

Private Consumption, Government Spending, Debt Neutrality: Resolving Kormendi- Feldstein-Modigliani Controversy

AQDAS ALI KAZMI

The debt neutrality hypothesis, in its quintessential form, postulates that debt/tax mix for financing deficit is irrelevant. More precisely, the debt-neutrality deals with the two fundamental questions:

- (i) Given the volume and composition of government expenditures, does it matter whether they are financed by taxes or debt issue?
- (ii) Do public deficits absorb private savings that otherwise finance private capital formation?

Juxtaposed to the traditional Keynesian theory which answers these questions positively, the exponents of debt-neutrality make the counter-claim that debt is neutral and public deficits have no “crowding out” effects on private saving or investment.

The debt-neutrality is popularly termed as the Ricardian Equivalence Hypothesis because the fundamental logic underlying this hypothesis was originally presented by David Ricardo in Chapter XVII entitled “Taxes on Other Commodities than Raw Produce” of his celebrated “The Principles of Political Economy and Taxation”. Although Ricardo explained why government borrowing and taxes could be equivalent, he never sponsored the case for unlimited issue of government bonds. In fact, he warned against the consequences of continuous fiscal deficits in the following words: “Form what I have said, it must not be inferred that I consider the system of borrowing as the best calculated to defray the extraordinary expenses

Aqdas Ali Kazmi is Economic Consultant at the Ministry of Commerce, Islamabad.

Author's Note: The paper is based on a sub-section of Chapter-VI of my Ph.D. dissertation submitted to Boston University in 1991. I am grateful to the Dissertation Committee comprising of Professors John Harris, Fabio Schiantarelli, Gustav F. Papanek, Kenneth Chomitz and Gary Koop for their help and guidance. Thanks are due to Professor Robert Barro (Harvard University) for providing useful material and guidelines at the initial stages of my research, and Mr Oscar Malhado (of El Salvador) the fellow Ph. D. student for continuous assistance in computer work.

of the state. It is a system which tends to make us less thrifty—to blind us to our real situation.”

The original idea of Ricardo was reincarnated in a well-known theoretical model of intergenerational altruism by Barro (1974) and that proved to be a milestone for the phenomenal output in the theoretical and empirical literature on Ricardian Equivalence. While refinement, substantiation alongwith empirical estimation and testing was extensively undertaken by Barro (1976, 1976a, 1978, 1987, and 1989), the debate that ensued let to some outstanding contributions on the subject.

Kochin (1974); Aschauer (1985); Kormendi (1983); Leiderman and Razin (1988) have produced empirical support for the Debt Neutrality Hypothesis using data on U.S.A., Canada and other developed countries. On the other hand, Buchanan (1976); Brennen and Buchanan (1987); Modigliani *et al.* (1985); Feldstein and Elmendorf (1987); Haque (1988); Buiters and Tobin (1980); Poterba and Summers (1988) produce evidence which is generally inconsistent with the basic logic of the Debt Neutrality. The overall reviews of the debate are presented in Bernheim (1987); Boskin *et al.* (1987); Bernheim (1989) and Leiderman and Blajer (1988), which generally come to the conclusion contradicting the findings of the Debt Neutrality. A fairly comprehensive review of literature on Debt Neutrality or Ricardian Equivalence Hypothesis literature is given in Kazmi (1991).

The controversy on debt neutrality between Kormendi, Feldstein and Modigliani highlights some important aspects of fiscal policy. The lead in this direction has been provided by Feldstein and Kormendi (1983), with Feldstein producing results in contradiction to debt neutrality hypothesis while Seater and Kormendi bring forth estimates broadly consistent with debt-neutrality for the U.S.A.

The Feldstein Model

The specific framework of analysis adopted by Feldstein is a consumer expenditure function relating real per capita consumption expenditure to a measure of real permanent income, real wealth and to various fiscal variables. The Feldstein model thus assumes the following form:

$$C_p = b_0 + Y_t + b_2 W_t + b_3 SSW_t + b_4 G_t + b_5 T_t + b_6 TR_t + b_7 Dt + ut$$

Where C_p is the consumer expenditure, Y is permanent income, W is the market value of privately owned wealth at the beginning of the year t , SSW is the measure

of the value of future social security benefits, G is government spending on goods and services, T is tax revenues, TR is government transfers to individuals and D is the net debt of the federal, state and local governments. All variables are in constant prices and on per capita basis. An additional variable which Feldstein favours for inclusion in the above model is the real net rate of interest. However due to lack of an adequate series for the variable of net rate of interest for the full sample period (1930–77), Feldstein excludes it from the estimated model.

Given the above model, the debt neutrality hypothesis implies that $b_3 = b_5$ $b_6 = b_2 + b_7 = 0$, whereas the more general fiscal expectations view implies that $b_3 > 0$, $b_5 < 0$, $b_6 > 0$ and $b_2 - b_7 > 0$. In the extreme and limiting case of fiscal impotence, government spending should fully offset the private consumption expenditure such that $b_4 = -1$, but the less extreme case of debt neutrality would expect b_4 to be negative and significant with its magnitude being less than 1. The traditional case postulates b_4 equal to zero.

In the above model, the parameter restrictions would slightly change if Y is measured as disposable personal income rather than national income. Since disposable income is measured as net of taxes and includes transfers, the neutrality hypothesis would imply that the separate coefficient of the tax-variable should be positive ($b_5 > 0$). However, government spending in this case too would depress consumer expenditures ($b_4 < 0$), social security wealth should have no effect on consumer spending ($b_3 = 0$) and the effect of the separate government debt variable should just offset the fact that government debt is included in the measured value of household wealth ($b_7 = -b_2$). The conventional view of consumer behaviour, on the other hand, suggests that disposable personal income captures the full effect of taxes and transfers (i.e. $b_5 = b_6 = 0$), that government spending has no direct effect on consumer spending ($b_4 = 0$), that social security wealth increases consumer spending ($b_3 > 0$) and that government debt is treated by consumers like all other forms of wealth which implies that ($b_7 = 0$).

Kormendi's Consolidated Approach

The consumption equations adopted by Kormendi (1983) which are fairly close to those of Feldstein aim at developing "an alternative approach to modelling private sector consumption/saving behaviour based on rational evaluation of the consequences of government fiscal policy". This approach also aims at determining to what extent government debt is net wealth and thereby affects private consumption. He contrasts his "consolidated" approach with the "standard or (conventional) approach" which assumes that private sector ignores government spending and

treats government debt as net wealth.

Kormendi (1983) estimates the generalised consumption function.

$$C_t = a_0 + a_{11}Y_t + a_{12}Y_{t-1} + a_2G_t + a_3W_t + a_4TR_t + a_5T_t + a_6RE_t + a_7GINT_t + a_8D_t + U_t$$

which nests the consolidated and standard approaches in accordance with good statistical practice for testing competing models. Estimation is by OLS with all variables expressed in first differences because the data are nonstationary and are not rendered stationary by linear detrending.

Under the consolidated approach we expect $a_2 < 0$, $a_4 = a_5 = a_6 = a_7 = a_8 = 0$. Seater (1993) concludes: "The original Kormendi (1983) estimates give somewhat mixed results, with a_2 significantly negative and a_5 , a_6 , and a_7 all insignificantly different from zero, in accordance with the consolidated approach, with a_7 significantly positive, in accordance with the standard approach, and with a_8 significantly negative in accordance with neither approach. Subsequent extensions using more accurate data, a slightly longer sample period, and 2SLS estimation yield estimates upholding all of the consolidated approach's hypotheses on the consumption function's coefficients [Kormendi and Meguire (1990)]. In addition, extensive tests reject the coefficient equality restrictions implied by the standard approach [Kormendi (1983); Kormendi and Meguire (1990)]. The results thus are almost totally consistent with the consolidated approach, a corollary of which is Ricardian equivalence, and are much like those of Seater and Mariano's replication of Feldstein."

Some basic differences between the Kormendi and Feldstein specifications are worth-noting. The former defines income (Y) as net national product, wealth (W) as the stock of residential plus non-residential fixed capital plus an estimate of the stock of human capital. The variable social security wealth (SSW) is ignored in Kormendi while two additional explanator variables i.e. retained earnings (RE) and government net interest payments ($GINT$) are included. Furthermore, while Feldstein estimates his equations taking all variables in level form, Kormendi uses the first-difference form to achieve stationarity and to eliminate the "spurious regression" problem, associated with time-series macro-level data.

Concerning the choice of variables in first difference or level form, Granger and Newbold have shown that there can be a high risk of getting unacceptable results or face serious problems of interpreting the coefficients of the equation if it is found to have strong autocorrelated residuals, reflected in low Durbin-Watson value. Under such circumstances the only plausible conclusion to be drawn is that

equation is misspecified whatever the value of R^2 observed. The form of the misspecification can be considered to either (i) the omission of relevant variables, (ii) the inclusion of irrelevant variables, (iii) autocorrelated residuals, or (iv) in general the combination of these possibilities. The popular remedies for these misspecifications are to either include a lagged dependent variable or take first-differences of the variables involved in the equation or to assume a simple first-order autoregressive form for the residuals of the equation. It could be expected that in general any of these methods to either include a lagged dependent variable or take first-differences of the variables involved in the equation or to assume a simple first-order autoregressive form for the residuals of the equation. It could be expected that in general any of these methods will alleviate the problem, but it cannot be assured that the problem will be completely removed. Therefore, Granger and Newbold recommend that until a really satisfactory procedure is available taking first-difference of all variables that appear to be highly autocorrelated would be an appropriate solution, which should considerably improve the interpretability of the coefficients.

The critics of the first-difference solution point out some of its usual limitations. For example, the use of first-difference estimation is believed to be less efficient than estimation in level form with an autoregressive transformation. Moreover, as Feldstein and Elmendorf (1987) have pointed out, if variables are measured with error, the use of first difference estimation increases the errors in variable bias. If the response of consumers to an explanatory variable is not immediate, the use of first difference estimation can be a causal factor of substantial underestimation of its true effect.

Modigliani's Critique

Modigliani and Sterling (1986, 1990) criticise Kormendi on several grounds: specification of the consumption function, failure to include a measure of temporary taxes, choice of sample period, and use of differenced data. Modigliani and Sterling argue for a consumption function specification that implicitly imposes the kind of restrictions discussed above. Moreover, Modigliani and Sterling argue for a shorter sample period that does not include World War II.

More important are Modigliani and Sterling's other two criticisms. Modigliani and Sterling present regression results suggesting that Ricardian equivalence does not survive inclusion of a temporary tax variable, whose values they report in their first (1986) article. Finally, Modigliani and Sterling assert that the data should not be differenced. As mentioned earlier, differencing is unneces-

sary when the variables involved are cointegrated, even if they have a stochastic trend.

The reestimated equations by Modigliani and Sterling in the light of their specific critique produce results quite different from these obtained by Kormendi.

Debt Neutrality Tests for Pakistan

In the light of the above critique, our preference has been to estimate the equations for Pakistan with variables taken in level form after first order autoregressive transformation when needed. However, a set of equations in first difference is also presented to test the robustness of the parameter estimates, but the level form remains the basic structure of the variables in our estimated models.

The specifications and estimation of macro-level consumption-saving models for measuring the effects of fiscal policy are beset with numerous conceptual and measurement problems. The most serious among these is the endogeneity of the key explanatory variables. The variables such as consumption, income, government spending, debt and deficits and interest rates may be determined simultaneously. For example the endogeneity of tax variable can really be established. An exogenous increase in consumer spending inevitably boosts the aggregate demand that in all likelihood would raise the volume of tax-collection, particularly sales taxes and profit taxes along with progressive personal taxes. This brings about a positive correlation between taxes and consumer spending which biases the coefficient of the tax variable towards zero and therefore in favour of fiscal neutrality hypothesis. The need for the reduction, if not complete elimination of the bias necessitates the choice of some ideal instrumental variable which should be highly correlated with the systematic component of the variable but uncorrelated with the concurrent disturbance in consumption equation.

The lagged value of the tax variable itself could serve as a useful instrument because as Feldstein has pointed out, this choice "achieves the desired high correlation with the systematic component of the tax variable but, because cyclical conditions last more than one year, is not completely uncorrelated with the consumption disturbance in the subsequent year". Similarly we may need appropriate instrumental variables for other explanatory variable such as government expenditure, debt etc. The considerations of endogeneity problem has the popular inducement of resorting to estimation of consumption-saving models by the 2SLS techniques.

However in case, where 2SLS procedures fail to improve upon OLS, only the OLS estimates are presented.

The results of numerous estimates of the consumption function to test debt neutrality are presented and analysed below. The objective is to test the robustness and stability of the parameters involved and thus draw inferences about consumer behaviour in response to a diversity of fiscal stimuli. Table 1 furnishes the estimates of the basic version of the debt neutrality models which incorporate variables such as per capita income (Y), wealth (W), government purchases (G), taxes (T), government interest payments (GINT), retained earnings (RET), social security

Table 1
Tests of Debt Neutrality
Private Consumption Functions for Pakistan: 1960-88
(Level Form Estimation)

	2SLS (1)	2SLS (2)	2SLS (3)	2SLS (4)
C	70.255 (1.113)	48.760 (0.560)	44.160 (0.650)	7.325 (0.112)
Y	0.491 (5.911)	0.514 (5.924)	0.505 (6.384)	0.617 (7.534)
W	0.021 (0.437)	0.024 (0.347)	0.028 (0.531)	0.037 (0.719)
G	-0.048 (-0.437)	0.041 (0.180)	-0.014 (-0.065)	-0.074 (-0.395)
T	0.681 (1.553)	0.840 (1.760)	0.623 (1.432)	0.766 (1.842)
GINT	1.502 (0.667)	0.152 (0.059)	-	-
RET	-0.882 (-0.286)	-	-0.375 (-0.123)	-1.884 (-0.728)
SSW	- (-0.792)	-6.443	- (-1.633)	-13.299
SUBS	1.484 (2.085)	-	1.495 (2.072)	-
D	0.046 (0.156)	0.097 (0.302)	0.197 (1.340)	0.246 (0.853)
\bar{R}^2	0.969	0.962	0.968	0.989
DW	1.741	1.788	1.709	1.686
F	112.407	-	-	375.834
SSR	2871.560	3476.900	2837.360	3151.180

wealth (*SSW*), subsidies (*SUBS*) and public debt held by the private sector (*D*). All the equations in this table have been estimated by 2SLS after correcting for first order autoregressive serial correlation.

In Equation 1.1, the coefficients of *Y*, *T* and *SUBS* are positive and significant at 5 percent level while the coefficients of *W*, *G*, *GINT*, *RE* and *D* are not significant. The overall fit of the equation is quite good with *R*² equal to 0.969 and the value of *F*-statistics being equal to 112.407. However the estimate of 0.491 for the MPC is quite low and the coefficient of *G* with the negative sign has a very low value of only 0.048. For *DN* proposition to hold, *G* must have a negative and significant coefficient with its magnitudes somewhat approaching unity if not quite identical to unity. Whereas the positive and significant coefficient for *T* (taxes) and positive but insignificant coefficient for *D* i.e. the debt variable are consistent with *DN* hypothesis, the large positive and significant coefficient for *SUBS* goes against debt neutrality expectations. Taken all the results together, find that they are not consistent with the debt-neutrality hypothesis.

In Equation 1.2, the variables *RET* (retained earnings) and *SUBS* are dropped while the variable *SSW* (social security wealth) is added to the equation. this change in specification of the model does not alter significantly the results obtained; in Equation 1.1, except that the coefficient of *G* variable becomes positive but remains insignificant. The coefficients of *W*, *GINT*, *SSW*, and *D* remain insignificant while the coefficient of *T* increases in terms of magnitude as well as *t*-ratio. Even though the coefficients of variables of *GINT*, *SSW*, *T*, *D* are in line with the debt neutrality hypothesis, the positive but insignificant coefficient of the critical variable of *G* renders the debt neutrality hypothesis untenable.

We reach the same conclusion in interpreting Equation 1.3 in which *GINT* and *SSW* were excluded and the 2SLS estimate gives a small coefficient of *G* equal to -0.014 which is insignificant; at the traditional 5 percent level of significance thus contradicting the debt neutrality expectations. In this equation, the coefficient of *D* (public debt) is positive and significant at 10 percent level while the coefficient of *SUBS* is positive, large and significant at 5 percent. Both the latter results adversely affect the viability of debt-neutrality proposition.

In Equation 1.4, the results are mixed. The coefficient of *G* is negative and insignificant as is the case in other equations. However, *SSW* (social security wealth) has a negative coefficient which is significant at 10 percent and *D* (public debt) has a negative coefficient which is not significant at 5 percent level. The negative two variables in this specification behave according to debt-neutrality expectations. In sum, the results fail to support either the debt neutrality case or the pure traditional case of fiscal illusion.

Some exponents of debt neutrality hypothesis have argued that estimates of models with variables taken in first difference form would bring results closer to debt-neutrality proposition. To validate this stand, a set of equations of consumption function in first difference was estimated for the period 1960–88 using OLS and results are reproduced in Table 2. The most characteristic result of these

Table 2
Tests of Debt Neutrality
Private Consumption Functions for Pakistan: 1960–88
(First-difference Estimation)

	OLS (1)	OLS (2)	OLS (3)	OLS (4)
C	1.043 (0.186)	2.494 (0.507)	2.217 (0.418)	2.408 (0.463)
DY	0.634 (2.552)	0.485 (2.432)	0.507 (2.089)	0.524 (2.207)
DG	0.008 (0.034)	-0.077 (-0.351)	-0.072 (-0.314)	-0.060 (-0.270)
DW	-0.066 (-0.696)	-0.027 (-0.300)	-0.029 (-0.311)	-0.026 (-0.286)
DGINT	1.242 (0.562)	1.186 (0.585)	1.197 (0.576)	-
DRET	-3.517 (-0.012)	-	-0.607 (-0.168)	-0.544 (-0.153)
DSUBS	- (2.259)	1.399 (1.897)	1.348 (1.936)	1.353
DT	1.022 (1.878)	0.562 (1.259)	0.615 (1.108)	0.595 (1.093)
DD	-0.032 (-0.098)	-0.026 (-0.087)	-0.029 (0.095)	-0.072 (-0.288)
\bar{R}^2	0.087	0.231	0.192	0.291
DW	2.057	2.021	2.034	2.032
F	1.368	2.161	1.803	2.082
SSR	4179.920	3519.610	3514.380	3575.710

equations is the small and insignificant coefficient of the critical variable G which is a contradiction of the neutrality proposition. In fact in Equation 2.1, the coefficient of G is positive, while in others it is negative. Another important contradiction to debt neutrality is provided by the coefficient of $SUBS$, which is large, positive and significant as may be seen in Equations 2.2, 2.3 and 2.4. These two results indicate that consumers in the developing economy like Pakistan are essentially non-Ricardian. Contrarily the consumer behaviour in terms of taxes, debt, retained earnings and government interest payments reflects the opposite. Especially in case of taxes, the coefficient is large and significant as in Equation 2.1, is positive but insignificant at 5 percent level in Equations 2.2, 2.3 and 2.4.

Additional tests of Debt Neutrality are provided in Table 3. The consumption function is reestimated after including real interest rate variable, taking two types of interest rate, namely $R1$ (real interest rate on deposits of 6 months to one year maturity) and $R3$ (real interest rate on deposits of 3 years maturity). The equations are estimated by OLS , $AR1$ and $AR2$. In the new configuration of the consumption function, G (government spending) turns out to be negative but insignificant, RET (retain earning) has a negative coefficient but insignificant, $SUBS$ (subsidies) is insignificant even though with a positive coefficient, T (tax variable) is positive and significant at 5 percent level in all equations. The debt variable is significant at 10 percent level in Equations 3.1 and 3.3 while it is not significant in Equations 3.2 and 3.5. The variable R (real interest rate) is negative in all equations and highly significant in all equations except Equation 3.3. The interpretation of these equations suggests that the necessary restrictions imposed by pure debt neutrality on the key variables are not supported.

CONCLUSION

The empirical evidence for Pakistan indicates that despite sensitivity of the consumption function to the treatment of specification, simultaneity, data choice and stationarity, measurement of the quantities involved and the limitations of econometric methodology, there is limited evidence to support the case for debt neutrality. In the Kormendi-Feldstein-Modigliani controversy, the macro-econometric estimation of consumption function for Pakistan are somewhat oriented in support of Feldstein and Modigliani and other non-Ricardian associates rather than Kormendi and the fraternity of economists supporting debt neutrality or Ricardian Equivalence.

Table 3
Tests of Debt Neutrality
Private Consumption Functions for Pakistan: 1960-88
(Effects of Real Interest Rates)

	AR1 (1)	AR2 (2)	OLS (3)	AR1 (4)	AR1 (5)
C	58.590 (1.044)	68.778 (1.168)	53.027 (1.020)	54.816 (0.991)	56.098 (0.982)
Y	0.638 (7.799)	0.619 (7.099)	0.663 (2.853)	0.644 (8.489)	0.638 (7.743)
Y-1	-	-	0.020 (-0.878)	-	-
G	-0.089 (-0.492)	-0.104 (-0.561)	-0.114 (-0.612)	-0.086 (-0.492)	-0.093 (-0.509)
W	-0.020 (-0.433)	-0.170 (-0.170)	-0.014 (-0.331)	-0.019 (-0.437)	-0.018 (-0.380)
GINT	-	1.293 (0.686)	-	-	-
RET	-2.077 (-0.765)	-2.403 (-0.861)	-2.019 (-0.672)	-2.037 (-0.936)	-1.981 (-0.731)
SUBS	0.131 (0.162)	0.157 (0.192)	0.005 (0.005)	-	0.178 (0.224)
T	0.963 (2.388)	1.006 (2.433)	0.872 (1.880)	0.978 (2.908)	0.935 (2.345)
D	0.194 (1.566)	0.042 (0.167)	0.222 (1.802)	0.172 (1.416)	0.175 (1.391)
R	-104.442(R3) (-2.203)	-102.871(R3) (-2.139)	-87.974(R1) (-1.373)	-111.919(R1) (-3.068)	-105.452(R1) (-2.206)
\bar{R}^2	0.972	0.971	0.989	0.973	0.971
D.W	1.639	1.622	-	1.623	1.625
F	123.766	106.581	270.391	142.607	117.602
SSR	2124.600	2073.140	2705.820	2134.920	2129.200

SYMBOLS OF VARIABLES

The following symbols have been used in the regression models of Ricardian Equivalence:

- Y = Real income per capita (1959–60 prices).
 $GINT$ = Government interest payment real per capita.
 RET = Retained earnings of the corporate sector real per capita.
 SSW = Social security wealth real per capita.
 $SUBS$ = Subsidies paid by the government real per capita.
 G = Total government expenditure on consumption and gross capital formation in real per capita.
 $R1$ = Real interest rate on deposits of six months to one year maturity.
 $R3$ = Real interest rate on deposits of over 3 years maturity.
 W = Wealth variable which includes debt, M2 and capital stock real per capita.
 D = Total domestic public debt held privately real per capita.
 T = Taxes real per capita.
 DY = First difference of Y .
 DG = First difference of G ; and so on for other variables deployed in Table 2.

REFERENCES

- Aschauer, David Alan (1985) Fiscal Policy and Aggregate Demand. *American Economic Review* 75 : 117–27.
 Barro, Robert J. (1974) Are Government Bonds Net Wealth? *Journal of Political Economy* 82: November–December 1095–1117.
 Barro, Robert J. (1976) Reply to Feldstein and Buchanan. *Journal of Political Economy* 84: April 343–349.
 Barro, Robert J. (1976a) Reply to “Perceived Wealth in Bonds and Social Security” and “Barro on the Ricardian Equivalence Theorem”. *Journal of Political Economy* April 84:2.
 Barro, Robert J. (1978) *The Impact of Social Security on Private Saving: Evidence from the U.S. Time Series*. Washington, D.C.: American Enterprise Institute.
 Barro, Robert N. (1987) Government Spending, Interest Rates, Prices, and Budget Deficits in the United Kingdom, 1701–1918. *J. Monet. Econ* Sept. 20:2.

- Barro Robert J. (1989) The Ricardian Approach to Budget Deficit. *Journal of Economic Perspectives* 3:2 37–55.
- Bernheim, D. (1987) Ricardian Equivalence; An Evaluation of Theory and Evidence. *Macroeconomics Annual*. Cambridge: National Bureau of Economic Research 263–315.
- Bernheim, D. (1989) A Neoclassical Perspective on Budget Deficits. *Journal of Economic Perspectives* 3:2 55–72.
- Boskin, Flemming, John S. and Gorini Stefano (eds) (1987) *Private Saving and Public Debt*. Oxford, (U.): Basil Blackwell.
- Brennen, H. C., and J. M. Buchanan (1987) The Logic of Ricardian Equivalence Theorem. In J. M. Buchanan, C. K. Rowley and R. D. Tolison (eds) *Deficits*. New York: Basil Blackwell 79–92.
- Buchanan, J. M. (1976) Barro on the Ricardian Equivalence Theorem. *Journal of Political Economy* 84: 4 April 337–32.
- Butler, and J. Tobin (1980) Debt Neutrality: A Brief Review of Doctrine and Evidence. In G. Furstenburg (ed) *Social Security versus Private Saving*. (Series on Capital and Saving, Vol. 1.) Cambridge, Mass: Ballinger Publishing Co.
- Feldstein, Martin, and Douglas, W. Elemendorf (1987) Taxes, Budget Deficits and Consumer Spending: Some New Evidence. Cambridge, Massachusetts: National Bureau of Economic Research. (Working Paper No. 2355.)
- Haque, Nadeem U. (1988) Fiscal Policy and Private Sector Saving Behaviour in Developing Countries. *International Monetary Fund Staff Papers* 35:2 316–35.
- Kazmi, Aqdas Ali (1991) Savings, Consumption and Ricardian Equivalence: A Macroeconometric Analysis of Pakistan: 1960–88. Ph. D. (Economics) Dissertation, Boston, M.A.: Boston University. U.S.A.
- Kochin, L. (1974) Are Future Taxes Anticipated by Consumers? Comment. *Journal of Money, Credit and Banking* 6:8 August 385–94.
- Kormendi, Roger (1983) Government Debt, Government Spending, and Private Sector Behaviour. *American Economic Review* 73: 594–1010.
- Kormendi, and Meguire Philip (1990) Government Debt, Government Spending, and Private Sector Behaviour: Reply and Update. *American Economic Review* 80: 2 604–617.
- Leiderman, L., and M. T. Blejer (1988) Modelling and Testing Ricardian Equivalence. *International Monetary Fund Staff Papers* 35:1 1–35.
- Leiderman, Leonardo, and Assaf Razin (1988) Testing Ricardian Neutrality with an Intertemporal Stochastic Model. *Journal of Money, Credit and Banking* 20:1 1–21.
- Modigliani, Jappali, T., and M. Pagano (1985) The Impact of Fiscal Policy on National Savings: The Italian Case. *Banca Nazionale del Lavoro Quarterly Review*

91–126.

Modigliani, Franco and Arlie Sterling (1986) Government Debt, Government Spending, and Private Sector Behaviour: Comment. *American Economic Review* December 76:5 1168–79.

Modigliani, Franco and Arlie Sterling (1990) Government Debt, Government Spending and Private Sector Behaviour: A Further Comment. *American Economic Review* June 80:3 600–03.

Poterba, James M., and Lawrence H. Summers (1988) Recent U.S. Evidence on Budget Deficits and National Savings. Cambridge, Mass: National Bureau of Economic Research. (Working Paper No. 2144.) 1–22.

Seater, John J. (1982) Are Future Taxes Discounted? *Journal of Money, Credit and Banking* August 14:3 376–89.

Seater, John J. (1993) Ricardian Equivalence. *Journal of Economic Literature* 31: March 142–190.

Seater, John J. (1985) Does Government Debt Matter? A Review. *Journal of Political Economy* July 16:1 121–31.

Comments on
“Private Consumption, Government Spending,
Debt Neutrality: Resolving Kormendi-
Feldstein-Modigliani Controversy”

It is my pleasure to be a discussant for an interesting paper presented by Dr Kazmi. It deals with the issue of Ricardian Equivalence that has important policy implications. Although there is a large amount of literature empirically testing this controversial issue for developed countries, the research on developing countries was lacking until recently. In this regard, Dr Kazmi's effort to bring some empirical evidence from Pakistani data should be appreciated. Nevertheless, the empirical tests of Ricardian Equivalence for Pakistan is an important exercise, the methodology to be used in performing such tests is very crucial. I would like to make some observations and technical comments.

Dr Kazmi has tested the Kormendi-Feldstein-Modigliani controversy over debt neutrality using time-series data from Pakistan. In his analysis, he empirically tested three hypotheses; the Feldstein model, Kormendi, Consolidated Approach, and Modigliani. Certain parameter restrictions are imposed to test the issue of debt neutrality. The results are consistent with the Feldstein and Modigliani hypotheses and hence he concludes that the Ricardian Equivalence is supported by Pakistani data.

There are two important points to be made clear before commenting on the paper. First, one should be very careful in using the term “validity of Ricardian Equivalence”. Even the proponents of *REP* do not claim that it holds in its exact form. The issue is whether *REP* can be used as an approximation. The second important point is the strong underlying assumptions for this hypothesis to hold. Perfect capital mobility or no liquidity constraints is one such assumption, that is difficult to hold in a country like Pakistan. There I encounter the first problem in this paper. In view of the above two points, the results obtained in this paper are not surprising. One should not expect an evidence supporting the equivalence hypothesis for Pakistan. Having said that, the more interesting and important question is not whether *REP* holds for Pakistan but what are the factors that deviate the economy being Ricardian neutral

As stated earlier the issue of the validity of *REP* is of significant importance for a developing country like Pakistan and the results would have long-run implications for policy planning. Hence the model specification should be realistic to the economy. In this respect, testing the Feldstein, Kormendi, or Modigliani model may not be appropriate for Pakistan's economy. This is very much obvious looking at the specifications used in the paper.

Whether this specification is appropriate in the contest of Pakistan is an open question. Furthermore, data on certain variables is not available for Pakistan. One such example is value of social security benefits (*SSW*). In the absence of any social security system, it seems inappropriate to include this variable in the specification. The use of pension funds as a proxy is not appropriate either, as services sector is a small fraction of the total labour force.

Furthermore, the author is using certain variables like market value of privately owned wealth (*W*), retained earnings of corporate sector (*RET*), and net debt of federal, state, and local governments (*D*). All these variables involve some measurement problems. It would be advisable to discuss these issues before estimating the model.

Another issue I would like to comment on is the debate over the use of data in level form or in the first difference. A detailed discussion is provided in the paper on this issue while estimating the model. In view of recent econometric developments in using time-series data, an appropriate way is to apply some diagnostic tests for unit roots. It is generally believed that most of the macro-economic series have unit roots but are stationary in the first differences. Further empirical evidence suggest that consumption and income, if integrated of order one, may have cointegration. If the two series are cointegrated then estimation in levels is suggested. However, if the series are stationary in first difference but not cointegrated, then the estimation in first difference is preferred. It would be more meaningful to first look the the time-series properties of the data and then determine which estimation technique should be adopted.

Finally, the estimation technique for any model is contingent to its specification. The use of *2SLS* or any other technique is suggested where *OLS* may not provide consistent/efficient parameter estimates. Hence, such a decision is made, *a priori*, not as a hit-and-trial method to obtain the results one is interested in. In this regard the author's statement "where *2SLS* procedures fails to improve upon *OLS*, only the *OLS* estimation are presented" may not be consistent with what econometric theory would suggest.

In concluding, I would again appreciate Dr Kazmi's effort to work in this

interesting area of research. At the same time, may I suggest to him to use a model more realistic to Pakistan's economic environment. The results obtained from such a realistic model would have long-run implications and would help policy-makers to make much use of his findings.

Ahmed M. Khalid

National University of Singapore,
Singapore.