can be termed as good, bad or neutral depending on the paradigm one cares to choose. On the basis of his estimated regression coefficients for the consumption and saving functions, Dr Kazmi is able to reject the REH.

I think the empirical test conducted by the author is a useful exercise as far as it goes. However, I would like to make certain additional observations about his paper.

(1) The fact that he does not find support for the REH for Pakistan does not surprise me. I argue that the assumptions under which the REH is supposed to hold are generally absent in the case of Pakistan, indeed in the case of many developing countries. As O'Driscoll points out in a brief yet delightful 1977 JPE article that as an empirical proposition, it is Ricardian Nonequivalence rather than Equivalence Hypothesis that is supposed to hold. In fact, as pointed out by him, even Ricardo was a non-Ricardian when it came to the practical world which empirical analysis is more concerned with. [Bernheim and Bagwell (1988) have expressed additional reservations about the REH by noting that the structure of families envisaged by Barro's analysis could be highly unrealistic].

My point is that just a consideration of assumptions needed for REH to hold in the case of Pakistan would have convinced me that REH would not be supported by the Pakistani experience. In particular, I want to note that till recently when Federal Investment Bonds were introduced, strictly speaking, there has been no bond financing in Pakistan. Though the Khas Deposit Certificates have been widely used as a non-bank source of deficit financing, these are not bonds in a strict sense and certainly not in the sense implicit in the debates about REH.

The reason being that there never was a secondary market where such certificates could be bought or sold.

Again, interèst rate has been a policy variable and not a market price in Pakistan. Besides, the country is marked by poor financial intermediation and possible liquidity constraints.

It is thus still an open question that if REH would hold in case of Pakistan if necessary conditions were present.

(2) However, leaving aside the above issue of the assumptions aside let me note that many still may prefer to treat the discovery of truth about the REH as ultimately an empirical issue. Thus, let me make a couple of observations from a purely econometric point of view. Testing REH by relying on estimated regression coefficients of the consumption (or saving) function must contend with certain objections.

(a) Possibility of simultaneity between consumption and income;
(b) Endogenity of budget deficits; for instance, budget deficits and saving have strong have strong cyclical elements and it is difficult to sort the causation in these patterns.

The above considerations, in addition to differing formulations of the null hypothesis and variations in the set of control variables, and their definitions may be responsible for the fact that the empirical evidence about REH in the advanced countries has been mixed at best.

In the specific context of Dr Kazmi's paper, I have noted his efforts to capture the effects of the 1965 war with India by including a dummy variable. I wonder why he did not include one for 1972-73 to capture the effects of the emergence of Bangladesh as an independent country as a result of the 1971 war. This would be useful in light of the several studies related to other aspects of Pakistan's economy that have found this to be a point of structural break.

In conclusion, Dr Kazmi's paper is a very interesting one as it deals with an issue of great importance in the context of the debate about the financing modes of government expenditure. His poineering estimates of the REH for Pakistan are very significant and I hope that his work encourages further research in this important area. Certainly, his plans to extend his study to include grants and other foreign capital inflows are very worthwhile.

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