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Are Trade Openness and Financial Development Complementary?

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Abstract: Trade liberalization and financial deepening have assumed greater significance for a country's economic growth performance in recent times. Several theoretical and empirical studies have devoted considerable attention to the association between economic performance and trade liberalization as well as to the connections between financial market development and economic growth. However, literature is sparse in terms of the direct linkages between trade openness and financial sector development. This paper finds that trade openness and financial development are complementary and econometrically tests this hypothesis for India over a period of time. However, two important policy implications of the analysis presented in this paper deserve attention. First, although financial deepening has emerged as an important aspect of the economic growth strategy in the Indian context, since the sources of such a deepening may be both domestic as well as external; the importance of a judicious policy mix cannot be neglected, especially in the wake of the current global financial meltdown. Second, as documented in the econometric analysis, the complementarities between trade openness and financial deepening appear to be less pronounced. However, this should be interpreted with some caution. While the Indian data suggest that trade and financial liberalization policies may possibly be pursued independent of each other, this by no means suggests that there are no reinforcing linkages between the two.

Introduction

Trade liberalization and financial sector development have assumed greater significance for a country's economic performance in recent times, especially in the wake of the recent global financial meltdown with wide-ranging

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economic effects and policy responses including the G-20 (Sen, 2008; Dubey, 2009; Griffith-Jones, Ocampo and Stiglitz, 2010; Chandrasekhar and Ghosh, 2010; Dhar, 2010, among others). There was already a comprehensive critique (Stiglitz, Ocampo, Spiegel, Ffrench-Davis and Nayyar, 2006) of the economic policies advocated by the IMF and other international financial institutions as they 'often resulted in stagnating growth, crises, and recessions for client countries'. Thus, the complex issue of trade and financial sector opening and/or deepening becomes even more important than before.

Indeed, many theoretical and empirical studies have devoted considerable attention to the association between economic performance and trade liberalization as well as to the connections between financial market development and economic growth. However, the issue of direct linkages *between* trade liberalization and financial market development has not received commensurate attention in the literature. At the very outset, it may be emphasized that financial sector development is akin to financial deepening in any economy. Financial deepening refers to increased provision of credit or liquidity in the economy. Increased liquidity could have both domestic and external sources. The external sources of deepening therefore are tantamount to financial liberalization.

Lack of literature notwithstanding, the logic of a direct connection between trade openness and financial development/deepening in an economy is fairly obvious. While trade liberalization necessitates concomitant financial sector reforms and integration with the global markets to augment trade flows, financial integration with global markets could also engender trade flows through improving product competitiveness due to increased availability of cheaper and secured financial capital.

This paper asserts that *ceteris paribus* trade openness and financial development are complementary and econometrically tests the direct linkages between the two. The research question raised by this paper is wheather the development of the financial system in an economy directly affected by trade openness and does trade openness stimulate financial deepening? This question

is answered in the specific context of India, utilizing a multivariate cointegrated time-series framework.

The paper is organized as follows. The following section (2) discusses relevant literature. The empirical section (3) econometrically links trade openness with financial development and utilizes GDP growth rates as well as other variables in a VAR framework. Section 4 offers a summary and conclusion.

Literature

A bulk of theoretical analysis surrounding trade openness and financial development can be located in endogenous growth models (new growth theory), where international trade and capital market development are analyzed in terms of their impact on long term growth. The engine of growth in such models may be increasing returns to scale due to investments in reproducible factors or technological progress that is achieved by investment in R&D. Within this analytical framework, scholars have either focused on the impact of international trade on economic growth (trade studies) or on the connections between financial market development and growth (financial development studies), largely ignoring the multi causal linkages *between* economic growth, financial development, and international trade. The following literature review is illustrative.

Among trade studies, endogenous growth models based on accumulation of physical capital contend that trade affects growth because it stimulates capital accumulation in the less capital abundant country (Fisher, 1995; Majumdar and Mitra, 1995). Where human capital investment is concerned, Lucas (1993) contends that, marginal benefits emanating from human capital investment might be increased by demand expansion through trade (scale effects) and the inflow of new ideas through trade stimulates investment in human capital by increasing its efficiency (Lucas, 1993). In the category of trade studies that focus on technological progress, Grossman and Helpman (1991) note that trade openness creates knowledge spillovers that can increase the efficiency of investment in R&D, thereby stimulating growth. Trade openness results in an increase in demand which in turn fosters more R&D and drives economic growth (Romer, 1990).

Where empirical substantiation of the trade-growth linkage is concerned, the existence of a positive relationship between openness and economic growth has been well documented by Balassa (1985), the World Bank (1987), Roubini and Sala Martin (1991), Harrison (1995), Frankel and Romer (1996), Sachs and Warner (1995, 1997), Ben-David (1993, 1996).

In the category of financial integration/development studies, endogenous growth models focus on how financial development stimulates the twin engines of growth viz., investment in capital and/or in R&D. In this vein, Pagano (1993) notes that financial development helps to improve the efficiency of capital allocation, thereby promoting growth. Similarly, liquidity provided by financial market development can help investment in schooling and human capital formation and thus drive growth (De Gregorio, 1996). Cooley and Smith (1995) argue that efficient financial markets might promote entry in entrepreneurial activity and then human capital accumulation through learning by doing. Finally, fully integrated financial markets can result in better risk assessment and insofar as R&D is a risky activity financial development can enhance technological progress and endogenously drive economic growth. (Saint Paul, 1992; Feeney, 1994).

As in the case of trade-growth studies, a positive association between financial development and economic growth link has also been empirically documented in the literature (Atje Jovanovic 1993; King and Levine, 1992, 1993, 1994; Jayaratne and Strahn 1996; Levine and Zervos. 1996). Empirical evidence on the associations between financial liberalization and economic growth however is ambiguous - Diaz-Alejandro (1985) presents evidence showing that financial liberalization has not always been growth promoting.

As explained above, the endogenous growth literature is deficient in examining trade openness, financial development, and economic growth in a multi causal conceptual framework. Blackburn and Hung (1998) have attempted to bridge this caveat by offering a theoretical analysis that suggests a direct effect of trade liberalization on economic growth mediated via new product development. As trade encourages the number of new producers

who need access to finance, financial development is encouraged. In other words, there is an *indirect* theoretical link between trade liberalization and financial deepening. Similarly, Feeney (1994a) explores the trade-financial development link from another theoretical perspective and argues that financial sector integration increases the probability for risk sharing that allows product specialization and in turn benefits trade.

In sum, the studies examined above fall short of analyzing direct linkages between trade openness and financial development. While there has been limited theoretical inquiry in this area, there is only one study that has studied the issue of complementarity between the trade sector and the financial sector. In their working paper, Ginebri *et. al.* (2001) posit that controlling for growth effects, there is a direct positive relationship between trade liberalization and financial sector development. The theoretical underpinnings of this complementarity lie in the fact that trade liberalization can promote entrepreneurial development which in turn necessitates a need for well developed capital markets. An empirical analysis done by the authors for Spain and Italy verifies the posited complementarity between trade and financial development. This paper is motivated by similar considerations and attempts to test the complementarities between trade openness and financial deepening in the Indian economy over 1970-2005 in a VAR framework as discussed below.

Empirical Analysis

The empirical analysis concerns itself with exploring multicausal linkages between trade openness, financial deepening, and the level of real GDP. Macroeconomic data for all variables were obtained from International Financial Statistics (2006). Trade openness is estimated by measuring the ratio between the sum of imports and exports to GDP (TRADEGDP). Financial deepening is measured by the level of total credit to the private sector (PVTCREDIT). The empirical examination was conducted as a VAR framework with the above mentioned three variables over the time period 1970-2005. A sample split that constricts the time series to the post – liberalization phase from 1991 to 2005 was also studied.

In order to test the nature of linkages between TRADEGDP, PVTCREDIT, and GDP one has to take care of cointegration among the variables. Econometrically speaking, Engle and Granger (1987) note that a linear combination of two or more non-stationary series may be stationary and such time series are said to be cointegrated. To this end, the paper utilizes a vector error correction (VEC) model. The latter is a restricted VAR that has cointegration restrictions built into the specification, so that it is designed for use with nonstationary series that are known to be cointegrated.

A Johansen (1995) cointegration test was also carried out in order to determine the cointegration rank among the variables as displayed in Table 1 below. As indicated, the LR statistic rejects any cointegration at the 5 per cent level.

Table 1: Johansen Cointegration Test

Sample: 1970 2005				
Included observations: 33				
Test assumption: Linear deterministic trend in the data				
Series: TRADEGDP PVTCREDIT GDP				
Lags interval: 1 to 2				
Eigenvalue	**Likelihood Ratio**	**5 Percent Critical Value**	**1 Percent Critical Value**	**Hypothesized No. of CE(s)**
0.308667	16.47595*	29.68	35.65	None
0.119028	4.294536*	15.41	20.04	At most 1
0.003402	0.112450*	3.76	6.65	At most 2
*(**) denotes rejection of the hypothesis at 5%(1%) significance level				
L.R. rejects any cointegration at 5% significance level				

Subsequently, we estimate the impulse response function (IRF) in Appendix I (Figures 1 and 2). An impulse response function (IRF) traces the effect of a one standard deviation shock to one of the innovations on current and future values of the endogenous variable. While, impulse response functions trace the effects of a shock to an endogenous variable on the variables in the VAR, variance decomposition disaggregates variation

in an endogenous variable into the component shocks to the endogenous variables in the VAR.

The variance decomposition gives information about the relative importance of each random innovation to the variables in the VAR. This is important since within the IRF the innovations are, usually correlated, so that they have a common component which cannot be associated with a specific variable. A somewhat arbitrary but common method of dealing with this issue is to attribute all of the effect of any common component to the variable that comes first in the VAR system.

For a more robust exploration, the errors are orthogonalized by a Cholesky decomposition so that the covariance matrix of the resulting innovations is diagonal. Table 2 illustrates the results. It must be noted that the variance decomposition results are sensitive to the ordering of variables. This paper bases the ordering of variables on the specifics of the Indian context. The reasoning is that domestic provision of credit to the private sector (financial deepening) in India has been consistent and steady over a significantly long time-period. This may be compared with the relatively recent emphasis on trade openness. Even now the trade/GDP ratio has remained at a modest 30 per cent.

Table 2: Variance Decomposition Analysis: 1970-2005

Variance Decomposition of TRADEGDP:				
Period	**S.E.**	**TRADEGDP**	**PVTCREDIT**	**GDP**
1	3.464834	81.97856	18.02144	0.000000
2	3.984289	76.59512	18.84231	4.562572
3	5.658582	40.18986	51.49369	8.316448
4	8.026968	25.23189	65.91713	8.850984
5	12.93701	10.38121	78.71531	10.90348
6	20.37514	4.737565	84.05739	11.20505
7	31.88074	2.095854	87.02785	10.87629
8	49.00579	0.949592	88.49393	10.55648
9	74.42180	0.431387	89.29120	10.27742
10	111.9793	0.195221	89.70761	10.09717

Table 2 continued

Table 2 continued

Variance Decomposition of PVTCREDIT:				
Period	**S.E.**	**TRADEGDP**	**PVTCREDIT**	**GDP**
1	7.144808	0.000000	100.0000	0.000000
2	13.47543	0.070257	99.90054	0.029206
3	24.51378	0.078243	98.72541	1.196351
4	40.31577	0.044716	97.03341	2.921879
5	64.51177	0.042547	95.19117	4.766279
6	100.4974	0.031326	93.69275	6.275927
7	154.0997	0.023862	92.60876	7.367374
8	233.4213	0.018363	91.85846	8.123179
9	350.6214	0.014900	91.34956	8.635542
10	523.5298	0.012733	91.00241	8.984858
Variance Decomposition of GDP:				
Period	**S.E.**	**TRADEGDP**	**PVTCREDIT**	**GDP**
1	16.82780	0.006652	41.80904	58.18431
2	26.64373	4.061436	58.98276	36.95580
3	39.21861	3.331186	76.13324	20.53557
4	58.55548	2.849125	87.93858	9.212293
5	90.18358	1.758402	93.14733	5.094271
6	139.8728	0.971238	94.23557	4.793195
7	215.9838	0.520242	93.81457	5.665192
8	329.8790	0.278504	93.08199	6.639510
9	499.0292	0.153816	92.38392	7.462266
10	749.1093	0.088506	91.80982	8.101678

As any scholar of the Indian economy would know that the country went through a period of liberalization primarily since 1991. For this reason, the foregoing econometric tests were also conducted on a sample that spans the time period 1991-2005. As per the results (Table 3), the series are cointegrated, i.e. do display the problems of nonstationarity or presence of trend-effect. Therefore, the VEC model was used to correct for it so that real relationships among the variables could be examined as it allowed for short-term adjustments towards a long run real equilibrium relationships. The estimated VEC model is contained in Appendix II (Tables A1 and A2).

After correcting for the nonstationarity problem, two methods were used to examine the extent and direction of relationships viz. Impulse

Response Function (IRF) and Variance Decomposition. The results indicate that there was a need to conduct the variance decomposition test as the relationships among variables under consideration were not borne out by the IRF methodology as expected from the economic logic and the timing of reforms in the financial and trade sectors in India. This was possibly due to the inherent weaknesses in the IRF methodology as mentioned earlier. Appendix II (Figures 3 and 4) contain the IRFs associated with the 1991-2005 time period. The results of Variance Decomposition over the same time period are presented in Table 4.

A comparison of the Variance Decomposition analysis per Tables 2 and 4 offers interesting insights. The tables suggest that trade openness is explained by financial openness to the extent of 44 percent in the recent sample period as opposed to 18 percent in the case of full sample. On the other hand, a growth led - trade linkage in not evident in the Indian case for both the periods under consideration.

Financial deepening is neither explained by trade openness or GDP growth in both samples. Approximately, 69 percent of GDP is explained by financial deepening in the post-liberalization era as compared to 42 per cent in the case of full sample. Again, a trade-led growth hypothesis is also not borne out by these estimations.

Table 3: Johansen Cointegration Test: Post-Liberalization (1991-2005)

Sample: 1991 2005				
Included observations: 15				
Test assumption: Linear deterministic trend in the data				
Series: TRADEGDP PVTCREDIT GDP				
Lags interval: 1 to 1				
Eigenvalue	**Likelihood Ratio**	**5 Percent Critical Value**	**1 Percent Critical Value**	**Hypothesized No. of CE(s)**
0.771346	38.37345	29.68	35.65	None **
0.529247	16.24028	15.41	20.04	At most 1 *
0.280547	4.938959	3.76	6.65	At most 2 *
*(**) denotes rejection of the hypothesis at 5%(1%) significance level				
L.R. test indicates 3 cointegrating equation(s) at 5% significance level				

Table 4: Variance Decomposition Analysis: 1991-2005

Variance Decomposition of TRADEGDP:				
Period	**S.E.**	**TRADEGDP**	**PVTCREDIT**	**GDP**
1	4.291950	56.04610	43.95390	0.000000
2	6.306542	65.03260	32.68270	2.284703
3	17.85599	39.08247	60.49565	0.421881
4	24.46492	47.77208	51.52422	0.703696
5	55.79834	29.06546	70.30364	0.630901
6	73.82244	36.14339	63.41356	0.443048
7	161.9169	24.34294	74.92300	0.734056
8	215.3589	31.81019	67.73577	0.454037
9	470.3922	23.46761	75.82952	0.702870
10	634.0998	31.13119	68.45009	0.418725
Variance Decomposition of PVTCREDIT:				
Period	**S.E.**	**TRADEGDP**	**PVTCREDIT**	**GDP**
1	8.093837	0.000000	100.0000	0.000000
2	16.29964	11.64395	88.35106	0.004986
3	39.85876	17.49452	82.25732	0.248156
4	63.74293	19.97743	79.82813	0.194439
5	129.0579	19.57206	79.83320	0.594734
6	196.8815	23.45421	76.21857	0.327216
7	386.2573	22.30454	77.18155	0.513903
8	594.1155	27.20077	72.55501	0.244221
9	1151.343	24.88831	74.71913	0.392566
10	1778.459	29.09875	70.71580	0.185456
Variance Decomposition of GDP:				
Period	**S.E.**	**TRADEGDP**	**PVTCREDIT**	**GDP**
1	11.70940	9.514831	68.61820	21.86697
2	21.51319	9.744018	82.71181	7.544169
3	43.60993	12.08391	85.67807	2.238023
4	51.54089	19.90888	76.64831	3.442806
5	88.18135	10.41015	80.83467	8.755186
6	102.8326	32.43541	60.58151	6.983074
7	172.5458	11.90164	80.70364	7.394715
8	188.1871	11.30122	80.71954	7.979239
9	434.1350	8.910856	87.57851	3.510639
10	477.5276	9.800858	83.57729	6.621847

Summary and Conclusions

This paper econometrically examines the multicausal linkages between financial deepening, trade openness, and GDP growth for the Indian economy over 1970-2005. To investigate the impact of liberalization on these linkages, the econometric analysis is also conducted over a sample split over the 1991-2005 time period. For the full sample, the series are not cointegrated, i.e. do not display the problems of nonstationarity or presence of trend-effect. Two methods were used to examine the extent and direction of relationships, viz. Impulse Response Function (IRF) and Variance Decomposition due to inherent weaknesses in the IRF methodology.

Variance Decomposition of the full sample suggests that trade openness is explained by financial openness to the extent of 18 per cent. On the other hand, GDP-led trade hypothesis is invalid in the Indian case for the period under consideration. Financial deepening is not explained by either trade openness or GDP growth. Approximately, 42 per cent of GDP is explained by financial deepening. A trade-led growth hypothesis is also not validated by the estimated equations after having corrected for the errors on account of nonstationarity. Thus, the full sample indicates that financial deepening is positively associated with growth.

A similar analysis of the 1991-2205 sample yields more insightful results. Econometric results suggest that trade openness is explained by financial deepening to the extent of 44 per cent in the recent sample period as opposed to 18 per cent in the case of full sample. On the other hand, GDP-led trade hypothesis is invalid in the Indian case for both the periods under consideration.

Taken together the analysis in this paper indicates that the trade-financial deepening linkages need to be examined in greater detail. Post-liberalization, financial deepening of the economy may drive trade as well as economic growth. Two important policy implications of the analysis presented in this paper deserve attention. First, financial deepening has emerged as an important aspect of the economic growth strategy in the Indian context. But, as mentioned above, since the sources of such a deepening

may be both domestic as well as external, the importance of a judicious policy mix cannot be neglected, especially in the backdrop of the recent global economic slowdown. Second, as documented in the econometric analysis, the complementarities between trade openness and financial deepening appear to be less pronounced. However, this should be interpreted with some caution. While the Indian data suggest that trade and financial liberalization policies may possibly be pursued independent of each other, this by no means suggests that there are no reinforcing linkages between the two. Perhaps a more definitive answer on the issue of complementarities can only be taken by studying varied country experiences over time.

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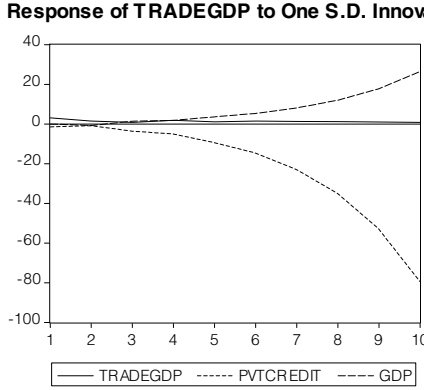
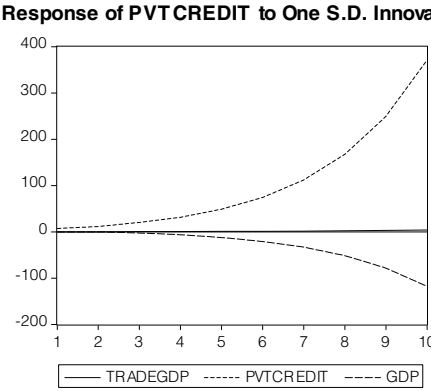
Fig 1: Impulse Response Function: Full Sample





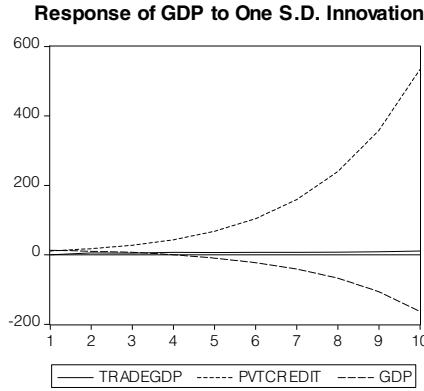


Fig 2: Impulse Response Function: Full Sample

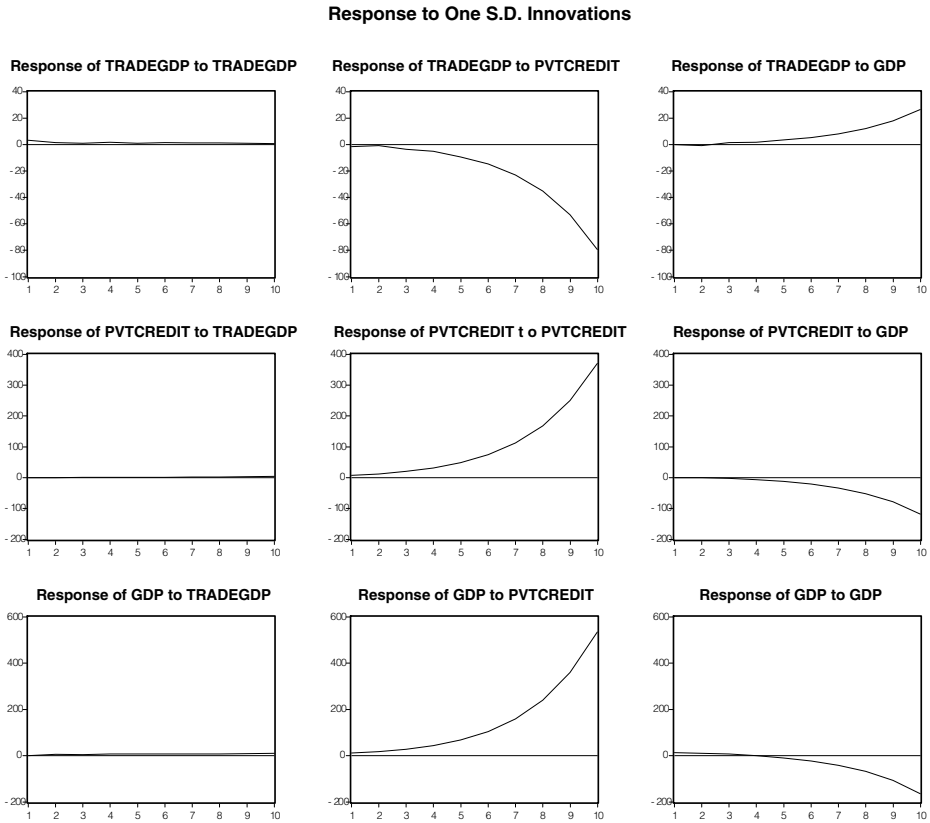


Table A1:
Vector Error Correction (VEC) Model

VAR Model - Substituted Coefficients:
==========

D(TRADEGDP) = - 0.4213570767*(TRADEGDP(-1) + 0.1488135129*PVTCREDIT(-1) - 0.09922204054*GDP(-1) + 2.106144162) + 0.4525647747*D(TRADEGDP(-1)) + 2.912281929*D(TRADEGDP(-2)) + 0.3603163427*D(PVTCREDIT(-1)) - 0.7146352003*D(PVTCREDIT(-2)) - 0.2158992841*D(GDP(-1)) + 0.1611534103*D(GDP(-2)) + 0.001039118337

D(PVTCREDIT) = 4.552628709*(TRADEGDP(-1) + 0.1488135129*PVTCREDIT(-1) - 0.09922204054*GDP(-1) + 2.106144162) - 6.307271828*D(TRADEGDP(-1)) - 8.041670584*D(TRADEGDP(-2)) - 0.6619626254*D(PVTCREDIT(-1)) + 1.469819629*D(PVTCREDIT(-2)) + 0.4307024415*D(GDP(-1)) - 0.206909315*D(GDP(-2)) + 7.719796263

D(GDP) = 17.36653898*(TRADEGDP(-1) + 0.1488135129*PVTCREDIT(-1) - 0.09922204054*GDP(-1) + 2.106144162) - 18.67248397*D(TRADEGDP(-1)) - 19.56859168*D(TRADEGDP(-2)) - 1.430285546*D(PVTCREDIT(-1)) + 0.5991089635*D(PVTCREDIT(-2)) + 1.128808165*D(GDP(-1)) + 0.2560994353*D(GDP(-2)) + 10.07405014

Table A2:
Vector Error Correction Estimates

Sample: 1991 2005			
Included observations: 15			
Standard errors & t-statistics in parentheses			
Cointegrating Eq:	CointEq1		
TRADEGDP(-1)	1.000000		
PVTCREDIT(-1)	0.148814		
	(0.01820)		
	(8.17532)		
GDP(-1)	-0.099222		
	(0.00587)		
	(-16.9025)		
C	2.106144		
Error Correction:	D(TRADEGDP)	D(PVTCREDIT)	D(GDP)
CointEq1	-0.421357	4.552629	17.36654
	(1.32426)	(2.49732)	(3.61288)
	(-0.31818)	(1.82301)	(4.80684)
D(TRADEGDP(-1))	0.452565	-6.307272	-18.67248
	(1.54049)	(2.90508)	(4.20280)
	(0.29378)	(-2.17112)	(-4.44287)
D(TRADEGDP(-2))	2.912282	-8.041671	-19.56859
	(2.40492)	(4.53524)	(6.56115)
	(1.21097)	(-1.77315)	(-2.98249)
D(PVTCREDIT(-1))	0.360316	-0.661963	-1.430286
	(0.35828)	(0.67565)	(0.97747)
	(1.00568)	(-0.97974)	(-1.46325)
D(PVTCREDIT(-2))	-0.714635	1.469820	0.599109
	(0.31693)	(0.59768)	(0.86466)
	(-2.25485)	(2.45922)	(0.69288)
D(GDP(-1))	-0.215899	0.430702	1.128808
	(0.13080)	(0.24667)	(0.35686)
	(-1.65057)	(1.74606)	(3.16317)
D(GDP(-2))	0.161153	-0.206909	0.256099
	(0.11930)	(0.22498)	(0.32548)
	(1.35080)	(-0.91967)	(0.78683)

Table A2 continued

Table A2 continued

C	0.001039	7.719796	10.07405
	(3.87485)	(7.30727)	(10.5715)
	(0.00027)	(1.05645)	(0.95295)
R-squared	0.692502	0.877980	0.910662
Adj. R-squared	0.385003	0.755960	0.821324
Sum sq. resids	276.3125	982.6530	2056.650
S.E. equation	6.282771	11.84816	17.14080
F-statistic	2.252050	7.195368	10.19343
Log likelihood	-43.13519	-52.65062	-58.18995
Akaike AIC	6.818026	8.086750	8.825327
Schwarz SC	7.195653	8.464376	9.202954
Mean dependent	-1.076000	16.53267	31.72600
S.D. dependent	8.011518	23.98393	40.55065
Determinant Residual Covariance	20277.82		
Log Likelihood	-138.2319		
Akaike Information Criteria	22.03091		
Schwarz Criteria	23.30540		

Fig 3: Impulse Response Function: Split Sample

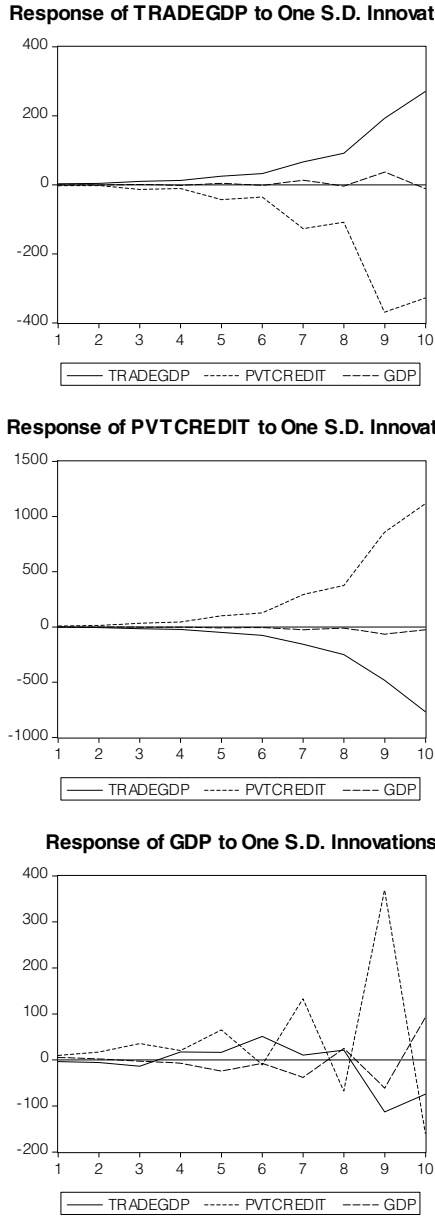
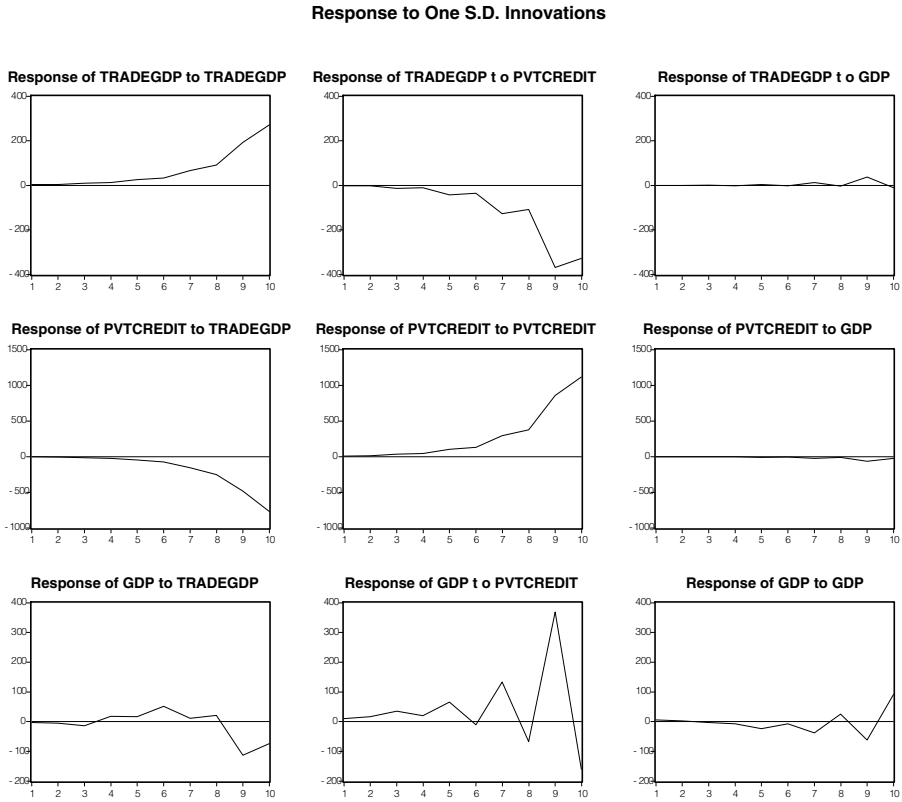


Fig 4: Impulse Response Function: Split Sample



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