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An Evaluation of Current Account Behaviour Amidst Globalisation

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Abstract: The study analysed the current account response to international economic factors namely, oil price volatility, exchange rate of Indian rupee, trade openness, net foreign assets and home country inflation using data spanning 2001 Q1 to 2020 Q4. The study revealed that a hike in oil price volatility, net foreign assets and home country inflation leads to current account deficit increase. The main reason being the failure of intertemporal hypothesis for the Indian economy. The study concludes that for maintaining healthy current account position, rupee should be allowed for free conversion and trade barriers should be reduced to the minimum. Also, private saving should be encouraged to provide a buffer for elevated oil import bill and efforts should be made to cut the oil imports as far as possible.

1. Introduction

In the era of globalisation, maintaining macroeconomic stability especially in terms of current account balance position is the major challenge which is being confronted by almost all the economies. Exchange rate swings are the main cause behind macroeconomic instability following globalisation and resultant factors. As a consequence of globalisation, world has become totally interdependent in terms of fulfilling their respective needs for survival but simultaneously this integration has also created problems in the form of mounting current account deficit of economies. India is no exception; its current account deficit is also piling up year by year. The main reason behind this mounting current account deficit of India is its major chunk of imports in the form of oil and gold. Current account position of India has almost in all the years remained in deficit. For instance, current account deficit (CAD) was at $8.1 billion in last quarter of year 2020-21. India undergone through a strange current account surplus in 2020–21 subsequent to covid-19, however, this surplus got reversed again to deficit in 2021-22.

Exchange rate fluctuations mean all the swings and adjustments causing currency's appreciation or depreciation owing to changes in one currency value in relation to another currency. The constant hike in oil prices as is being generally experienced by almost all the nations and simultaneous rise in the demand for oil has further aggravated the problem of maintaining favourable current account balance position.

In the present study, for analysing economic openness, trade openness reflects globalisation. While giving due weightage to globalisation in the form of trade openness, other variables such as international oil prices, rupee exchange rate, net foreign assets, home country's inflation are being considered as major determinants of current account balance position.

2. Literature Review

In order to lay down the objectives of the study in a precise manner, a brief review of literature related to the problem being analysed is being presented in chronological order as below:

Baharumshah *et al.* (2003) focussed on persistent rise of imbalances in current account of four ASEAN nations namely, Malaysia, Thailand, Indonesia and Philippines for the years 1961 to 1999. For analysing the current account behaviour in these economies, the intertemporal budget constraint (IBC) approach is being employed. Using conventional ADF & PP unit root tests, Johansen's cointegration technique and Gregory Hansen cointegration approach, the study found that with the exception of Malaysia, strong evidence regarding the violation of intertemporal balancing model approach has been discovered for all the considered nations prior to the Asian financial crisis. On the contrary, significant co-movement among inflows and outflows in Philippines, Indonesia and Thailand has been observed throughout the post-crisis period. This eventually brings us to the conclusion that these nations' current account deficit was unmaintainable and failed to move towards external-account equilibrium.

Arouri *et al.* (2015) focussed on analysing the sensitivities of current account deficit in response to real exchange rate based on annual data series throughout 1975 to 2011. The study revealed that a rise in rupee exchange rate lowers current account imbalance and it further emphasised the disturbances in the form of productivity shocks, technological advancements and changes in consumer behaviour.

Garg and Prabheesh (2017) analysed India's current account behaviour after the period of liberalization and detected that whether it is subjective to external factors through an intertemporal model on the quarterly data series ranging from 1997–98Q1 to 2012–13Q2. The study tested hypotheses such as Twin-Deficit Hypothesis in comparison to hypothesis of Ricardian Equivalence and Feldstein-Horioka. The findings based on ARDL bound testing displayed that Indian current account balances are affected by external determinants viz., oil prices volatility and foreign income and also by some macroeconomic factors such as real effective exchange rate, fiscal balance and private investment. It has been discovered that the results are in support of the twin-deficit theory while contradicting Ricardian equivalence theory.

Behera and Yadav (2019) explored the significance of current account deficit from the different perspectives emphasizing on its financing structure, behavioural patterns, sustainability in context of India employing several unit root tests (both with or without structural breaks), Johansen-Juselius cointegration test, Vector Error Correction approach and Toda and Yamamoto Granger non-causality

approach to perform empirical analysis. The evaluation brings out that inflation, trade openness, terms of trade, relative income growth, fiscal deficit, real deposit rate and age reliance factor all contribute to India's current account imbalance. The analysis further highlighted that the decline in corporate investments and household savings were major factors contributing to the widening of the CAD.

Riaz et al. (2019) investigated the influence of nominal effective exchange rate, trade openness, domestic relative income and net foreign assets on a subset of South Asian economies from 1984 and 2015 employing Johansen-Juselius cointegration technique and Vector Error Correction Method. The economies selected for the study are India, Bangladesh, Pakistan and Sri Lanka represent the four major economies in SAARC group of nations. The current account model employed throughout this study is aligned with the saving-investment model. The study used intertemporal modelling to figure out the variables that affect current account in considered South Asian economies. The paper revealed that for considered economies, there is a significant long-term association between trade openness, domestic income, net foreign assets and current account.

Saxena and Gupta (2020) examined long-term and short-term influence of real exchange rate and consequential volatility impact on exports from India to US applying autoregressive distributed lag bound testing approach depend upon quarterly data from 1991Q1 to 2018Q4. The study observed that aggregate real exports from India are quite sensitive and responsive to real exchange rate in long-run while comparatively lesser sensitive in short-run. The paper further highlighted that economic impact is positively and significantly related to level of exports made. But, Indian exports to US does not indicate any significant association with exchange rate volatility. As a whole, the study concluded that exports are predominantly influenced by factors other than real exchange rate volatility.

Rani *et al.* (2022) observed the influence of currency futures on volatility of Indian rupee exchange rate based on Indian rupee vis-a-vis US dollar, Euro, UK pound and Japanese yen covering a period from February 2002 to February 2020. The results of GARCH (1,1) model brings out that volatility persists for considered bilateral currency's exchange rates. The study found that the volatility of returns from exchange rate during pre and post currency futures period is statistically significant and higher during pre-futures period for USD-INR and GBP-INR while it has been discovered to be higher in post future era for EUR-INR and JPY-INR. The authors emphasised that volatility persistence between currency futures and spot markets should be taken into account at the time of framing hedging strategies.

For making an in-depth analysis of current account balance position, numerous determinants have been considered and explained at length in earlier studies, generally for developed economies. However, determinants for current account balance for the economies like India have not been discussed elaborately in the existing literature. Having identified the research gap, an effort is being made to verify the behavioural impact of selected variables, viz., rupee exchange rate, volatility of oil prices, trade openness, net foreign assets and wholesale price index on current account deficit of India.

3. Objectives of the Study

The major thrust of the dissertation is to achieve the below mentioned objectives:

1. To analyse the behaviour of current account in relation to selected external sector variables and home country inflation.

2. To observe the short run drivers incorporating long run equilibrium among the endogenous factors.

4. Data Description

For assessing the behaviour of CAD in the era of globalisation, quarterly data spanning 2001 Q1 to 2020 Q4 have been taken into account. The observations on CAD, rupee exchange rate (RER), trade openness (TOP), net foreign assets (NFA) and wholesale price index (WPI) have been obtained from official website of RBI. The oil prices have been extracted from Energy Information Administration's website. CAD to GDP ratio has been considered while trade openness has been expressed as ratio of overall imports & exports to GDP. For GDP series from 2001 to year 2010, year 2004-05 is the base year. However, base year for GDP from 2011-2020 is 2011-12. So, GDP has been deflated in the following manner:

$$GDP\ Deflation = \frac{Nominal\ GDP}{Real\ GDP}$$

Subsequently, GDP data series from year 2001-2010 has been changed using new base year viz., 2011-12. Hence, final GDP series has been taken with single base year i.e., 2011-12. Similarly, in order to calculate fluctuations in oil prices, standard deviation volatility viz., SDV has been based on measures proposed by Sotoudeh and Worthington (2016) & Elder and Serletis (2010), which followed the below mentioned two steps. Firstly, changes in oil prices have been estimated using following formula:

$$r_t = \log(dop_t) - \log(dop_{t-1}) \quad (1)$$

where dop_t represents daily crude oil price (spot) for the current period, dop_{t-1} is the daily spot crude oil price of previous period and r_t is the daily change in the crude oil price (spot values). Then, following formula has been used to determine oil price volatility index:

$$SDV_t = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}\left\{r_t - \frac{1}{T}\sum_{t=1}^{T} r_t\right\}^2} \quad (2)$$

where T is number of trading days per quarter.

Further, Net Foreign Assets (NFA) as a proportion of GDP has also been considered. The expected association between NFA and current account deficit is considered as negative when based upon saving-investment approach. However, in the free exchange rate era the sum total of current along with capital account must equate zero till the point a nation could tolerate larger trade gap for an enlarged period as a result of high concentration of NFA and could still not be considered as insolvent (Yang, 2011). This implies positive association between NFA and current account deficit.

Wholesale Price index (WPI) – Undoubtedly, home country inflation is not a basic influencer of CAD, however, particularly in case of India, higher inflation raises saving and investment gap. Saving ability of households is deteriorated by higher inflation rates due to the tendency of the

people making more of the unproductive investments. It is due to this reason that inflation has also been considered as a determinant of CAD. Considering this, WPI has been taken as a measure of inflation in this paper.

5. Research Methodology

5.1. Unit Root Tests

In order to verify stationarity of time series observations, Augmented Dickey Fuller (ADF) test (1979) and Phillips-Perron (PP) test (1988) has been applied.

5.2. Autoregressive Distributed Lag Modelling (ARDL)

For assessing long-run and short-run interlinkages and sensitivity of current account in response to selected determinants in the globalised world, ARDL model established by Pesaran and Shin (1999) and Pesaran et al. (2001) has been employed. Cointegration has been checked through bounds test. If cointegration is detected, subsequently long-run ARDL coefficients for the independent factors are obtained viz., OPV, RER, TOP, NFA and WPI by means of equation (3) and equation (4), respectively:

$$CAD_t = \beta_0 + \sum_{i=1}^{p} \beta_1 CAD_{t-1} + \sum_{i=1}^{p} \beta_2 RER_{t-1} + \sum_{i=1}^{p} \beta_3 OPV_{t-1} + \sum_{i=1}^{p} \beta_4 TOP_{t-1} + \sum_{i=1}^{p} \beta_5 NFA_{t-1} + \sum_{i=1}^{p} \beta_6 WPI_{t-1} + u_t \quad (3)$$

$$\Delta CAD_t = \lambda_0 + \sum_{i=1}^{p} \lambda_1 \Delta CAD_{t-1} + \sum_{i=1}^{p} \lambda_2 \Delta RER_{t-1} + \sum_{i=1}^{p} \lambda_3 \Delta OPV_{t-1} + \sum_{i=1}^{p} \lambda_4 \Delta TOP_{t-1} + \sum_{i=1}^{p} \lambda_5 \Delta NFA_{t-1} + \sum_{i=1}^{p} \lambda_6 \Delta WPI_{t-1} + \theta ECM_{t-1} + \mu_t \quad (4)$$

The long-term behaviour as obtained through equation (3) and here β_0 stands for constant, β_1,β_2, β_3, β_4, β_5 and β_6 signify long run coefficients for the regressors and μ_t means error term. Here in this system, value of F-statistic confirms the existence or non-existence of cointegration. If F value is less than lower bound range, then no cointegration exists among the series undertaken. However, if F-statistic turns higher than upper bound range, cointegration exists. If F-statistic remains within upper and lower critical range, it implies indecisive conclusion.

Likewise, in equation (4), λ_0 is constant, λ_1,λ_2,λ_3, λ_4, λ_5 and λ_6 are short-run dynamic coefficients and $\backslash$ symbolises error correction term (ECT_{t-1}), which signifies the rate of correction for long-run equilibrium required to restored subsequent to any disturbance in the preceeding period.

6. Results and Discussion

At the outset, we used unit root tests for assessing stationarity property of the series undertaken.

Table 1: ADF and PP Unit Root Tests

	Augmented Dickey Fuller Test (ADF)				*Phillips-Perron test (PP)*			
	Levels		*Ist Difference*		*Levels*		*Ist Difference*	
Series	*Constant*	*Constant & Trend*	*Constant*	*Constant & Trend*	*Constant*	*Constant & Trend*	*Constant*	*Constant & Trend*
CAD	0.0011*	0.0063*	0.0000*	0.0000*	0.0024*	0.0105**	0.0001*	0.0001*
RER	0.3892	0.0052*	0.0000*	0.0000*	0.3824	0.0233**	0.0000*	0.0000*
OPV	0.0000*	0.0000*	0.0001*	0.0001*	0.0000*	0.0000*	0.0001*	0.0001*
TOP	0.1817	0.4048	0.0000*	0.0000*	0.2212	0.4943	0.0000*	0.0000*
NFA	0.9858	0.9764	0.0000*	0.0000*	0.8767	0.8445	0.0000*	0.0000*
WPI	0.1201	0.1786	0.0000*	0.0000*	0.1896	0.1219	0.0000*	0.0000*

*, ** and *** depicts 1%, 5% and 10% level of significance respectively.

Table 1 portrays the results of ADF and PP unit root test which reveal that CAD, RER and OPV are stationary at levels I(0) whereas TOP, NFA and WPI are non-stationary at levels I(0) and stationary at I(1) (Kaur & Kulaar, 2022). These unit root tests explored that a few of series are stationary at levels whereas other being stationary at first difference. Consequently, the condition for ARDL model has been satisfied since few of the series are I(0) and few are I(1) and none of the series is integrated of order two viz., I(2) or higher.

Table 2: Normalized CAD Equation based on Bounds Test

Series	*F-Statistic*	*P-value*	*Conclusion*
F_{CAD} (CAD/ RER, OPV, TOP, NFA, WPI)	9.528*	0.0000	Cointegration
Critical Statistic	Lower Bound	Upper Bound	
1% Significance level	4.29		5.61
5% Significance level	3.23		4.35
10% Significance level	2.72		3.77

Table 2 exhibits cointegration results based on bounds test which bring out that null hypothesis of absence of co-integration stands rejected since F value i.e., 9.528 is greater than the upper critical bound range at 1%, 5% and 10% level of significance. Thus, there exists cointegration and long-run association among variables taken into account to analyse the response of CAD with respect to selected

variables. Moving on, ARDL model (1,0,1,1,1,1) has been specified based upon equation (3) which gives long and short-run coefficients of regressors.

Table 3: The Values of Long-run Parameters for CAD

Series	*Coefficient*	*S.E.*	*t-Statistic*	*P-value*
C	0.0862**	0.0369	2.3363	0.0223
RER	-0.0172**	0.0077	-2.2092	0.0303
OPV	0.1063***	0.0551	1.9308	0.0574
TOP	-0.4587*	0.0735	-6.2409	0.0000
NFA	0.0598**	0.0312	1.8789	0.0410
WPI	0.7120*	0.1468	4.8489	0.0000
R^2	0.7253	AIC		-8.9342
Adj. R^2	0.6941	SIC		-8.8534
F-stat.	57.037*	DW Stat.		1.8854
P-value (F-stat.)	0.0000			

*, ** and *** depicts 1%, 5% and 10% level of significance respectively.

Long-run ARDL model could be presented in the form of an equation as below:

$$CAD = 0.0862^{*} - 0.0172^{*}(RER) + 0.1063^{*}(OPV) - 0.4587^{*}(TOP) + 0.0598^{**}(NFA) + 1.7120^{*}(WPI) \quad (5)$$

Table 3 exhibits that exchange rate and trade openness have negative impact on current account deficit and are both statistically significant at 5% and 1% level of significance respectively. A hike in exchange rate of Indian rupee i.e., declining rupee has favourable impact on current account deficit which is theoretically true. The reason behind this tendency of current account deficit getting improved with the depreciation of Indian rupee is on account of Indian foreign trade pattern i.e., India's exports being elastic while imports being inelastic which are generally in the form of oil. Rupee exchange rate is thus significant contributing factor of current account position of India and this rupee should be made freely convertible keeping a concern for severe swings by means of RBI controls in the form of interventions as and when needed. Trade openness representing globalisation level of Indian economy also has negative influence on India's current account position and the coefficient value (-0.458) highlights that 45.8% of current account balance sensitivities are due to only trade openness. On the basis of this, we can conclude that trade openness improves the health of current account position and further provides support to the globalisation reforms. Since India is progressing towards globalisation, it could further improve current account balance position by resorting to increased proportion of exports to other nations.

Considering other side of the coin, it could be observed that oil price volatility has a negative impact upon current account deficit, implying that oil price hikes disturb the current account balance position of India and contribute to mounting deficits. These findings with respect to oil price volatility

impact on CAD has an important connotation that Marshall-Lerner hypothesis and J-curve expenditure switching behaviour fails in case of India which in turn signifies that as far as Indians are concerned, private savings fall short of hikes in oil import bills. Furthermore, it can be said that fiscal deficit is closely linked to current account position. The intertemporal hypothesis is somehow similar to Marshall-Lerner hypothesis and J-curve which implies that oil importers raise the level of savings in order to provide a buffer for the higher oil prices internationally. But this intertemporal hypothesis is not applicable in India due to its inelastic oil imports and further favouring the present consumption over the savings. All this contributes to mounting current account imbalance.

Further, NFA and WPI are positively and significantly associated with CAD. It has been observed that current account is more responsive to change in WPI in comparison to change in NFA since the coefficient of WPI is higher than the coefficient of NFA. As far as NFA is concerned, as per intertemporal approach, positive association between NFA and current account can be considered like that economies with high concentration of NFA can run current account deficit for an enlarged period and could still be in solvent mode.

Likewise, in case of WPI, positive and significant association between home country inflation i.e., WPI and CAD has been observed. It implies that rise in the level of inflation in India widens savings and investment gap and jeopardises saving ability of individuals. The reason behind this being individuals resort to unproductive investments which further contribute to mounting current account deficit of Indian economy.

The adjusted R^2 (0.69) implies that 69% of the swings in current account deficit are represented by the determinants so considered. Further, model is free from autocorrelation as Durbin-Watson value is 1.885 and close to 2.

Table 4: Short-run Drivers and Error-Correction Term

Series	*Coefficient*	*S.E.*	*t-Statistic*	*P-value*
D(RER)	-0.0120**	0.0056	-2.1280	0.0368
D(OPV)	0.0182	0.0311	0.5865	0.5593
D(TOP)	0.1773***	0.1021	1.7356	0.0869
D(NFA)	0.0104***	0.0059	1.9578	0.0510
D(WPI)	0.7250*	0.1747	4.1503	0.0000
ECT (-1)	-0.7009*	0.0909	-7.7050	0.0000

*, ** and *** depicts 1%, 5% and 10% level of significance respectively

Table 4 illustrates short-run drivers based upon ARDL specification (1, 0, 1, 1, 1, 1). Here, it can be clearly witnessed that error correction term (ECT_{t-1}) is negative and significant (-0.70). It can be concluded that disturbance in the preceeding quarter is being rectified at the rate of 70% in the present quarter, implying the restoration of long-run equilibrium by short-run drivers.

Table 5: Diagnostic Test

Diagnostic Test	*F-value*	*P-values*
Normality test	3.2988	0.1921
Breusch-Godfrey LM Test of Serial Correlation	0.5099	0.6892
Breusch Pagan Godfrey Test of Heteroscedasticity	1.2235	0.3044
Ramsey RESET Test	2.2668	0.1360

Table 5 provides the evidence that the selected ARDL model is free from autocorrelation, heteroscedasticity and specification error and the observations are normal. All this clearly shows that the selected model is the best fit.

CUSUM test for Stability Checking

To verify if the coefficients of the estimated model are consistent, the figure of CUSUM test at 5% level of significance has been obtained and displayed in Figure 1. It is clear that residuals obtained from the model are free from structural instability.

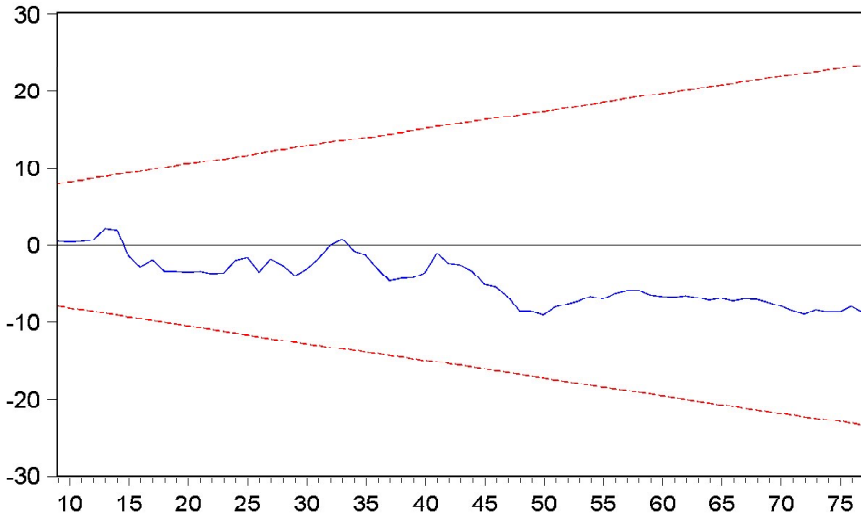

Figure 1:. Figure of Cumulative Sum of Recursive Residual (CUSUM)

7. Conclusion

The paper explored the impact of globalisation on current account balance position of India considering the determinants as exchange rate of Indian rupee, volatility of oil prices, trade openness, net foreign assets and home country inflation in the form of wholesale price index based on data series spanning 2001 Q1 to 2020 Q4 and using ARDL model. In the era of globalisation it is really hard and challenging

to maintain current account balance within the tolerable limits. This paper highlights various determinants of current account balance position for the Indian economy. The paper brings out that exchange rate of Indian rupee and trade openness have a favourable impact on current account position of India which further implies that rupee could be allowed for free conversion and trade barriers should be cut down to the minimum. By resorting to a greater degree of globalisation, India could go a long way in reducing the current account deficit by raising the level of exports being made.

Further, oil price volatility, net foreign assets and home country inflation are directly linked with mounting current account deficit since the coefficient is positive and significant. As a result of hikes in oil prices globally, oil import bills are raised to a level where current account balance is disturbed. The main reason being that in India intertemporal approach fails which highlights that when oil prices jump, the oil importers make more savings to provide buffer for the increased oil bills but that is not true in case of India. Due to positive impact of oil price volatility on current account deficit, it could be inferred that in India present consumption is favoured over savings and as a consequence of this, oil importers end up with oil bills which fall short of buffer in the form of savings. Lesser saving and higher consumption further aggravates the problem of fiscal deficit which ultimately contributes current account deficit.

Moving on, net foreign assets and home country inflation are positively and significantly associated with current account deficit. It has been observed that current account is more responsive to change in home country inflation in comparison to change in net foreign assets since the coefficient of wholesale price index is higher than the coefficient of net foreign assets. As far as net foreign assets is concerned, as per intertemporal approach, positive association between net foreign assets and current account can be considered like that economies with high concentration of net foreign assets can run current account deficit for enlarged period and could still be solvent. Likewise, in case of wholesale price index, positive and significant association between home country inflation i.e., wholesale price index and CAD has been observed. It implies that rise in the level of inflation in India widens savings and investment gap and jeopardises saving ability of individuals. The reason behind this being individuals resort to unproductive investments which further contribute to mounting current account deficit of Indian economy.

A few suggestions following these observations are, for instance, rupee should be made freely convertible, keeping a concern for the severe swings through RBI controls in the form of interventions as and when needed. Also, the trade barriers should be cut to minimum in order to raise the level of exports being made and oil import should be reduced. Further, based on findings of paper, it can be inferred that persistently rising net foreign assets and home country's inflation will lead to the worsening of current account position due to mounting pressure on current account balance of India.

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