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The Twin Deficits Phenomenon: Evidence from Pakistan

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1. INTRODUCTION

Like most developing countries a steady budget deficit in Pakistan is the primary cause of all major ills of the economy. It has varied between 5.4 to 8.7 percent during last two decades. On the other hand the current account deficit varied between 2.7 to 7.2 percent during the same period. The variations in fiscal policy can lead to predictable developments in an open economy's performance on current account, remains a controversial issue. An important aspect of this issue concerns what is termed as twin deficit analysis, according to which fiscal deficits and current account balances are very closely related so that reductions in the former are both necessary and sufficient to obtain improved performance in the later.

Theoretical work on the relationship that exist between variations in fiscal policy and the current account balance has been based upon two types of models. These models are constructed from postulated behavioural relationships that purport to describe how the economy works in aggregate without explaining the behaviour of agents who make up the economy [Mundel (1963); Branson (1976); Dornbusch (1976); Kawai (1985) and Marston (1985)]. The second type of model, derives the important macroeconomic relationships from the microfoundations of individual optimising behaviour [Dixit (1978); Neary (1980); Obstfeld (1981); Persson (1982); Kimbrough (1985); Frenkel and Razin (1986); Cuddington and Vinals (1985, 1986a) and Moore (1989)]. However, both of these approaches have yielded divergent results.

Recent empirical investigation of relationship between budget and trade deficit provides the mix results. Researchers [Evans (1988); Miller and Russek (1989); Dewold and Ulan (1990); Enders and Lee (1990) and Kim (1995)] supported the Ricardian equivalence that the budget deficit does not affect trade deficit. On the other hand, Darrat (1988); Abell (1990); Zietz and Pemberton (1990); Bachman (1992) argue in favour of Keynesian proposition that these twin deficits are closely linked and the budget deficit causes the trade deficit.

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The growing government deficit along with steady current account deficits have been an important issue for policy-makers in Pakistan. Moreover, given the emphasis on free trade, decentralisation and growth there is a need to understand the connection of fiscal and trade imbalances in Pakistan economy. In Pakistan few researchers [Zaidi (1995); Burney and Akhter (1992); Burney and Yasmeen (1989) and Kazimi (1992)] have highlighted the problem arising due to growing budget deficit and its relationship with macroeconomic variables like interest rate, exchange rate, consumption and savings, based on OLS techniques. This study unlike earlier studies is based on cointegrating technique, error-correction model and causality test to investigate the twin deficit phenomenon in Pakistan both in short-run and long-run.

This paper investigates the short and long run relationship between budget deficit and trade deficit using cointegration analysis and error-correction methodology. Also Granger trivariate causality tests are performed. This is done to avoid the methodological problem of the third missing variable in the bivariate causality tests. As omitting important variables while testing the direction of causality between budget deficit and current account deficit may yield spurious empirical results. The paper is organised such that second section discusses the theoretical framework. Section three describes the econometric methodology and related issue followed by data in Section four. The empirical findings and interpretations are presented in Section five. Section six provides concluding remarks.

2. THEORETICAL FRAMEWORK

The relationship between budget deficit and current account deficit could be written as:

$$CA = S^{pvt} - I - (G - T) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Where, CA stands for current account balance, S^{pvt} for private saving; I for investment, G for government purchases; and T for direct taxes collected from household firms by the government. The government deficit is given by $G–T$. A rise in the government deficit will increase the current account deficit if the rise in government deficit decrease total national saving. If the current taxes are held constant and ($S^{pvt}–I$) remains the same or stable, an increase in temporary purchase will raise the government deficit ($G – T$) which affects the current account positively. In this way a government deficit resulting from increased purchases reduces the nations' current account surplus or widens the nations' current account deficit.

The impact of increasing budget deficits in increasing a large trade deficit could be one aspect of the twin deficit phenomenon. Another aspect could be a positive effect of budget deficit on interest rates [Vamvoukas (1997)]. Higher interest rates attract investment from abroad, so that the demand for home currency rises and results in appreciation of its value, which implies cheaper import and more expensive exports, pushing the trade balance towards deficit.

There are no two opinions that deficit due to government purchases will reduce both desired consumption and national saving and increases the current accounts deficit. But the Ricardians and Keynesians have differences over the effects of budget deficit caused by tax cut or tax increase. According to Ricardian advocates if the current and planned future government purchases remain unchanged, a current tax cut will not lead people to consume more. As a cut in current tax would be balanced by an increase in expected future taxes, and tax payers do not feel better off even though their current after tax incomes have increased. Thus, national savings, current account balance, consumption, interest rates and investment remain unaffected. On the other hand proponents of Keynes believe that consumers do respond to a current tax cut by consuming more because they may expect that a higher deficit now may more likely bring higher taxes in future. This will reduce national savings, increase current account deficit and will effect all macro linkages between them as well. This leads to twin deficits phenomenon.

Furthermore, there is another link between budget deficit and current account deficit. As budget deficit increases, government will increase its borrowing, thereby rate of interest will increase leading to foreign capital inflow. This will appreciate the value of the local currency which, results in cheaper imports and expensive exports. Thus there would be merchandise trade deficit. Besides the above primary linkages there are other channels through which these two deficits are interlinked. In this regard Abell (1990) finds four important macro variables like economic growth, rate of inflation, exchange rate and money supply as directly effecting these deficits in U.S. Firstly, rapid economic growth accompanies large investments followed by higher interest rate attracting foreign capital. Also stronger growth of economy leads to increase in foreign imports, which could cause a worsening of trade deficit. Secondly, the rate of inflation affects the relative desirability of internationally traded goods and thus the trade balance. Thirdly, a prior changes in deficit causes changes in trade deficit not only through interest rate linkage but also through exchange rate linkage. And finally the influence of budget deficits on domestic monetary policy effects the trade deficit as changes in M_1 are influenced by prior changes in the deficit and interest rates. These changes in M_1 influence the trade deficit through the causality prior relationship with interest rates.

3. ECONOMETRIC METHODOLOGY

Let us consider variables DEF_t and CA_t, where DEF_t is the actual budget deficit in real terms, CA_t, is the current account balance in real terms, and t stands for time. If *DEF* and *CA* are considered to be stochastic trends and if they follow a common long-run equilibrium relationship, then *DEF* and *CA* should be cointegrated. Cointegration is a test for equilibrium between non-stationary variables integrated of same order. According to Engle and Granger (1987), cointegrated variables must have an ECM representation. The main reason for the popularity of cointegration analysis is that it provides a formal background for testing and estimating short and long-run

relationships among economic variables. Furthermore, the ECM strategy provides an answer to the problem of spurious correlations. If *DEF* and *CA* are cointegrated, an ECM representation could have the following form:

$$\Delta DEF_t = a_0 + a_1 C_{t-1} + \sum_{i=1}^{n} a_{2i}\,(1-L)\,\Delta DEF_{t-i} + \sum_{i=1}^{n} a_{3i}\,(1-L)\,\Delta CA_{t-i} + u_t \quad \ldots (2)$$

$$\Delta CA_t = b_0 + b_1 E_{t-1} + \sum_{i=1}^{n} b_{2i}\,(1-L)\,\Delta DEF_{t-i} + \sum_{i=1}^{n} b_{3i}\,(1-L)\,\Delta CA_{t-i} + e_t \quad \ldots (3)$$

where L is the lag operator and C_{t-1} and E_{t-1} are error corrections term. The error-correction term C_{t-1} in Equation 2 in the lagged value of residuals from the cointegrating regression DEF_t and CA_t and the term E_{t-1} is Equation 3 corresponds to the lagged value of residuals from the cointegrating regression of CA_t on DEF_t. In Equations 2 and 3, ΔDEF_{t-i}, ΔCA_{t-i}, u_t and e_t, are stationary, implying that their right hand side must also be stationary. It is obvious that Equations 2 and 3 compose a bivariate vector autoregression (VAR) in first difference augmented by the error-correction terms C_{t-1} and E_{t-1} indicating that ECM and cointegration are equivalent representations. According to Granger (1988), in a cointegrated system of two series expressed by an ECM representation, causality must run in at least one way. Within the ECM formulation of Equations 2 and 3, CA_t does not Granger cause *DEF* if all $a_{3i} = 0$ and $a_1 = 0$ and equivalently, DEF_t, does not Granger cause CA_t if all $b_{2i} = 0$ and $b_1 = 0$.

It is also possible that the causality between DEF_t and CA_t estimated from the ECM formulation could have been caused by a third variable. Such a possibility may be explored within a multivariate framework including other important variables, for example, real output, inflation, exchange rate, interest rate and money supply, which represent considerable determinants of government and trade deficits. Thus, the causal relationship between DEF_t and CA_t can be examined within the following ECM representation:

$$\Delta DEF_t = a_0 + a_1 C_{t-1} + \sum_{i=1}^{n} a_{2i}\,(1-L)\,\Delta DEF_{t-i} + \sum_{i=1}^{n} a_{3i}\,(1-L)\,\Delta CA_{t-i} + \sum_{i=1}^{n} a_{4i}\,(1-L)\,\Delta X_{t-i} + u_t \quad \ldots \quad \ldots \quad (4)$$

$$\Delta CA_t = b_0 + b_1 E_{t-1} + \sum_{i=1}^{n} b_{2i}\,(1-L)\,\Delta DEF_{t-i} + \sum_{i=1}^{n} b_{3i}\,(1-L)\,\Delta CA_{t-i} + \sum_{i=1}^{n} b_{4i}\,(1-L)\,\Delta X_{t-i} + e_t \quad \ldots \quad \ldots \quad (5)$$

where X_t could be a third variable such as GNP, exchange rate, interest rate, price and money supply. In ECM Equations 4 and 5, C_{t-1} and E_{t-1} are the lagged values of the residuals from the cointegrating equations. Regarding GNP, prices, exchange rate, interest rate and money supply as control variables, the system captures the

response of DEF_t and CA_t to changes in these variables creating an additional channel of causality between DEF_t and CA_t. Thus, DEF_t Granger cause CA_t not only if the parameters b_{2i} and b_1 are jointly significant, but also if the parameter b_{4i} are statistically significant.

4. DATA

This study covers the period from 1973–98 for Pakistan. The data for fiscal deficit (DEF), GDP deflator (P), Consumer Price Index (CPI), Average Exchange Rate (EX) and money supply (MM) are from International Financial Statistics of various years. Moreover, figures for current account balance (CA) and GNP at constant prices are from 50 Years of Pakistan and Yearbook 2000 (both government publications). For the weighted interest rates on deposits (WIR) we have used various State Bank Bulletins. Both, fiscal deficit and current account balance are converted into real terms by deflating them with CPI.

5. ESTIMATIONS AND RESULTS

Cointegration test requires the series of all variables to be stationary. Therefore, Phillips-Perron (PP) unit root test (1998) which also checks for serial correlation are performed the results presented in Table 1 indicate that series of all seven variables are

Table 1

The Phillips-Perron (PP) Unit Root Tests

	Level	First Differences
1. With a Constant and Time Trend		
DEF	–1.47	4.63**
CA	–2.71	9.16**
GNP	–3.02	–4.65**
P	–2.38	–7.05**
WIR	–2.03	–5.65**
EX	2.04	–4.22*
MM	2.97	–4.19*
2. With a Constant and no Time Trend		
DEF	1.07	–4.38**
CA	–0.63	–8.02**
GNP	1.65	–4.32**
P	–2.32	6.47**
WIR	–2.41	–5.32**
EX	8.54*	–
MM	10.12*	–

* Significant at 5 percent.
** Significant at 1 percent.
DEF = Budget Deficit: (Revenue + Grants) – (Expenditure + Lending Minus Repayments).
CA = Current Account Balance: (Includes goods, services, income and unrequited transfers).
GNP = Gross National Product.
P = Growth in GDP Deflator.
WIR = Weighted Interest Rate.
EX = Average Exchange Rate.
MM = Money Supply $M_1 + M_2$.

each I (1) with a constant and time trend in the data. Subsequently, Johansen (1988, 1991) cointegration test is employed. This test is more appropriate when more than two variables are used in the equation, and it can make use of I(0) variables also. The null hypothesis is that there can be *r* cointegrating vectors among the three variable system (CA, DEF, GNP), (CA, DEF, P), (CA, DEF, EX), (CA, DEF, WIR) and (CA, DEF, MM). The trace test and λ max test are carried out using one and two years lag lengths. The results in Tables 2a and 2b indicate that except for the (CA, DEF, WIR) system, all other trivariate systems have at least one cointegrating vector demonstrated by both tests; that is, each group of the series are cointegrated and have a common stochastic trend and therefore there is a long run relationship among the three variables in each system.

Additionally, a model that is cointegrated requires that ECM be incorporated into the system in estimating the causality. The causal pattern between DEF and CA is investigated in Tables 3, 4, 5 and 6 within the ECMs of the form of the Equations 4 and 5. Atmost three lags are used for each independent variables to conserve degrees of freedom and the AIC is used for model selection. While the error correction terms E_{t-1} and C_{t-1} appearing as regressors reflect long run dynamics, the coefficients on the lagged values of ΔDEF, ΔCA, ΔGNP, ΔP, ΔEX and ΔMM are short run parameters measuring the short run immediate impact of independent variables on ΔDEF and ΔCA. If E_{t-1} is negative this implies that deficit and the third variables in the system are too high in relation to trade balance, deficit will be adjusted downward so that deficit together with the third variable and trade balance can restore their long run equilibrium [Jones and Joulfarian (1991)]. Whereas positive C_{t-1} is said to mean that in the beginning current account balance together with the third variable is relatively lower than the fiscal deficit, therefore, balance needs to adjust upward in order to restore long run equilibrium.

Our results in the four models suggest that budget deficit has powerful long run effects on current account deficit, as evident from statistically significant E_{t-1} in all ΔCA equations in all models. Lagged changed in ΔDEF have negative signs in all ΔCA equation but is only significant in model 1 at 5 percent significance level. Also lagged changes in ΔGNP, ΔEX and ΔMM are significant. On the other hand in ΔDEF equations, the coefficient of C_{t-1} reflecting long run effect of current account deficit on fiscal deficit is positive and only significant in model 1. There is also no evidence of short run causality from current account balance to fiscal deficit.

Thus ECM estimates suggest a lead of ΔDEF over ΔCA in the long run in all of the models. Also we could not find any relationship between the twin deficits through the interest rate linkage as we found no cointegration between interest rate and the twin deficits. However, other policy variables like economic growth, exchange rate and money supply do effect current account balance negatively. This could be because as economic growth increases it raises imports, exports decrease as exchange rate increases and current account deficit reduces as money supply increases.

Table 2a

The Johansen Cointegration Test Statistics

		Trace Tests		
a.	Linear deterministic trend in data and a constant	H0: r = 0	H0: r = 1	H0: r = 2
	1. DEF, CA, GNP			
	One year lag	42.76*	24.86	9.28
	Two year lag	48.64**	22.40	7.51
	2. DEF, CA, P			
	One year lag	45.10*	21.86	10.61
	Two year lag	49.21**	18.27	5.25
	3. DEF, CA, WIR			
	One year lag	37.12	17.33	6.66
	Two year lag	36.45	13.01	5.33
	4. DEF, CA, EX			
	One year lag	49.25**	24.82	9.73
	Two year lag	74.21**	17.80	7.08
	5. DEF, CA, MM			
	One year lag	68.27**	27.39*	9.55
	Two year lag	77.61**	33.61**	5.19
b.	No deterministic trend in data and a constant			
	1. DEF, CA, GNP			
	One year lag	43.07**	22.60*	6.23
	Two year lag	43.27**	12.19	3.45
	2. DEF, CA, P			
	One year lag	39.56*	16.24	4.79
	Two year lag	37.01*	13.46	2.30
	3. DEF, CA, WIR			
	One year lag	30.24	10.51	2.31
	Two year lag	33.88	11.07	2.64
	4. DEF, CA, EX			
	One year lag	44.85**	17.01	6.86
	Two year lag	49.25**	24.82	9.73
	5. DEF, CA, MM			
	One year lag	56.86**	21.39*	8.46
	Two year lag	68.27**	27.39*	9.55

*Significant at 5 percent.
**Significant at 1 percent.
DEF = Budget Deficit: (Revenue + Grants) – (Expenditure + Lending Minus Repayments).
CA = Current Account Balance: (Includes goods, services, income and unrequited transfers).
GNP = Gross National Product.
P = Growth in GDP Deflator.
WIR = Weighted Interest Rate.
EX = Average Exchange Rate.
MM = Money Supply $M_1 + M_2$.

Table 2b

The Johansen Cointegration Test Statistics

		λ Max Rank Tests		
a.	Linear deterministic trend in data and a constant	H0: r = 0	H0: r = 1	H0: r = 2
	1. DEF, CA, GNP			
	One year lag	17.9	15.58	9.28
	Two year lag	26.24*	14.89	7.51
	2. DEF, CA, P			
	One year lag	23.24*	11.25	10.61
	Two year lag	30.94**	13.02	5.25
	3. DEF, CA, WIR			
	One year lag	19.79	10.67	6.66
	Two year lag	23.44*	7.68	5.33
	4. DEF, CA, EX			
	One year lag	24.43*	15.09	9.73
	Two year lag	56.41**	10.72	7.08
	5. DEF, CA, MM			
	One year lag	40.88**	17.84*	9.55
	Two year lag	44.00**	28.42**	5.19
b.	No deterministic trend in data and a constant			
	1. DEF, CA, GNP			
	One year lag	20.47**	16.37*	6.23
	Two year lag	31.08**	8.74	3.45
	2. DEF, CA, P			
	One year lag	23.32*	11.45	4.79
	Two year lag	23.55*	11.16	2.30
	3. DEF, CA, WIR			
	One year lag	19.73	8.20	2.31
	Two year lag	22.81*	8.43	2.64
	4. DEF, CA, EX			
	One year lag	27.84**	10.15	6.86
	Two year lag	24.43*	15.09	9.73
	5. DEF, CA, MM			
	One year lag	35.47**	12.93	8.46
	Two year lag	40.88**	17.84*	9.55

*Significant at 5 percent.

**Significant at 1 percent.

DEF = Budget Deficit: (Revenue + Grants) – (Expenditure + Lending Minus Repayments).

CA = Current Account Balance: (Includes goods, services, income and unrequited transfers).

GNP = Gross National Product.

P = Growth in GDP Deflator.

WIR = Weighted Interest Rate.

EX = Average Exchange Rate.

MM = Money Supply $M_1 + M_2$.

Table 3

Estimates of ECMs for ΔCA and ΔDEF
Model 1

Variables	ΔCA	ΔDEF
Constant	1.88	0.210
	(1.15)	(0.12)
$\Delta CA_{t(-1)}$	–0.535	–0.390
	(–2.53)*	–1.27
$\Delta CA_{t(-2)}$	–0.656	–
	(–3.04)*	
$\Delta CA_{t(-3)}$	0.537	–
	(2.06)*	
$\Delta DEF_{t(-1)}$	–0.024	0.055
	(–0.14)	(0.18)
$\Delta DEF_{t(-2)}$	–0.373	–
	(–2.40)*	
$\Delta DEF_{t(-3)}$	–0.374	–
	(–2.33)*	
$\Delta GNP_{t(-1)}$	–	–0.082
		(–0.84)
$\Delta GNP_{t(-2)}$	0.021	–
	(0.34)	
$\Delta GNP_{t(-3)}$	–0.225	–
	(–3.02)*	
E_{t-1}	–0.222	–
	(–3.55)**	
C_{t-1}	–	0.668
		(2.05)*
R^2	0.882	0.207
$\bar{R}^2$	0.775	0.040
AIC	17.6768	19.07932
N	22	24

*Significant at 5 percent.
**Significant at 1 percent.
***Significant at 10 percent.

Table 4

Estimates of ECMs for ΔCA and ΔDEF
Model 2

Variables	ΔCA	ΔDEF
Constant	1.2844	–1.194
	(–2.23)*	(–1.73)
ΔCA(–1)	–0.229	–0.373
	(–0.90)	(–1.10)
ΔCA(–2)	–0.286	–
	(–1.06)	
ΔCA(–3)	0.441	–
	(1.37)	
ΔDEF(–1)	–0.281	0.083
	(–1.06)	(0.27)
ΔDEF(–2)	–0.171	–
	(–0.78)	
ΔDEF(–3)	–0.298	–
	(–1.22)	
ΔP(–1)	0.120	–0.163
	(0.79)	(–0.88)
ΔP(–2)	–0.257	–
	(–1.8)***	
ΔP(–3)	0.168	–
	(1.27)	
E_{t-1}	–0.305	–
	(–2.07)*	
C_{t-1}	–	0.648
		(1.54)
R^2	0.776	0.123
$\bar{R}^2$	0.572	–0.061
AIC	18.31931	19.17984
N	22	24

*Significant at 5 percent.
**Significant at 1 percent.
***Significant at 10 percent.

Table 5

Estimates of ECMs for ΔCA and ΔDEF
Model 3

Variables	ΔCA	ΔDEF
Constant	0.978	–0.131
	(–1.24)	(–0.12)
ΔCA(–1)	–1.070	–0.894
	(–3.33)**	(–1.01)
ΔCA(–2)	–1.721	–0.420
	(–3.47)**	(–0.70)
ΔCA(–3)	–0.756	–
	(–1.94)***	
ΔDEF(–1)	–0.108	–0.30
	(–0.55)	(–0.096)
ΔDEF(–2)	–0.192	–0.430
	(–1.03)	(–1.53)
ΔDEF(–3)	–0.189	–
	(–0.96)	
ΔEX(–1)	–0.212	0.130
	(–0.27)	(–0.121)
ΔEX(–2)	–1.436	1.629
	(–2.10)*	(–1.76)
ΔEX(–3)	0.237	–
	(0.30)	
E_{t-1}	–0.407	–
	(–3.22)**	
C_{t-1}	–	1.529
		(1.39)
R^2	0.821	0.409
$\overline{R}^2$	0.658	0.133
AIC	18.096	19.10486
N	22	23

*Significant at 5 percent.
**Significant at 1 percent.
***Significant at 10 percent.

Table 6

Estimates of ECMs for ΔCA and ΔDEF
Model 4

Variables	ΔCA	ΔDEF
Constant	–2.891	4.030
	(–1.80**)	(–0.53)
ΔCA(–1)	0.543	0.225
	(1.08)	(0.28)
ΔCA(–2)	–0.495	0.041
	(–1.68)	(0.06)
ΔCA(–3)	–	0.702
		(1.18)
ΔDEF(–1)	–0.068	0.381
	(–0.36)	(0.93)
ΔDEF(–2)	–0.038	0.099
	(–0.23)	(0.25)
ΔDEF(–3)	–	0.675
		(2.02)***
ΔMM(–1)	–0.012	–0.045
	(–0.72)	(–0.85)
ΔMM(–2)	–0.051	0.088
	–(2.66)*	(2.22)*
ΔMM(–3)	–	0.032
		(0.52)
E_{t-1}	–1.929	–
	(–2.84)*	
C_{t-1}	–	0.821
		(0.66)
R^2	0.866	0.761
$\overline{R}^2$	0.790	0.498
AIC	17.54336	18.63855
N	23	22

*Significant at 5 percent.
**Significant at 1 percent.
***Significant at 10 percent.

6. CONCLUDING REMARKS

This study uses annual data and is based on cointegration analysis, ECM strategy and Granger trivariate causality tests. The empirical results indicate that the budget deficit has positive as significant long-run causes effect on the trade deficit in

Pakistan. However, during the short run the causal effect is negative between budget deficit and current account balances. Furthermore, except for interest rate, other policy variables like economic growth, exchange rate and money supply do effect current account deficit directly and could be used more effectively in Pakistan to reduce the twin deficit.

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Comments

Anjum Aqeel and Mohammad Nishat have attempted to investigate the causality between the two important deficits, that is Budget deficit and Current Account (trade) deficit. I found it a good exercise to understand behaviour of two deficits and their linkage with each other with reference to Pakistan. To test the causality between two deficits the authors selected to apply cointegration based error correction mechanism. Theoretically error correction based test is a recent advancement in the analysis of causality between the non-stationary variables. It simultaneously deals with long-run as well as short-run causality analysis.

Though this is a commendable attempt I have noted number of theoretical and methodological shortcomings. Further the presentation and interpretation of the results indicate carelessness of the authors. Apart from the typing mistakes following points need to be considered before the presentation of final version of the paper.

(1) The concept of budget deficit needs to be clarified. It should include government revenue rather than direct taxes only.

(2) On page 538 it should be like, "*CA* does not granger causes *DEF* if all a_{i1}, $a_1 \neq 0$ and equivalently, *DEF* does not Granger causes *CA* if b_{i1}, $b_1 \neq 0$. Further the causality analysis within *ECM* framework require that a_1 or $b_1 \neq 0$. For clarity of concept see for example, Mehra (1991), AER.

(3) Though the bivariate cointegrating relationship and error correction model is touched in the discussion but the results are not given in the paper. This may be due to computer mistake or because authors could not find significant cointegrating relationship between the twin deficits.

(4) In trivariate cointegration analysis authors did not present estimated long-run relationship. They also did not present the results of the significance test of estimated parameters. In the absence of significance test the results could have been that there is no cointegrating relationship between *CA* and *DEF*. It could be due to the presence of long run relationship between the variables of interest and the third variable that is included in the analysis.

(5) The authors have presented estimated error correction models. However in these models the authors wrongly included the error correction term that is obtained from the cointegration analysis of one model into second model. I suppose this could be due to typing error. If this is not a case then the results and conclusions drawn on the basis of this analysis remains no longer valid.

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