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The Dynamic Link Between Budget and Current Account Balance: Evidence from Selected Upper & Middle Income Countries (A Panel ARDL Approach)

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Abstract: This study elaborates the connection between BD and CAD in selected upper-middle-income countries (UMC's) by employing the panel data over the period from 2000 to 2020. This paper also tries to evaluate that weather the theory of Ricardian Equivalence or Keynesian Approach exists in case of selected upper-middle-income countries. First, we would apply the ADF approach to check the stationarity between the variable. After that, ARDL econometrics approach is adopted in order to check the long-run and short-run association among Current Account Balances (CAB), Fiscal Deficit (FD), Gross Fixed Capital Formation (GFCF), Real Effective Exchange Rate (REER), GDP Per Capita Growth (GDPPCG) and Trade. The findings showed that FD, REER, GDPPCG and trade have positive impact on CAB. While, in the long-run GFCF affects CAB negatively. This paper also pointed out that the Keynesian Theory is more suitable for selected upper-middle-income economies.

Key Words: Fiscal Deficit, Current Account Deficit, Upper and Middle-Income Countries, ARDL

Introduction

Upper-middle-income counties (UMC's) are those countries whose GNI (Gross National Income) remains between 4,096 – 12,695 USD, according to 2021 per capita GNI calculate using the Atlas method by World Bank. GNI per-capita converted to US dollar by dividing the mid-year population, via using the World Bank Atlas method. GNI is the summation of value-added through all internal producers & production taxes, not incorporated in the valuation of output plus income received from abroad.

When monetary and fiscal policies accomplished clearly, accept a decisive part in overall macro-economic constancy. The macro-economic concept, which assumes the ideal relationship between FD and CAD, is commonly known as "Twin Deficit Hypothesis". Many economies are facing the problems of external and internal deficits. The continuous increases in both deficits have been the main issue for any policy maker in selected upper-middle-income economies. In addition, for de-centralization, development and free trade, there is needed to understand connection among FD and CAD. Some researcher for example, Shifidi and Nyambe1 (2020), Todorov and Durova (2020), Eita et al. (2018), Saidam and Sarmidi (2017), Bandy and Aneja (2015) they also highlighted this problem arise due to large internal and external deficits.

Kalaj and Mema (2015) examine the THD for the context of Albanian over the period from 1991 to 2014. Nicholson (2015) test the TDH by applying the Toda and Yamamoto Lag Augmented Method by used the quarterly data from 2001 to 2015. A study by Ganchev (2010) found that BD affects the CAD in Bulgaria from 2000 to 2010 by applying the VAR test. Sobrino (2013) highlighted the TDH a case study of Peru by applying Wald test and quarterly data ranging from 1980 to 2012.

In this paper there are two major theories which represent the association among FD and CAD. One is the Keynesian Proposition and the other is Ricardian Equivalence Theory. Keynesian theory, explains the

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positive and significance relationship among CAB and BD. If there is an increase in FD as a result domestic absorption increased, imports also increased and extend the CAD. On the other hand, Ricardian Equivalence theory is opposite to Keynesian approach, Ricardian theory stated that there is no relationship between internal and external deficits. It says that shifts among taxes and FD do not affect the interest rate, the size of investment/CAB.

This study also tries to find out that which theory i.e. Keynesian Approach or Ricardian Equivalence is more appropriate for selected upper-middle-income countries. It is also trying to investigate the causal association among FD & CAD both in the long-run and short-run. This paper also examines the association among FD and CAD in selected upper-middle-income countries. The objectives of this paper are as follows:

- To explore the long-run connection among FD and CAD.
- To examine the short-run connection between FD & CAD.
- Policy recommendations.

Review of Literature

Shifidi and Nyambe1 (2020) evaluated the association among FD and CAD in Namibia from 1990 to 2014 (time series data). Used the different econometrics techniques i.e. co-integration and granger causality. They concluded that FD affects the CAD positively and uni-directional causality that goes from CAD to FD. Furthermore, transmission mechanism examined the less significant in Namibia for explaining the relationship between two deficits. Eita et al. (2018) investigated the macro-economic variables and CAB for the context of Namibian economy. Applying both annually and quarterly data from 1990 to 2016 through the ARDL test and proved the evidence of TDH in Namibian economy which showed that importance of fiscal polies to reduce the CAD.

Todorov and Durova (2020) observed the TDH by adopted VAR test. The 1st part of their findings (the casual connection among FD and CAD) showed existence of TDH in Bulgaria. 2nd (positive and significance association between FD and CAD) rejected this hypothesis over the period from 1999 to 2019. In addition to that, Ganchev (2010) the paper illustrated the TDH by employing the VECM, VAR test and showed that BD affects the CAD positively and on other side there is no evidence displayed between two balances in a short run for the Bulgarian economy.

Banday and Aneja (2019) illustrated the TDH as well as reverse causality a case study of China by applying the time series data over the period from 1985 to 2016. ARDL test revealed the linear connection amongst FD and CAD and the test of granger causality showed that there is bi-directional causality travelled from FD to CAD. They also pointed out that negative shocks of FD will decrease the CAD. On the other extreme, positive shocks of FD will increase the CAD. Sobrino (2013) highlighted the TDH and reverse causality a case study of Peru. This study rejects the TDH by applying the quarterly data ranging from 1980 to 2012. Furthermore, reverse causality i.e. CAD causes the BD in the short run by adopted the granger causality and Wald test.

Saidam and Sarmidi (2017) re-examined the TDH for Malaysian economy by adopted the co-integration test and ARDL over the period from 1988 to 2015. This study accepts the Ricardian Equivalence Hypothesis in the long-run. Moreover, it's also showed the existence of co-integration among BD and CAD in short run. Neame (2015) evaluated the TDH for the emerging small open economy of Lebanon through econometrics model i.e. granger causality. This study proved the unidirectional association among BD and CAD which represent that the rising BD put upward pressure on CAD. Nicholson (2015) tested the TDH by applying the granger causality; Toda and Yamamoto Lag Augmented method by using the quarterly data from 2001 to 2015. The results showed unidirectional causality travelled from CAD to BD for Jamaican economy.

Kalaj and Mema (2015) examined the TDH for the context of Albanian economy. Applied the annually data from 1991 to 2014 through econometric technique i.e. granger causality test. This study pointed out that uni-directional causality running FD to CAD. However, no casual effects found of CAD on FD.

In last, there are large numbers to studies have empirically reviewed in order to explain the TDH in selected upper-middle-income-countries. There are mixed results are found due to the different data

range and econometrics technique. Some authors find out the positive association between the two balances and some are against. Some work showed the different direction of causality between the variable. Even though, this study does not covers all opinions related to the problem of TDH in selected upper-middle-income countries.

Model, Data & Methodology

After estimated the empirical review of different researchers regarding the TDH, a number of studies have been recognized in order to examine the connection amongst FD and CAD along with other macroeconomic variables.

Model Specification & Data

The works on TDH related to selected upper-middle-income economies ranging the data from 2000 to 2020, acknowledge the connection between FD & CAB in different stages. The data accumulated from World Development Indicator (WDI). One the basis of this study established a model in order to achieve the long-run and short-run determination of this study.

$$CAB = f(FD, REER, GFCF, GDPPCG, TRADE) \quad (1)$$

Extended multi-variable model is as under,

$$CAB = \beta_0 + \beta_1 FD + \beta_2 REER + \beta_3 GFCF + \beta_4 GDPPCG + \beta_5 TRADE + u_t \quad (2)$$

Where, β_0 represents the intercepted term, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are regression constants and all variables of the model are defined as,

CAB = Current Account Balance (% of GDP)

FD = Fiscal Deficit (% of GDP)

REER = Real Effective Exchange Rate (index (2010 = 100))

GFCF = Gross Fixed Capital Formation (annual %)

GDPPCG = GDP Per Capita Growth (annual %)

Trade = Trade (% of GDP)

Methodology: Panel ARDL

The ARDL model presented by Pesaran and Shin (1999) & Pesaran, Shin & Smith (2001) regarding to explore the long-run & short-run connection among independent and independent variables. ARDL applied when some variables are stationary at level I(0) and some are at first difference I(1). For this purpose, the null hypothesis of ARDL test is as under:

$$H_0: \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = \varphi_5 = 0$$

$$H_1: \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq \varphi_5 \neq 0$$

Econometrics Analysis

In order to meet above arguments, we would study the connection among internal and external deficits for selected upper-middle-income economies via different macroeconomic variables. In this paper, we would employ the different econometrics techniques to estimate the connection among variables. Firstly, we would apply the ADF test regarding to check the stationarity of the variables. Secondly, we would apply the panel ARDL test in order to check the long-run and short-run connection between variables.

Descriptive Statistics Analysis

Descriptive statistics investigation the first part of the econometrics methods which shows the summary of descriptive statistics of key variables for selected upper-middle-income economies over the period from 2000 to 2020.

**Table 1**

Descriptive statistics of key variables for UMC (2000–2020)

| | CAB | FD | REER | GFCF | GDPPCG | TRADE |
|--------------|----------|----------|----------|----------|---------|----------|
| Mean | -3.42 | 3.038 | 97.16 | 5.11 | 2.90 | 81.40 |
| Median | -2.90 | 1.89 | 97.79 | 4.65 | 2.92 | 80.77 |
| Maximum | 20.96 | 114.10 | 173.25 | 50.50 | 13.69 | 220.40 |
| Minimum | -32.45 | -10.02 | 53.07 | -36.64 | -9.21 | 22.10 |
| Std. Dev. | 9.10 | 10.44 | 17.93 | 10.50 | 3.74 | 33.56 |
| Skewness | -0.41 | 7.63 | 1.092 | 0.14 | -0.03 | 0.82 |
| Kurtosis | 3.96 | 76.85 | 6.19 | 4.31 | 3.23 | 4.34 |
| Jarque-Bera | 34.89 | 123472.7 | 325.08 | 39.54 | 1.28 | 98.15 |
| Probability | 0.00 | 0.00 | 0.00 | 0.00 | 0.52 | 0.00 |
| Sum | -1784.40 | 1583.12 | 50624.84 | 2664.53 | 1511.35 | 42412.47 |
| Sum Sq. Dev. | 43069.89 | 56743.68 | 167222.6 | 57420.03 | 7285.11 | 585790.5 |
| Observations | 521 | 521 | 521 | 521 | 521 | 521 |

Source; Author's calculations

In the above table 4.1, mean, median, maximum, minimum and standard deviation are existing of current account balance (CAB), fiscal deficit (FD), real effective exchange rate (REER), gross fixed capital formation (GFCF), GDP per-capita growth (GDPPCG) and trade in the columns 2, 3, 4, 5, 6 and 7 separately.

On the average, CAB, FD, REER, GFCF, GDPPCG and trade are -3.42, 3.038, 97.16, 5.11, 2.90, and 81.40 for selected upper-middle-income economies. Maximum and minimum value of CAB is stayed within 20.96 (Gabon) and -32.45 (Grenada) over the period of 2000–2020. Likewise, FD remained between 114.10 (Bulgaria) & -10.02 (Colombia), REER 173.25 (Turkey) & 53.07 (Russian Federation), GFCF 50.50 (Romania) & -36.64 (Romania), GDPPCG 13.69 (Kazakhstan) & -9.21 (Botswana) and trade remain between 220.40 (Malaysia) & 22.10 (Brazil).

The value of CAB, FD, REER, GFCF and GDPPCG and trade for selected upper-middle-income economies are leptokurtic.

Correlation Analysis

Correlation examination shows the connection among dependent and independent variables ranging the data from 2000 to 2020 for selected upper-middle-income countries.

Table 2

Correlation matrix of key variables for UMC (2000–2020)

| Correlation | CAB | FD | REER | GFCF | GDPPCG | TRADE |
|-------------|-------|-------|-------|-------|--------|-------|
| CAB | 1.00 | | | | | |
| FD | -0.08 | 1.00 | | | | |
| REER | 0.01 | 0.02 | 1.00 | | | |
| GFCF | 0.10 | -0.05 | 0.01 | 1.00 | | |
| GDPPCG | 0.07 | -0.07 | 0.07 | 0.54 | 1.00 | |
| TRADE | 0.02 | 0.20 | -0.01 | -0.01 | 0.04 | 1.00 |

Source: Author's calculations

The above-mentioned table 4.2 shows the correlation matrix of key variables for the selected upper-middle-income economies over the period from 2000 to 2020. CAB has a positive relationship with REER, GFCF, GDPPCG and trade while there is a negative correlation with FD. FD has a positive correlation with REER and trade while on the other side there is a insignificance connection with GFCF & GDPPCG. REER has a positive correlation with GFCF and GDPPCG while there is a negative correlation with trade. GFCF has a positive correlation with GDPPCG while on the other side there is a negative correlation with trade.

GDPPCG has a positive correlation with the trade. Finally trade has positive correlation with all other variables.

Panel Unit Root Tests

In this section, before estimate the long-run association among dependent and controlled variables, it is required to check the stationarity of the variables ranging data from 2000 to 2020 for selected upper-middle-income economies. This paper employs the following two econometrics approach i.e. ADF (Augmented Dickey –Fuller) & PP (Phillip–Perron) in order to check stationarity of the variables. The following Table 4.3 shows the panel unit root test of all the variables i.e. CAB, FD, REER, GFCF, GDPPCG and trade.

Table 3

Results of panel unit root tests

| Variable | ADF | | Phillips–Perron | | Results |
|----------|----------------------|-------------------------------|----------------------|-------------------------------|---------|
| | At Levels | At 1 st Difference | At Levels | At 1 st Difference | |
| CAB | -2.90369 (0.0018) | - | -3.68778 (0.0001) | - | I(0) |
| REER | -1.52106 (0.0641) | -6.68222 (0.0000) | -1.02437 (0.1528) | -7.59924 (0.0000) | I(1) |
| GFCG | -3.01685 (0.0013) | - | -4.10011 (0.0000) | - | I(0) |
| GDPPCG | 4.05553 (1.0000) | -3.28353 (0.0005) | -1.22727 (0.1099) | -11.1442 (0.0000) | I(1) |
| TRADE | -1.19763 (0.1155) | -10.6341 (0.0000) | -0.46730 (0.3201) | -10.1636 (0.0000) | I(1) |

Source: Author's calculations

The results of the panel unit root tests represents in the table 4.3 which shows that variables CAB and GFCF are found stationary at level I(0). While on the other extreme, some variables i.e. REER, GDPPCG and Trade are found stationery at first difference I(1) over the period from 2000 to 2020 for selected upper-middle-income countries. The co-integration results shows that ARDL test will be apply for proving the long run & short run association.

Long Run Analysis

This section represents the long-run association among CAB dependent and FD, REER, GFCF, GDPPCG and trade, controlled variables. Table 4.4 shows the long-run ARDL evaluations of twin deficit model. The coefficient variable FD, REER, GDPPCG and trade have positive and significant impact on CAB, while, coefficient variable GFCF affects the CAB negatively.

Table 4

Long run ARDL estimates of twin deficit model

| Dependent Variable: CAB | | | | |
|-------------------------|-------------|------------|-------------|--------|
| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
| FD | 0.020078 | 0.022959 | 0.874520 | 0.3824 |
| REER | 0.009004 | 0.005271 | 1.708293 | 0.0884 |
| GFCF | -0.013508 | 0.040171 | -0.336259 | 0.7369 |
| GDPPCG | 0.074549 | 0.103028 | 0.723573 | 0.4698 |
| TRADE | 0.037979 | 0.014561 | 2.608237 | 0.0094 |

Source: Author's calculations



The long-run results show that the coefficient of fiscal deficit affects the current account balance positively. As 1% increase in FD will leads to CAB by 0.020%. This is also pointed out that Keynesian theory is more suitable for selected upper-middle-income countries and rejects the Ricardian approach. El-Khishin and El-Saeed (2021), pointed out the positive connection between FD and CAB for oil rich economies. Likewise, Shastri (2019) proved that FD effects the positively CAB for major South Asian Economies except Nepal. Furthermore, Mukhtar et al. (2021), Abbasi et al. (2021), Rehman et al. (2020), Samotu & Orisadare (2020), Magoti et al. (2020), Jackson and Jabbie (2020), Anantha Ramu (2017), Hassan et al. (2015), Bakarr (2014), Tufail et al. (2014), Jawaid and Raza (2013), Saeed and Khan (2012), Iram et al. (2011), Siddiqui (2011), pointed out the positive relationship between FD and CAB.

It is also showed that REER having positive and significance impact on CAB. As 1 % increase in REER will leads to CAB by 0.0090%. Theoretically, a decline in domestic currency will encourage exports and dis-courage imports, as a result it will improved the external sector performance. Our outcomes are compatible with El-Khishin and El-Saeed (2021) proved the positive and significant relationship between REER and CAB for oil and non-oil rich economies. Anantha Ramu (2017), proved that an increase in currency will improve the CAB. Khan et al. (2017), Bakarr (2014), Bon (2014), El-Baz (2014) they are all pointed out the positive association between REER and CAB.

Gross fixed capital formation (GFCF) is an essential tool among the FD and the CAD. The other remaining re-gressors also concentrate expected outcomes. For example, GFCF shows an adverse impact on CAB. The negative coefficient of GFCF shows that if there is 1% increase in it as a result CAB decline by 0.013%. These results are in consist with Abbasi et al. (2021), Rehman et al. (2020), Saba (2015), Hassan et al. (2015),

Furthermore, the coefficients of GDP per capita growth and trade both affects the CAB positively period from 2000 to 2020. 1% increase in GDPPCG than CAB also increased by 0.074%. If there is 1% increase in trade as a result CAB also increased by 0.03% for selected upper-middle-income countries. These findings also concluded by El-Khishin and El-Saeed (2021), Khan et al. (2017), Oshota and Badejo (2015), Tufail et al. (2014), Chowdhary and Saleh (2007).

Short Run Analysis

This sector represents the short-run connection among dependent (CAB) and controlled variables (FD, REER, GFCF, GDPPCG and trade). Table 4.5 expresses the short-run ARDL evaluations of twin deficit for selected upper-middle-income countries. In this portion we would examine the Error Correlation Model (ECM). The determination of ECM is to examine the speed of adjustment. ECM shows that how quickly the variables are converting near to equilibrium.

Table 5

Short run ARDL estimates of twin deficit model

| Dependent Variable: CAB | | | | |
|-------------------------|-------------|------------|-------------|-------------|
| Variable | Coefficient | Std. Error | t-Statistic | Probability |
| COINTEQ01 | -0.462910 | 0.059257 | -7.811837 | 0.0000 |
| D(FD) | 0.120067 | 0.077044 | 1.558428 | 0.1199 |
| D(REER) | 0.046440 | 0.041510 | 1.118765 | 0.2639 |
| D(GFCF) | -0.044209 | 0.025903 | -1.706671 | 0.0887 |
| D(GDPPCG) | 0.100895 | 0.083424 | 1.209426 | 0.2272 |
| D(TRADE) | 0.061922 | 0.035820 | 1.728706 | 0.0846 |
| C | 1.126370 | 0.586813 | 1.919470 | 0.0556 |

Source: Author's calculations

The table 4.5 shows the short-run ARDL estimation for selected upper-middle-income economies. The outcome shows the co-integration equation, that is negative (-0.462910) and Probability (0.0000). This conclusion suggests that the variable meets towards the long-run equilibrium, a speed of merging being 46.29%. Equation for selected upper-middle-income countries -0.462910 represents that long-run

equilibrium detected short-run shock which is adjusted within four months. The study also pointed out the coefficient of the intercept positive i.e. 1.126370 and probability is 0.0556.

Conclusions and Policy Recommendations

This study elaborates the connection between BD and CAD in selected upper-middle-income countries (UMC's) by employed the panel data from 2000 to 2020. This study is very important because the theory of TDH is controversial. Few researchers concluded that there is a positive and significant relationship between internal and external deficits, whereas, some pointed out negative association between FD and CAB.

In this study we finds the relationship between FD and CAB along with macroeconomic variables in selected upper-middle-income economies both in long-run and short-run, firstly we would apply the Augmented-Dickey-Fuller (ADF) test. The results of ADF shows that some variables are stationary at level $I(0)$ and some are at first difference $I(1)$. So, we would apply Autoregressive Distributed Lag (ARDL) econometrics technique. One model has been made to shows the association among the variables. The finding shows that FD, REER, GDPPCG and trade affects the CAB positively. Moreover, the connection between GFCF and CAB is insignificant. This paper also concluded the Keynesian theory is more suitable for selected upper-middle-income economies.

For policy recommendation, this paper endorses that comprehensive and proper strategy in order to improve the savings & investment regarding to bring out the positive impact on CAB. The Govt. of upper-middle-income countries should also improve the direct and indirect taxes, decrease their expenditures and improve revenue system. For the investment attraction into the country interest rate should be decrease.

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APPENDIX

Table

List of countries which data are taken from WDI.

| S. No | Country Name | S. No | Country Name | S. No | Country Name |
|-------|------------------------|-------|--------------------|-------|--------------------|
| 1 | Albania | 11 | Dominican Republic | 21 | Namibia |
| 2 | Belarus | 12 | Ecuador | 22 | Paraguay |
| 3 | Bosnia and Herzegovina | 13 | Gabon | 23 | Peru |
| 4 | Botswana | 14 | Grenada | 24 | Romania |
| 5 | Brazil | 15 | Jamaica | 25 | Russian Federation |
| 6 | Bulgaria | 16 | Kazakhstan | 26 | South Africa |
| 7 | China | 17 | Lebanon | 27 | St. Lucia |
| 8 | Colombia | 18 | Malaysia | 28 | Thailand |
| 9 | Costa Rica | 19 | Mauritius | 29 | Turkey |
| 10 | Dominica | 20 | Mexico | | |