

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

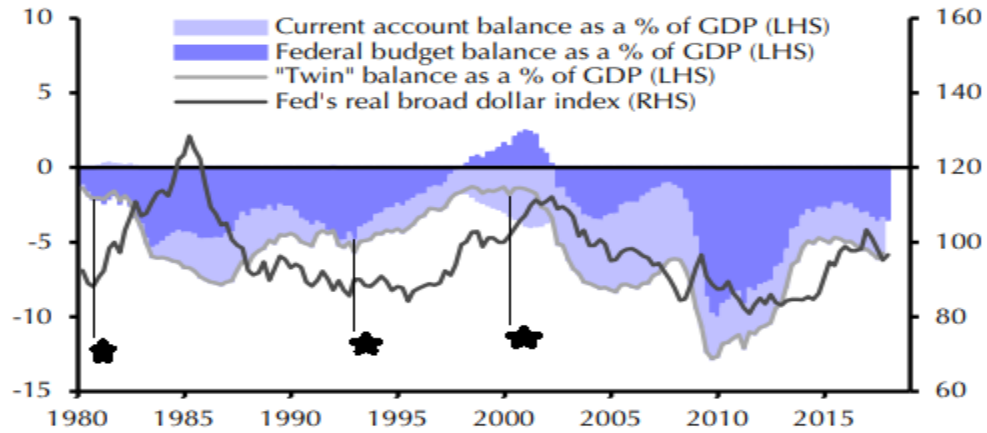
After beginning with a chapter covering the economic theories for this study and empirical model that will be utilized, it is important to overview the past studies that is pertinent to this work. To assess the feasibility of the twin deficit theory, the literature will also include previous research on the viability of the twin deficit.

This chapter comprises of six sections, segment 2.2 gives the evolution of the twin deficit hypothesis. Section 2.3 gives the twin deficit theory based on the national income accounting method, subsection considering twin deficit and Keynesian proposition. Section 2.4 discusses the Mundell Fleming approach for twin deficit, followed by the Ricardian hypothesis in section 2.5. Section 2.6 includes the number of subheadings, the empirical literature on twin deficit hypothesis, Ricardian equivalence, and studies based on BRICS countries. Section 2.7 gives summary and conclusion of this chapter.

#### **2.2 Evolution of twin deficit hypothesis**

During the late 1980s and early 1990s, empirical work on fiscal policy focused mainly on the budget deficit and public debt as a source of balance of payment problems (twin deficit). Figure 2.1 show that the twin deficit relationship appears to be possible. The widening of BD and CAD in the United States during the 1980s led many researchers and policy makers to believe that the deficits are closely associated. Martin Feldstein was the policy advisor of the Reagan Administration, is one of the leading economists who has popularized the twin deficit phenomenon.

**Figure 2.1: United States current account and budget balance (per cent of GDP)**



Sources: Thomson Reuters, CE

In the first half of the 1980s, the Reagan Administration executed an expansionary fiscal measure through a tax cut, which was not supplemented by monetary policies. There was one-sided stress on the US interest rate, which triggered capital inflows and a stronger dollar. This appreciation in dollar brought about a disintegration of the United States' intensity on world markets, and aggravates the CAD. In spite of these factors, the CAD shortfall appeared to "twin" the fiscal deficit in the United States. Martin Feldstein (1986) later expressed that the weakening in the US current account balance during the 1980s was brought about by high-interest rates (because of budget deficit) that causes appreciation in the US dollar. This as indicated by Feldstein ought to be treated as a one-time situation and not as a sign of any long-run situation.

However, Hervey and Merkel (2000) sketched out three-wide reasons to clarify the causes of deficits in the United States. The first one was a known as *consumption boom hypothesis*, which suggests that consumers have changed their preferences from saving to consumption.

The Asian currency crises, Brazil and Russia have contributed inflow of funds in US markets during mid of 1990s. The increase in capital inflow makes it difficult to export technology to the poorer nations, and an appreciation of dollar causes imports to rise. The increasing capital inflow from the foreign market diminishes from the productive and consuming capacity of these economies. This was called as *safe haven hypothesis* (Hervey and Merkel, 2000).

Finally, the technological shift in the US may be another cause of current account deficit, which was termed as *technological change hypothesis*. The increase in output due to the innovation has returned US investments. Investments increase due to technological change, which causes inflow of foreign capital to make the new investments (Hervey and Merkel, 2000).

### **2.3 Twin deficit hypothesis based on national income accounting method**

The linkages between fiscal deficit and trade deficit began to attract consideration in the 1980s, during Reagan's administration, the US experience higher budget and current account deficit which were termed as twin deficit hypothesis. This theory states that presuming an unaltered gap between private savings and investments over some time, a decrease in the BD equals to the changes in the CAD. The twin deficit theory is governed by the national income accounting system. (y) the estimated national income dependent on the Gross Domestic Product (GDP), (c) private consumption, I private spending, (g) public spending and (x-m) exports and imports shall be listed under net exports.

$$Y = C + I + G + X - M \quad (1)$$

On the other hand, equation (1) can be written as  $Y = C + S + T$  (S) saving, (T) taxes paid and (F) net factor income payment made to foreigners.

$$Y = C + S + T \quad (2)$$

After rearranging Equation (2), private savings form a part of the non-consumed disposable income that can be recorded as:

$$S = Y - F - T - C \quad (3)$$

After combining (1) and (3) equations we obtain

$$(T - G) = (X - M - F) + (I - S) \quad (4)$$

In equation (4)  $(T - G)$  gives government savings also known as budget surplus, if  $G$  exceeds  $T$  therefore creating budget deficit,  $(X - M)$  represents current account balance, when  $(M)$  imports increases  $(X)$  exports therefore creating current account deficit,  $(I - S)$  is private savings. The overall savings of the nation are given by the amount of public and private savings. The CAD is equal to the investment savings surplus and the difference between tax revenue and goods and services expenditure.

Equation (4) further recommends that the current account surplus is equal to budget surplus plus private savings and domestic investments. If the government reduces the taxes  $(T)$  and do not change the spending  $(G)$ , meaning generating a deficit. However, the impact of budget deficit falls on current account balance  $(X - M)$  or investment saving gap  $(I - S)$  needs to be investigated. There are two situations under which fiscal policy will only impact  $I - S$  and keep exports unaltered. If world capital markets were completely nonexistent, the primary situation will arise. Then it would be necessary to

fund all the investments domestically. Private savings will be equal to private investment and government expenditure in this case. An expansion in the deficit will proportionately increase  $S - I$ , and  $X - M$  would stay unaltered. The second situation would emerge if taxpayers didn't accept that higher income because of the budget deficit. If the taxpayers realize that deficits defer taxes, either if they know that they have to pay the higher taxes in the future, then they will save additional disposable income for the future obligation. Therefore, an increase in savings will be equal to the deficit, any adjustment in  $(T)$  will change  $S$ , and will keep investment  $(I)$ , exports  $(X)$  and imports  $(M)$  unaltered. In most of the developing nations, to reduce spending is very difficult due to political reason. Additionally, the extent of considerably increasing tax rates is restricted due to the predominance of poverty and tax collection (Egwaikhide, 1999).

The twin deficit theorem is based on the Mundell-Flemings traditional model. As reported, an increase in the BD would increase the exchange rate and lead to capital inflows under the flexible exchange rate and perfect capital mobility. However, if budget deficit happens due to tax reduction or by issuing bonds, this will increase money supply and increases demand for imports, which causes current account deficit. The increase in capital inflow results increase in exchange rate, which crowds out exports and worsens current account deficit.

Over the period 1980-2012, Ravinthirakumaran et al. (2016) tested the (SAARC) twin deficit hypothesis using cointegration methods, error correction mechanism and causality for Granger. The results affirm the causality of the BD to the CAD and accept the preposition of Keynesian for Sri Lanka, Pakistan and the reverse causality of Nepal and India and the short-term association between CAD and BD for Bangladesh.

A TVAR model was applied by Çatık et al. (2015) to find the validity of the twin deficit for Turkey using time series data over the 1994-2012 periods. The findings indicate that twin deficits can cause macroeconomic uncertainty. The twin deficit is true when a higher regime and divergent movements and a lower regime function in the economy.

Feldstein and Horioka (1980) recommended that investments and savings are correlated and in equation (4) investment deficit is constant. This suggests capital is immobile and opposing Mundell-Flemings model of twin deficit. Even Feldstein and Horioka do not inevitably say savings and investments are associated (Nguyen and Pagan (1990).

Banday and Aneja (2019) uses time series data over the period of 1985-2016 and applied ARDL model and Zivot and Andrews (ZA) structural break model for Chinese economy to estimate the association between BD and CAD. The results of ARDL model find long-run association among the variables and accepts Keynesian proposition for China. The results of Granger causality accept twin deficit hypothesis.

The twin deficits noted in the writing have different hypotheses. Sachs (1982) is credited with the Investment Theory, which clarifies that if the nation is an attractive force for foreign investment due to anticipated substantial returns due to the market climate, democracy, creative changes or a general increase in profitability, the investment inflows create a financial account overflow that is connected to the current account balance.

The Bachman Danger Prime Theory (1992) suggests that an exchange rate appreciation improves buying power as regards foreign goods, thereby raising the valuation of property and other financial practices. This pattern would increase spending and reduce savings, creating a deficit in the current account. This means that by changing the average cost of the non-tradable, the exchange rate will also affect the twin deficits. Enormous

government spending on non-tradable, for example, administrations or land area can actuate an appreciation which thus surges consumption toward tradable along these lines prompting current account deficits.

Korsu (2009) likewise contended that fiscal deficits affect the trade deficit through the money supply. He contends that expansion in budget deficit pushes upwards money supply when the deficits are financed by methods for seigniorage. Expansion in the money supply increases the prices of goods, which causes exchange rate appreciation and worsen the CAD.

Sargent and Wallace propose the subsequent connection (1981). They claim that seigniorage is the key to the funding of the deficit; the deficit would be required to be adopted by the national bank. Such an adjustment results in a rise in the supply of money and the rate of inflation. Sargent and Wallace (1981) subsequently agree that the origin is from budget deficits to the supply of money and then from the supply of money to inflation.

Another explanation is given by Miller (1983). He contends that budget deficit is fundamentally inflationary regardless of the monetization of deficits because there are various channels through which budget deficit causes inflation. He argues that regardless of whether the Central Bank doesn't change its deficits by raising the money supply/print, the deficits are inflationary by disproportionately. This is attributed to non-monetary deficits rising debt prices and rising interest expectations entering private capital and lowering inflation.

### **2.3.1 Keynesian preposition and twin deficits**

The twin deficit problem is regularly viewed as being to some extent Keynesian in its way to find the impact of fiscal policy on the current account balance. Bernheim (1989) write down that based on the Keynesian perceptive of budget deficit, a large portion of population are short-sighted or have liquidity limitations, and have high proclivity to consume based on their current disposable income. In view of this, a reduction in tax will have instant and significant effect on demand. However, the fiscal policy has significant impact on output; the Keynesian perspective assumes that the government can adjust fiscal policy to bring macroeconomic stability. This perception affected the fiscal policy in both BRICS and United States in the starting of 1980s and early of 1990s, with the tightening of fiscal policies executed with the objective of decreasing current account balance.

In comparison to the Keynesian short-run, the neoclassical states that the intake of the consumer is based on the theory of the life cycle as proposed by Modigliani and Ando in (1957). However, the Milton Friedman in 1957 permanent income hypothesis asserts that increase in permanent income increases private consumption. Further, the increase in income due to tax reduction, spending's gives rise to savings not spending (Barro, 1989:39). The increase in the fiscal deficit will give rise to household consumption by shifting the tax burden to a future generation. However, if the economy operates at full capacity, consumption will give rise to savings and interests rate will go up to bring equilibrium in the financial market. Bernheim (1989) argues increasing fiscal deficit crowds out capital accumulation. Based on the neoclassical persecution, people react just



to change in a lifetime income. They believe people layout extra assets over their lifetime with the goal that the quick effect of assets on consumption is little.

#### **2.4 Mundell Fleming approach to the twin deficit**

The Mundell-Fleming Model (MFM) depicts how in an open economy to world trade in goods and money market operates, and gives a structure to fiscal and monetary investigation Marcus Fleming (1962) and Robert Mundell (1963). The (MFM) is an augmentation of IS-LM model. Scacciavillani and Knight (1998) noticed that the improvement of the MF model during the 1960s mirrored the certainty of the capacity of macroeconomic strategies to accomplish both inward and outer stability. This model is based on a fixed price and shows the linkage between the money and the good market. The IS curve represents equilibrium in good markets and LM curve constitute equilibrium in money market. The balance of payment (BOP) curve in Mundell-Fleming (MF) model is the combination of real income and interest rate at which BOP is equal to zero. The Mundell-Fleming Model is a short-run open economy model, where bonds and domestic market is treated as substitute for money, and labour being a part of the (MF) model based on the belief that demand brings change in output.

The Mundell-Fleming (MF) model has two separate investigations; one is under fixed and second flexible exchange rate. Under the fixed exchange rate, monetary policy has less scope but, fiscal policy may have a significant impact. However, under the flexible exchange rate regime, monetary extension prompts an increment in output while fiscal

policy has no impact on employment and output level. The assumptions for full employment under the Mundell-Fleming (MF) model are as:

- Domestic and foreign goods are imperfect substitute.
- Fixed domestic prices
- Output is not constant
- Mobility in international capital

The output ( $y$ ) is determined by merging IS-LM and BOP curve; ( $r$ ) is the interest rate; ( $e$ ) is the real exchange rate and (BOP) is the balance of payment. In MF model balance of payment issue is solved when there is fixed exchange rate. However, MF model solves exchange rate under floating under exchange rate, in this situation exchange rate has a zero (BOP) Dornbusch (1997). This model is important to draw policy framework for interest rate, output and balance of payment under floating and fixed exchange rate.

The balance of payment curve represents the current account balance model in the Mundell-Fleming (MF) model. The balance of payment (BOP) model is equal current account balance (CAB) + capital account (CA) which is represented as:  $BOP = CAB + CA = 0$

The BOP curve can be written as below:

$$BOP = (e_0 - m_0) + k(r - r^*) = 0 \qquad k > 0 \qquad (5)$$

Where  $e$  is exports,  $m$  is imports,  $r$  is interest rate,  $r^*$  gives world interest rate and  $k$  is the parameter which shows capital mobility in response to the change in interest rate ( $r - r^*$ ).

On the other hand, we can write above import equation (5) in the simple linear function  $e_0 = m_0 + mp'y$ , as below:

$$\text{BOP} = (e_0 - m_0 - mp'y) + k(r - r^*) = 0 \quad (6)$$

The marginal propensity of import out of total income is given by  $mp'y$ . From the equation (6) we make domestic interest rate ( $r$ ) as a dependent variable which gives:

$$r = \{(r^* - (1/k)(e_0 - m_0)\} + (mp'/k)y \quad (7)$$

This is a simple linear equation of balance of payment curve is given as  $(mp'/k)$  in the equation (7). When the capital is imperfect mobile, the lenders treat assets and the world capital market is not perfect substitutes. On the other hand, perfect capital mobility can arise when assets and the world capital market are perfect substitutes. With the removal of free trade restrictions in the money market during the 1980s and 1990s world market capital market is probably going to move close to perfect capital mobility. The mobility in capital defines the slope of balance of payment curve. When there is imperfect capital mobility domestic interest rate may change from the world interest rate. Meaning the domestic and foreign goods is imperfect substitute and balance of payment curve has a positive slope. However, when domestic and world interest rates are same the capital mobility will be perfect.

The three curves under the Mundell-Fleming (MF) model and their slopes are significant for comprehension and surveying the effect of different policies on the current account balance. For instance, under a flexible exchange rate and high capital adaptability, the M-F model presumes that beginning from the current account balance, fiscal policy will increase output and which increases demand for imports. This will, therefore, lead to

current account deficit, due to rise interest rate and application in exchange rate causes inflow of funds in the domestic market which cause current account deficit. Comparative with the underlying situation of the economy, the expansionary fiscal approach has brought about a marginal increment in output with the higher interest rate. The CAD is equivalent to the surplus in the capital account. This short-term associations are themselves the explanation for the Mundell-Fleming double-deficit theory. Although under a flexible exchange rate, a lower interest rate would depreciate the exchange rate. Depreciation of the exchange rate raises the country's exports. In this respect, the expansionary monetary strategy will either lead to an increase or a decrease in the CAD.

The major criticism of the static models, the growing world oil prices in the 1970s bring attention to building a complete model of the current account balance. The growing oil prices all over the world raised the issue of optimal responses for controlling external instability/shocks (Obstfeld and Rogoff, 1995). The critiques of the Mundell-Fleming model focus on the short run and the representation of current account are static. It also neglects the effect of investments on current account balance and productive capital. However, the new dynamic model for current account has been developed which gives cointegration in the CAD. The most used model is intertemporal model for current account.

## **2.5 Ricardian equivalence theorem**

The criticism received by a Keynesian proposition from the Neo-classical perception about the budget deficit for disregarding the "crowding out effect". The expansionary government fiscal policy raises interest rate and shrinks the business activities. Robert

Barro presented another analysis of government fiscal policy. The change in budget deficit may affect private savings based on rational expectations. An increase in budget deficit implies that I am going to have more taxes in the future, so I will start saving for the repayment of higher taxes.

The idea of the Ricardian equivalence hypothesis emerges in the nineteenth century by David Ricardo (1817) in his article Funding System. In which he discussed the impact of deficit financing on the economy. They assume that the country is free from debt, if the country fought a war and had a budget deficit. Based on Ricardo that higher fiscal deficit will be financed by higher income tax, which constitutes a little portion of an income rather than large irregular expenses to finance the budget deficit. Ricardo asserts that it is difficult to make understand individuals that both the taxes are undesirable. The individual might know that a small income tax would be paid by the future generation, not by a person. However, if the individual leaves a lump sum amount to their successor, it might be contended that the person would be apathetic regarding the income tax diminishing the sum passed on to the succeeding age. Ricardo further argues if the person was required to pay a one single amount tax; the person will attempt to save the entire of it from their income.

The Ricardian proposition theorem states that a reduction in tax is due to deficit financing leads to higher taxes for the future generation (Barro; 1989). Obstfeld (1986), Sachs (1982) and Frankel (1986) have discussed the productivity of the world capital market. It presently gives the idea that international capital markets are incorporated to a vast extent, and this consolidation is somehow unsound. The degree to which people expect and put something aside for future tax liabilities, with most of the discussion

concentrating on Barro's (1974) idea of Ricardian equivalence. Ricardian theorem is based on the inductive reasoning of permanent life cycle hypothesis (Seater; 1993).

The conventional theory of Keynesian is challenged by the (REH) of Barro (1974, 1989). Ricardian theorem expresses that a fiscal deficit that is financed by a tax reduction and bond deals would be considered to be tax liabilities in future to benefit and withdraw the debt obligations. The economic agents who want to maximize their next generation welfare would increase savings instead of consumption in anticipation of future tax (Barro, 1989; Hashemzadeh & Wilson 2006; Sachs and Lorraine, 1993). The main doctrine of Ricardian equivalence is that changes in government deficit will have no impacts on consumption, savings, investments, inflation and interest rate.

The below model for Ricardian equivalence is based on Barro (1974, 1989) and Seater (1993).

$$G_0 - T_0 + r_1 GD_{-0} = GD_0 - GD_{-1} \quad (8)$$

$$G_1 - T_1 + r_1 GD_{-1} = -GD_0 \quad (9)$$

Where  $G$  is the government spending,  $T$  is the taxes paid by the individuals,  $r$  is the interest rate,  $GD$  is the government debt,  $BG^*$  is the private debt,  $C$  is the private consumption,  $P$  is the price,  $Y$  is the income,  $h, u, c, f, e$  and  $z$  is the real value of variables, 1 represents the present period, 0 is the given condition and +1 is the future period.

In equation (8) and (9) gives the budget deficit and interest payment. By dividing equation (8) by  $P_0$  and equation (9)  $P_1$  we get:

$$h_0 - u_0 + (1 + r_{-1}) P_{-1}/P_0 GD_{-1}/P_1 = GD_0 \quad (10)$$

$$h_0 - u_0 = - (1 + r^*_0) P_0/P_1 GD_0/P_0 \quad (11)$$

$r^*$  is the real interest rate

After substituting equation (10) and (11) we get:

$$h_0 - u_0 + (1 + r^*_0)^{-1} + (1 + r^*_{-1})c_{-1} = u_0 + u_1(1 + r^*_0)^{-1} \quad (12)$$

Equation (12) states that government debt and spending's must be equal to tax revenue.

The budget constraint of the private sector for the period of 0 to 1 is:

$$C_0 = Y_0 + GD^*_0 - (1 + r_{-1}) GD^*_{-1} - T_0 \quad (13)$$

$$C_0 = Y_1 - (1 + r_0) GD^*_0 - T_1 \quad (14)$$

Combining equation (13) and (14) we get:

$$f_0 + f_1 (1 + r^*_0)^{-1} = z_0 + z_1(1 + r^*_0)^{-1} - h_0 - h_1(1 + r^*_0)^{-1} - (1 + r^*_{-1})e_{-1} \quad (15)$$

Equation (15) gives the private sector inter-temporal budget constraint. The spending of private sector should be equal to (net income – debt).  $(f_0, f_1)$  is the consumption of individuals which can be maximised by  $U(f_0, f_1)$ .

$$f_0 + f_1 (1 + r^*_0)^{-1} = z_0 - h_0 + (z_1 - h_1)(1 + r^*_0)^{-1} \quad (16)$$

This assumption holds that in a closed economy, private savings must be equal to public debt ( $e = -c$ ). The government expenditure  $(h_0, h_1)$  and tax debt  $(c_0 - u_0)$  this will give equilibrium of price and quantity based on government budget constraint. This shows that

public debt and taxes do not affect private consumption. Under the Ricardian equivalence hypothesis, decrease in government saving counterbalance private saving and hence there will be no change in countries savings. Thus, a decrease in present tax is an indication for increase in future tax and a change in government expenditure. As long as economies continue to save, the interest rate in a closed economy does not adjust to establish a compromise between savings and investments (Barro: 1989).

However, in an open economy the interest rate is decided by the world markets. The ‘R’ denoted the interest rate and individuals in the economy can borrow the money at that rate. The results both the economies (closed economy and open economy) yield the same results.

$$f_0 + f_1 (1+r^*_0)^{-1} = z_0 - h_0 + (z_1 - h_1)(1-r^*_0)^{-1} - (1+r^*_0)(e_{-1} + c_{-1}) \quad (17)$$

Equation (17) tells us that decrease in tax will increase government debt but there will be no impact on private consumption. The consumption expenditure of present economy must be equal to present available resources to private sector minus external debt in the economy. However, the given value of debt in an economy, nor taxes and foreign borrowings impacts wealth, which is only affected by government expenditure ( $h_0, h_1$ ). With this assumption, current account will not get impacted because private savings are high to avert borrowing from abroad (Barro: 1989). The idea of Ricardian theorem is grounded with neoclassical method, they argue that the individuals are farsighted and arrange their consumption on the basis of life cycle hypothesis.



## **2.6 Empirical literature**

As seen in previous chapter, observational government economic management research in the 1980s indicates that the budget deficit generates a current account deficit and (these are twins). The Keynesian premise suggests that a larger budget gap raises interest cost, exchange rate inflation, and the CAD. The Keynesian contradiction claims that the BD and the CAD are unrelated. Changes in taxes have no association with interest rate and demand as given by Ricardian hypothesis. As shown below, the following section discusses the empirical relationship between the twin deficit hypothesis and Ricardian equivalence:

### **2.6.1 Twin deficit hypothesis**

Abell (1990) used different monthly data for US over the period of 1979 to 1985 by using vector auto regression model. The thesis focuses on the macroeconomic system of money flow, fiscal deficit, trade deficit, GDP, inflation, interest rates and the exchange rate. The results found that fiscal deficit causes a trade deficit. There is a transmission mechanism from governmental deficit to interest rate, to foreign direct investments and change in exchange rate and finally current account deficit.

Bernheim, B. D. (1987) the UK, Canada and West Germany, and the general cross-country connection, indicate that \$1 rise in the revenue gap would increase the current account deficit by up to \$0.30. For Mexico, the historical history between the CAD and the BD indicates that this effect is largely larger, can vary from \$0.80 to a billion. Interestingly, for Japan, the evidence is inconsistent since the revenue shortfall impacts the current-account deficit entirely. Miller and Russek (1989) used VAR methods for the

duration 1946-1987 to evaluate the relationship between BD and CAD. Causality from the exchange rate channel to current account deficit is observed in the results.

An increase in BD will cause foreign inflows and depreciates exchange rate, potentially triggering the current account deficit (see, Kouassi, Mougou'e and Kymn, 2004, Blanchard, 1985, Leachman and Francis, 2002, and Salvatore, 2006) in the sense of the Mundell flamenco model (Flaming, 1962; Mundell, 1963). Growing budget deficits will stimulate national absorption on the basis of the Keynesian absorption theory (increased demand for products and services), further increasing imports and contributing to increased CADs. The dilemma of twin deficits is connected to the degree of global mobility of capital and Feldstein and Horioka puzzles. If there is no clear correlation with high capital mobility between expenditure and savings, all deficits should move to that extent.

Enders and Lee (1990) develop a model based on optimization method over the period of 1947 to 1987 by employing VAR methodology. The VAR results find that government spending causes current account deficit. But, when the model was restricted on the basis of Ricardian hypothesis, which show how government debt impact interest rate and consumption, the results accept the hypothesis.

Rosensweig and Tallman (1993) used the VAR analysis for US. The model integrates the rate of trade, the interest rate and the nominal GDP of the economy. The findings indicate that the causality of the budget disparity increases the exchange rate and thus the trade deficit.

Kim and Roubini (2008) uses VAR model to test the twin deficit hypothesis for United States. The results find the fiscal shock improves trade balance and depreciates exchange

rate known as twin divergence. The conclusion finds private savings increase with the decline in investment via the interest rate channel because of crowding out effect.

Corsetti and Muller (2006) develop a VAR model to study impact of fiscal shock on twin deficit for Australia, Canada, United States and United Kingdom. Results find with the increase in openness in trade twin deficit increase and fiscal shock reduces the twin deficit. For Canada and United Kingdom twin deficit hypothesis is accepted. In Australia and United States, the author does not find strong evidence of twin deficit. In Australia fiscal shock does not have an impact on CAD.

Badinger et al., (2017) examines the linkage between fiscal and external balances for 73 nations from 1985 to 2012. Their results confirm the twin deficits hypothesis. Litsios & Pilbeam (2017) investigates Greece, Portugal and Spain using ARDL model. The empirical results suggest negative association between saving and CAD in all three countries.

Khalid and Guan (1999) analyzed five developed and five emerging countries and found cointegration and bidirectional linkage between the variables. However, the findings are unidirectional in developing countries.

Branson and Henderson (1985) assert that when the government reduces taxes, taxpayers react by expanding consumption. However, if the economy is at full employment, country savings must decline. Nation reserves are then lacking to cover all gainful investments at the current interest rate in addition to public borrowings. The variation between supply and demand will put an upward force on an interest rate. Increasing interest rates will reduce investments and increase savings. However, if there is no full employment in the economy, tax reductions may increase production due to increase in

demand. This will increase both private savings and net national income. Therefore, national savings may decrease significantly less than the full employed economy. As resources are unemployed, the effect of the BD on the CAD is negligible. There are numerous mechanisms by which these deficits are related. The change in deficits induces adjustments in the CAD by interest rate and exchange rate relationships.

Banday and Aneja (2017) investigates the relationships between the BD and CAD will be analysed for the period 1990 to 2016 in the context of the implementation of the cointegration mechanism of Johansen, Granger causality and the reaction feature Impulse. The findings of Johansen's cointegration are long-term, Granger causality shows two-directional causality and supports the Keynesian hypothesis and finds little proof in favor of the hypothesis for Ricardian equivalence.

Ketenci (2010) employs cointegration and ECM to analyses the effect of variables on Russia's current-account deficit from 1995 to 2008. The findings indicate that the CAD is diverged by mineral assets.

Baharunshah et al: 2006) explores the twin deficit hypothesis for 4 ASEAN countries using a single Zivot and Andrews (1992) systemic break test and cointegration test of 4 ASEAN countries. In Malaysia, Thailand, Indonesia and the Philippines, the findings of co-integration found long-term relationships with a single structural break. Authors find unidirectional causality via interest rate and exchange rate, BD to CAD.

Leroy (1984) analyses the United States and 58 advanced economies and developing countries, the BD and the CAD have a significant relation in developing countries and the budget deficit triggers trade imbalances.

Mukhtar et al., (2007) embraces the twin deficit theory, and develops a model to test the link between BD and CAD and reveals cointegration among the variables. The causality suggests bidirectional causality between the BD and CAD.

The VAR model was developed by Tallman and Rosensweig (1991) to assess the relation among variables using the US budget deficit and trade balance. Many macroeconomic considerations, including interest and exchange rates, were included to create a strong partnership. This results in a constructive relationship between the revenue surplus and the trade imbalance embraces and rejects the Keynesian plan.

Ghatak and Ghatak (1996) are using multiple variables to evaluate their theory of Ricardian equivalence for the span of 1950 to 1986: usage, spending, salaries, taxation, private property, government bonds, government expenditures, investments, government expenditures and interest on bonds. The thesis used multi-cointegration analysis and a realistic expectation calculation, and the two studies dismissed the REH, suggesting that tax cutbacks induce consumption. The findings thus invalidate the REH for India.

Bhat and Sharma (2018) are studies India using the NARDL model between 1970-71 and 2015-16. The findings accept the Keynesian hypothesis and dismiss the Ricardian hypothesis. The findings establish long-term associations between CAD and BD.

Goyal and Kumar (2018) investigated quarterly data for the Indian over the period 1996Q2 to 2015 Q4. The study employs the structural vector auto regression model between external imbalance, budget deficit, and the exchange rate. The results reveal the impacts of oil imbalances and consumption effects causing current account deficit and rejects REH.

Darrat (1988) examined the causal relation between government deficits and trade deficits using the US multivariate Granger causality test. There is a two-way correlation between trade gap and government deficit.

To check the linkage between BD and CAD for Nigeria and the accessible oil-based economy were investigated between 1970 and 2001 by Onafowora and Owoye (2006) using the role of vector error correction, granger causality and stimulus response. The results indicate that the current account deficit's budget deficit is a one-sided cause. The findings favor the Keynesian suggestion and contradict Ricardian hypothesis.

Vamvoukas (1997) employs an ECM and causality analysis to test link between BD and CAD. Unidirectional causality from BD to CAD and the result are consistent with the conventional Keynesian theory.

### **2.6.2 Ricardian equivalence theorem**

The standard Keynesian hypothesis is questioned by Barro's (REH) (1974, 1989). Ricardian principal notes that a fiscal shortfall funded by decreased revenues and securities sales will be deemed tax burdens to gain and withdraw debt commitments in the future. When citizens see the real valuation of their taxes growing, it just compensates for deficit spending; this liability does not become part of the overall savings. The economic agents who want to maximize their next generation welfare would increase savings instead of consumption in anticipation of future tax (Barro, 1989; Hashemzadeh & Wilson 2006; Sachs and Lorraine, 1993). The main doctrine of Ricardian equivalence is that changes in government deficit will have no impacts on consumption, savings, investments, inflation and interest rate.

Barro (1989) evaluates Ricardian proposition of budget deficit and outlines the motive of this hypothesis. Income and future tax are not certain; no perfection in capital market; taxes do not matter to individuals because no one lives forever. Barro makes a point that various studies on interest rate, savings, consumption and current account deficit support Ricardian hypothesis. But various studies have problems related data and their identifications which makes Ricardian proposition biased. Buchanan (1976) was the first who find close association between Ricardo and Barro proposition. However, many researchers like Bailey (1971), Ricciuti (2003) and Patinkin (1965) also find the means of funding debt do not fret.

Seater (1993) studies Ricardian proposition with both direct and indirect method. He found Ricardian method is correct logically, but there are lots of problems to hold it. Seater argued we need to develop a strong econometric model to confirm the Ricardian hypothesis. Roubini (1988) also find that there is no linkage between CAD and BD.

Afonso et al., (2018) studied 193 countries over the period of 1980-2016 using fixed effect model and system GMM model. The findings reveal that the fiscal policy will reduces the effect of BD on CAD. When there is an absence of fiscal policy rule twin deficit hypothesis exists.

To find out the relationship between BD and CAD for South Africa for the duration 1994-2016, Ncanywa and Letsoalo (2019) implemented an autoregressive distribution delay strategy and Granger causality test. The findings support the short-term interaction, but may not imply that the theory of Ricardian is recognized. The policy vector for expenditure cuts and current account deficits should be inflation.

Algieri (2013) tests GIIPS countries (Greece, Ireland, Italy, Portugal, and Spain) and uses Granger causality and Toda-Yamamoto for the 1980Q2 through 2012Q2 quarterly. The findings demonstrate that the debt and current account deficit are not causal and endorse theorem of Ricardian equivalence. They see conservative monetary strategies that do not impair the balance of the current account. Fixing fiscal policies will, however, boost budget deficits and economic development.

Chihi and Normandin (2013) study the linkage between BD and CAD for 24 developing countries from 1960 onwards by applying VAR structure. The results find positive correlation between external balance and budget deficit. The model is evaluated for every nation to such an extent that the anticipated second moments of the budget deficit and external balance and specifically the covariance between these deficits are near to these countries. The results for US reveal that budget deficit have insignificant relationship with external balance and accepts Ricardian equivalence hypothesis for US.

Gale and Orszag (2004) studies consumption and saving approach, which is based on reduced form of consumption function in United States. They include interest rate, private savings and real effective exchange rate. These studies conclude we could not reject Ricardian hypothesis but accept it partially. Yi (2003) investigates the relationship between exchange rate, CAD, consumption and BD for South Korea. The analysis finds no-cointegration relations among the variables and accepts Ricardian hypothesis.

Christopher Walker (2002) studies Japanese economy by considering huge budget deficit and large private savings. He employed VAR methodology and conclude the tax have negative sign to change in output and accept Ricardian hypothesis. Further, suggests private savings counterbalances budget policies.



The fiscal deficit doesn't prompt any changes in the exchange rate and interest rate (Garcia and Ramajo, 2004), and consequently no effect on CAD. However, the rational consumer knows that if there is a decrease in tax this year, in coming years it will be increased. Hence, the rational agent saves today for future tax liabilities.

Giorgioni and Holden (2003) investigates the Ricardian hypothesis for the countries (India, Pakistan, Nigeria, Burundi, Sri Lanka, Zimbabwe, Ethiopia, Honduras, morocco and El Salvador) by applying Bernheim consumption function. The results find that there are some evidences for Ricardian preposition but due to limitations of data you need to very caution regarding the variable identifications. Reitschuler (2008) also investigates Ricardian hypothesis in EU-11 member countries and results conclude, we could not accept Keynesian preposition but accepts Ricardian hypothesis.

Magazzino (2012) discusses GMM and Granger causality in European countries in relation to current account deficits, expenditure deficits and private consumption. The findings are mixed, with 1% growth in the BD raising the CAD by 0.21%. The GMM estimator findings align with the Ricardian hypothesis.

The link between fiscal policy and government debt for 17 OECD countries has been analyzed by Berben and Brosens (2007), using the ARDL method. The findings suggest that the relationship between consumption and individual income and wealth is favorable. Debt has a major relationship, though, which ensures that monetary measures are overshadowed by a reduction in demand. Evans and Karras (1996) also have a partial approach to Ricardian.

Some of the studies are based on Euler consumption function, Gale and Orszag (2004) gives the advantages of Euler consumption function which includes rational expectation

method and utility maximization method. Blanchard (1985) concludes in favor of both Ricardian and non- Ricardian approach. Evans (1993) has found no evidence in favor of Keynesian proposition and accepts Ricardian hypothesis.

Enders and Lee (1990) are using Vector Auto-Regression (VAR) modeling to analyze quarterly results for the United States 1947:1 to 1987:1. He used factors such as consumption, government expenditure, deficit, foreign currency, interest rate, and the balance of current accounts. The findings agree that the budget gap should not trigger commercial deficits and accept the theory of Ricardian equivalence.

## **2.7 Summary and Conclusions**

Chapter 2 has given the broad outlook of the theories regarding the twin deficit hypothesis (Keynesian proposition and Ricardian equivalence theorem). The linkage between the BD and the CAD in the US contributed during the late 1980s and early 1990s that the deficits have bidirectional causality. The Reagan Administration executed an expansionary fiscal measure through a tax cut, which was not supplemented by monetary policies. The one-sided policy exerted from interest rate and more imports and increase the value of the dollar. This appreciation in dollar brought about a disintegration of the United States' intensity on world markets, and a worsening of the trade balance. Under these conditions, the CAD seems to reflect the budgetary position, which prompts to popularize the twin deficit hypothesis. The discussions were not confined to the US, where fiscal and monetary policy in BRICS countries was concentrated around the current account deficit and increasing foreign debt.

The Keynesian stance claims that the large budget deficit raises interest costs, currency appreciation, and the current-account balance deteriorates. The next segment presents Mundell-twin-deficit Fleming's theory solution. This model demonstrates why the expansionary monetary strategy of the government worsens the balance of the current account. However, this paradigm has only a short-term effect on the CAD as a consequence of fiscal policies. The model is unable to estimate the long-term relationship that develops with stock and flow interlinks age. The critique of a Keynesian proposition on the neoclassical view of the budget deficit to ignore "crowding out effect" The expansionary fiscal policy of the government will contribute to an increase in the cost of interest and decrease business activities. Ricardian principal notes that a fiscal shortfall funded by decreased revenues and securities sales will be deemed tax burdens to gain and withdraw debt commitments in the future. When citizens see the real valuation of their taxes growing, it just compensates for deficit spending; this liability does not become part of the overall savings. The economic agents who want to maximize their next generation welfare would increase savings instead of consumption in anticipation of future tax (Barro, 1989). Based on the theory, the chapter defines the model for this study. The thesis uses reduced form of consumption function based on Bernheim (1987) to test Ricardian equivalence.

As written in the preceding section, the difference in empirical results on twin deficit hypothesis and Ricardian equivalence is due to differences in econometrics techniques, data, and sample size. Econometric strategies have likewise shifted particularly with the improvement of new estimation techniques setting an extra degree of variety in results from past work. Past research has given little consideration to the issue of structural

change, and this thesis looks to make a distinctive contribution to the writing by addressing this issue. The study will include different econometrics methods (ARDL, Impulse response functions, and causality analysis) that will give a wide contemporary investigation on the cause-and-effect relationship between BD, CAD and macroeconomic variables in BRICS countries.