CHAPTER 7

RICARDIAN EQUIVALENCE AND TWIN DEFICIT IN CHINA

7.1 Introduction

Fiscal and monetary strategies, when executed lucidly, assume a conclusive part in general macroeconomic stability. The macroeconomic theory which assumes an ideal connection between budget (or fiscal) deficit and trade balance is known as twin deficit hypothesis. Researchers such as Kim & Roubini (2008), Darrat (1998), Miller & Russek (1989) and Banday & Anaja (2019) have theoretically and empirically researched the growing literature on the twin deficit hypothesis (TDH).

However, majority of the countries are facing both BD and CAD. An imperative problem for policy makers in China has been the rising budget deficit. In addition, there is a need to understand the relation between the BD and CAD in the Chinese economy, given the importance of free trade, decentralization and growth.

A national income accounting identity may reflect the theoretical linkage between BD and CAD:

$$(S_p - I) + (IM-EX) = (G+TR-T) \quad (1)$$

where IM stand for imports, EX for exports, S_p for private savings, I for real investments, G for government expenditure, T for taxes and TR for transfer payments. When *IM* is greater than *EX,* the country has CAD. From the right-hand side of the equation, when (G+TR-T) is greater than 0, the country is running a BD.

$$(S_p - I) = (G+TR-T) - (IM-EX) \quad (2)$$

The objectives of this chapter are as following: Firstly, we analyse the association among the variables like BD, CAD and some macroeconomic variables by using ARDL approach. Secondly, we use Bernheim (1987) consumption function to validate Ricardian equivalence hypothesis by applying ARDL bound testing approach. Thirdly, we investigate the cause-and-effect relationship by applying Wald causality testing. Finally, a novel attempt is made to investigate the time way or (input and output behavior of the system) from the selected macroeconomic variables. Based, on the Granger causality outcomes, policy makers cannot predict the future policy based on the present results. Secondly, these results can be clarified with sample tests that may give more explanation on the dynamic properties of this relationship Masih and Masih (1995). This technique is based on Impulse response function, that a shock to one variable and predicting its effect on the other variable for the future time period.

The other sections follow as: Section 7.2 gives Macroeconomics aspects of the Chinese Economy. Section 7.3 describes data and model specifications. Section 7.4 provides methodology for this chapter. Section 7.5 gives empirical results. Section 7.6 concludes the chapter.

7.2 Macroeconomics Aspects of the Chinese Economy

The Chinese economy has encountered an unmatched development rate in the course of recent many years, with increments in export growth, investment and free market changes from 1979 and a yearly GDP development pace of 10%. The Chinese economy has

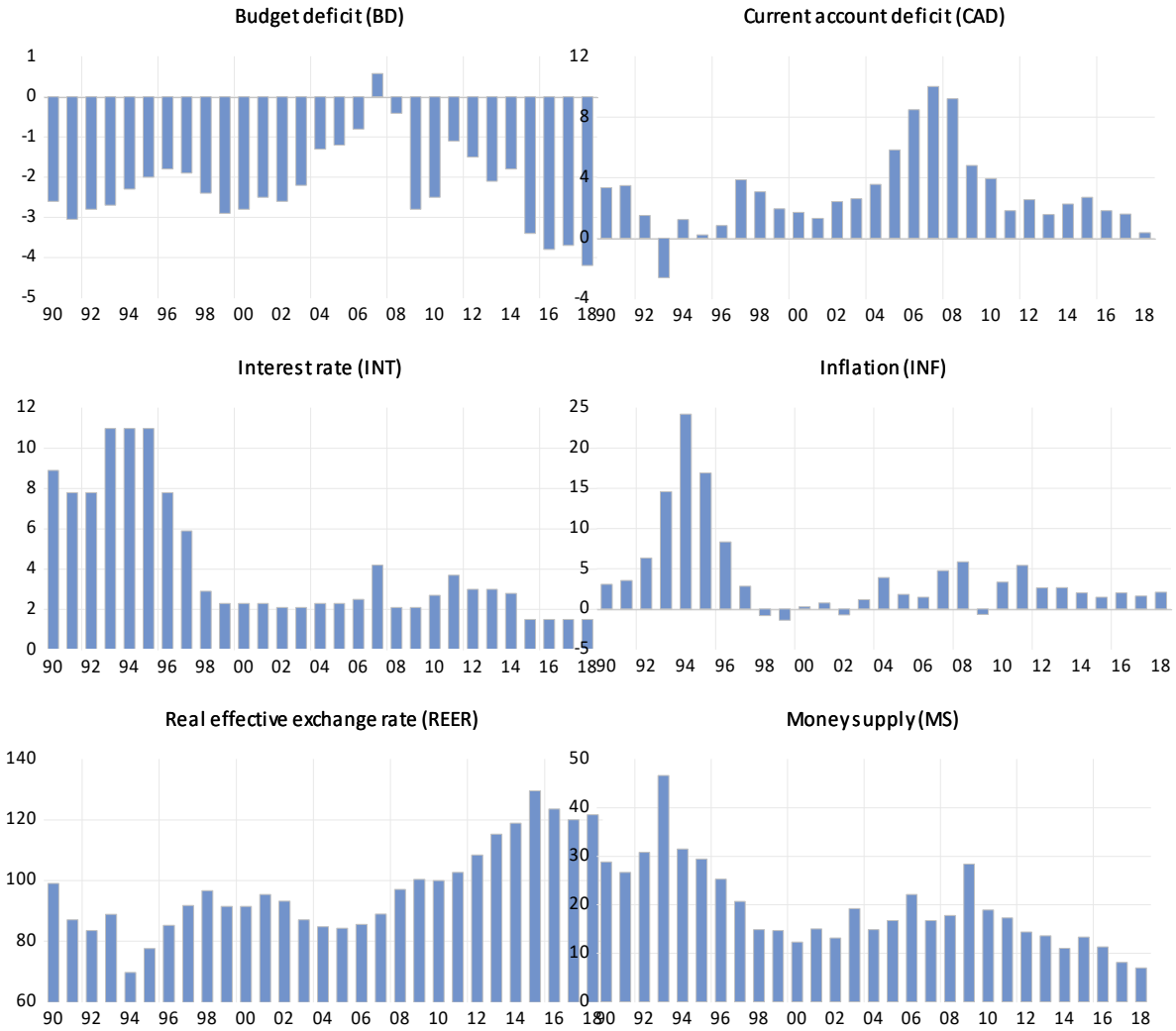
developed as the world's biggest economy in terms of manufacturing, construction and foreign exchange reserves.

In 2008, the worldwide monetary emergency gravely influenced the Chinese economy, bringing about a decrease in exports, imports and FDI and loss of jobs. Figure 7.1 shows that China's CAB has dropped significantly from its boom during 2007-08 financial crises. After the financial crisis, China's exports fell by 25.7% in February 2009. Further, the exclusive demand for Chinese goods in the international market pushed up current account surplus to 11% of the GDP in 2007, in a global economy (Schmidt & Heilmann, 2010). It is said that China has done better than other countries to cope up 2008 crisis with a greater fiscal stimulus in terms of tax reduction, infrastructure and subsidies when compared to the OECD countries (Herd et al., 2011; Morrison, 2011).

As the budget deficit was marginal (- 0.41% of GDP in 2008), as seen in Figure 7.1, the current account surplus increased to 9.23% of GDP. The budget deficit is raised by the negative shocks of the CAD and vice versa.

However, the stability in the exchange rate defines the flow of trade which finally improves the CAD. The negative shift in the current account is due to structural and cyclical forces. Cyclical factors are seen from a business point of view: the growing costs of Chinese imports, such as oil and semiconductors, are dragging down the current account balance. The structural change, is visible from financial side, that impacts Chinese finances and savings. Investment has decreased to 40% and residential investments have decreased from 50% to 40% of GDP.

Figure 7.1: Behaviour of some macroeconomic variables in China



Note: Overview of the variables from 1990 to 2018.

7.3 Data and Model specifications

We use the World Bank and the international trade data to perform the analytical analysis on the basis of the following variables over the duration 1990 to 2018.

(a) Based on the percentage of GDP, the current account deficit (CAD) shows the amount of the goods, services and investments imported as opposed to exports.

(b) The budget deficit (BD) demonstrates financial health in which spending, as a percentage of GDP, exceeds revenue.

(c) Deposit interest rate (DIR) as an interest rate proxy (INT) The sum paid by the creditor to the borrower on the basis of the principal percentage.

(d) Inflation (INF) is calculated on the basis of an index of consumer prices, representing an annual percentage rise in the cost of goods and services.

(e) Broad money (MS) a measure of the money supply that indicates the amount of liquidity in the economy. It includes currency, coins, institutional money market funds and other liquid assets based on annual growth rate and real effective exchange rate (REER).

(f) PC is private consumption; y is the gross national product (GDP), g is government spending expenditure and r is the interest rate, and T is the Tax in GDP percentage.

7.3.1 Model Specifications

The model will estimate the relationship among BD, CAD, INF, INT, REER and MS is as follows:

$$CAD = f\,(BD, REER, INF, INT, MS) \qquad (3)$$

The second one is based on Buiter and Tobin (1979) consumption function to test Ricardian equivalence hypothesis (REH) as given below in equation 4 and 5.

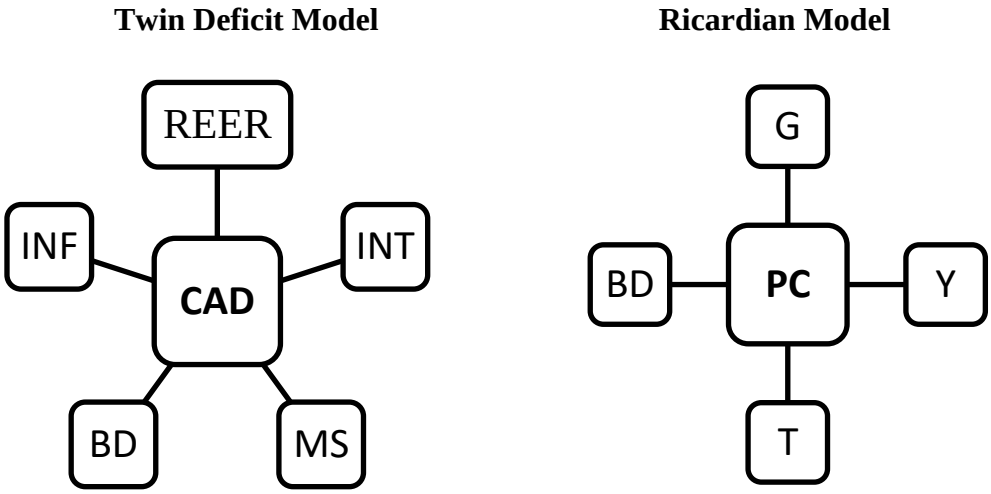
$$PC_t = a_0 + a_1 Y_t + a_2 G_t + a_3 T_t \qquad (4)$$

$$PC_t = a_1 Y_t + a_2 T_t + a_3 BD_t \qquad (5)$$

Both the equations (4 and 5) estimates Ricardian equivalence theorem.

Based on equation (3, 4 and 5) we have estimate twin deficit hypothesis and Ricardian equivalence given the above equations as given in figure 7.2 below.

Figure 7.2: Estimating Twin Deficit Hypothesis (TDH) and Ricardian Hypothesis



7.4 Methodology

7.4.1 Unit Root Test

The analysis part starts with the ADF and PP unit root test and followed by (Zivot and Andrews, 1992). With three models based on Perron, the Zivot and Andrews (ZA) unit root test begins with (1989). The ZA model is as described below:

$$Y_t = \mu^A + \theta^A DU_t(\lambda) + \beta^A{}_t + a^A Y_{t-1} + \sum_{j=1}^{k} c^A{}_j \, \Delta Y_{t-j} + \varepsilon_t \qquad (6)$$

$$Y_t = \mu^B + \beta^B{}_t + \gamma^B DT_t(\lambda) + a^A Y_{t-1} + \sum_{j=1}^{k} c^B{}_j \Delta Y_{t-j} + \varepsilon_t \qquad (7)$$

$$Y_t = \mu^C + \theta^C DU_t(\lambda) + \beta^C{}_t + \gamma^C DT_t(\lambda) + a^C Y_{t-1} + \sum_{j=1}^{k} c^C{}_j \Delta Y_{t-j} + \varepsilon_t \qquad (8)$$

From the equations above, $DU_t(\lambda)$ = 1, if t >Tλ, 0 otherwise: $DT_t(\lambda) =$ t − Tλ if t >Tλ, 0 otherwise. For equations (6) to (8), the null hypothesis is alp = 0, which means that (Y t) includes a drift unit root and excludes any structural breakpoints. When alpha < 0, it simply means that the series has a structural break with a trend-stationary phase that occurs at an unknown time point. DT_t is a dummy variable that means that shift occurs at TB time, whereDT_t=1 and DT_t = t-TB if t > TB; 0 otherwise. The ZA test (1992) indicates that the distribution of small sample sizes will deviate, ultimately producing asymptotic distribution.

7.4.2 Testing Ricardian theorem

I will set out the standard model before setting up the Ricardian approach. Two kinds of consumption models are used to assess the REH in writing. The initial one relies on the consumption work of Buiter and Tobin (1979). The subsequent one depends on the rational hypothesis of expectation, which was based on the premises of ideal fiscal approach data. Such model is used to comprehend the reasons for failure of REH. In any case, there are various investigations based on REH which attempt to discover the association between BD and CAD. But our investigation will utilize Buiter-Tobin model to test the RE speculation for China as given in condition 9 and 10 below:

$$PC_t = a_0 + a_1 Y_t + a_2 G_t + a_3 T_t \qquad (9)$$

$$PC_t = a_1 Y_t + a_2 T_t + a_3 \mathrm{BD}_t \qquad (10)$$

7.4.3 ARDL cointegration bounds testing approach

To verify the co-integration by comparing F-statistics against the critical values, we applied the ARDL boundary testing approach. This approach has significant advantages than other method of cointegration because we can estimate the model with any order of integration Pesaran et al. (2001). The results are calculated by using Microfit which defines bounds test critical values as "k".

The ARDL model for the equation (3) can be written in this form:

$$\mathrm{BD}_i = \theta_0 + \sum_{i=1}^{q} \theta_{1i} CAD_{t-i} + \sum_{i=1}^{q} \theta_{2i} BD_{t-i} + \sum_{i=1}^{q} \theta_{3i} INF_{t-i} + \sum_{i=1}^{q} \theta_{4i} REER_{t-i} + \sum_{i=1}^{q} \theta_{5i} MS_{t-i} + \sum_{i=1}^{q} \theta_{6i} INT_{t-i} + u_t \qquad (11)$$

$$\Delta \mathrm{BD}_i = \theta_0 + \theta_1 \Delta ECM_{t-1} + \sum_{i=1}^{q} \theta_{2i} \Delta CAD_{t-i} + \sum_{i=1}^{q} \theta_{3i} \Delta BD_{t-i} + \sum_{i=1}^{q} \theta_{4i} \Delta INF_{t-i} + \sum_{i=1}^{q} \theta_{5i} \Delta REER_{t-i} + \sum_{i=1}^{q} \theta_{6i} \Delta MS_{t-i} + \sum_{i=1}^{q} \theta_{7i} \Delta INT_{t-i} + u_t \qquad (12)$$

The equation (11 and 12) gives long-run and short-run results based on Schwarz Bayesian Criteria (SBC) optimized over 20000 replications. The lagged error correction term (ECM) is estimated which should be negative and significant.

7.4.4 Granger causality

We have estimated the causality between X_t to Y_t in this chapter, and vice versa. This association between causality and monotony drove Granger to express direct causality in a parametric structure, based on traditional time series data (see Box and Pierce 1970), for example, autoregressive models. Before applying Granger causality, it is important to verify statinarity and lag structure. The model can be written as: in order to estimate the causality among the variables.

$$\Delta BD_t = \alpha_1 + \Sigma\beta_1\Delta CAD_{t-i} + \Sigma\theta_1\Delta INF_{t-i} + \Sigma\gamma_1\Delta REER_{t-i} + \Sigma\delta_1\Delta INT_{t-i} + \Sigma\lambda_1\Delta MS_{t-i} + \varepsilon_t \quad (13)$$

$$\Delta CAD_t = \alpha_2 + \Sigma\beta_2\Delta BD_{t-i} + \Sigma\theta_2\Delta INF_{t-i} + \Sigma\gamma_2\Delta REER_{t-i} + \Sigma\delta_2\Delta INT_{t-i} + \Sigma\lambda_2\Delta MS_{t-i} + \varepsilon_t \quad (14)$$

$$\Delta INF_t = \alpha_3 + \Sigma\beta_3\Delta BD_{t-i} + \Sigma\theta_3\Delta CAD_{t-i} + \Sigma\gamma_3\Delta REER_{t-i} + \Sigma\delta_3\Delta INT_{t-i} + \Sigma\lambda_3\Delta MS_{t-i} + \varepsilon_t \quad (15)$$

$$\Delta REER_t = \alpha_4 + \Sigma\beta_4\Delta BD_{t-i} + \Sigma\theta_4\Delta CAD_{t-i} + \Sigma\gamma_4\Delta INF_{t-i} + \Sigma\delta_4\Delta INT_{t-i} + \Sigma\lambda_4\Delta MS_{t-i} + \varepsilon_t \quad (16)$$

$$\Delta INT_t = \alpha_5 + \Sigma\beta_5\Delta BD_{t-i} + \Sigma\theta_5\Delta CAD_{t-i} + \Sigma\gamma_5\Delta INF_{t-i} + \Sigma\delta_5\Delta REER_{t-i} + \Sigma\lambda_5\Delta MS_{t-i} + \varepsilon_t \quad (17)$$

$$\Delta MS_t = \alpha_6 + \Sigma\beta_6\Delta BD_{t-i} + \Sigma\theta_6\Delta CAD_{t-i} + \Sigma\gamma_6\Delta INF_{t-i} + \Sigma\delta_6\Delta REER_{t-i} + \Sigma\lambda_6\Delta INT_{t-i} + \varepsilon_t \quad (18)$$

7.5 Empirical results

In order to test the Ricardian theorem and twin deficit hypothesis for China, first we check the stationarity among the variables which will help us to define the appropriate methodology for the above defined data set.

7.5.1 Unit root test

The unit root results reveal that nine out of eleven variables are non-stationary at the level and two variables are stationary at the level given in below table 7.2.

Table 7.1: Results of unit root tests for China

	ADF		**PP**	
Variables	**Intercept**	**Intercept-Trend**	**Intercept**	**Intercept-Trend**
CAD(I_0)	-2.485(0.12)	-2.453(0.34)	-2.528(0.11)	-2.56(0.29)
CAD(I_1)	-5.107(0.00)[a]	-5.072(0.00)[a]	-5.636(0.00)[a]	-5.33(0.00)[a]
BD(I_0)	-1.987(0.28)	-2.013(0.56)	-2.567(0.12)	-2.562(0.29)
BD(I_1)	-3.702((0.00)[a]	-3.618(0.04)	-7.0231(0.00)[a]	-7.692(0.00)[a]
REER(I_0)	-4.042(0.00)[a]	-4.074(0.01)	-3.965(0.00)[a]	-4.380(0.00)[a]
REER(I_1)	-6.094(0.00)[a]	-6.146(0.00)[a]	-6.577(0.00)[a]	-14.72(0.00)[a]
MS(I_0)	-2.402(0.14)	-2.99(0.15)	-2.443(0.12)	-3.127(0.11)
MS(I_1)	-6.749(0.00)[a]	-6.656(0.00)[a]	-6.803(0.00)[a]	-6.682(0.0)[a]

INF(I_0)	-3.031(0.04)[a]	-4.140(0.014)[a]	-2.25412(0.19)	-2.374(0.38)
INF(I_1)	-4.938(0.00)[a]	-4.9259(0.00)[a]	-7.70762(0.0)[a]	-7.3585(0.0)[a]
INT(I^0)	-0.995(0.75)	-1.993(0.58)	-1.03964(0.72)	-2.166(0.49)
INT(I^1)	-4.438(0.00)[a]	-4.369(0.00)[a]	-4.54219(0.00)[a]	-4.311(0.00)[a]
TAX(I^0)	-0.571(0.86)	-3.18(0.12)	-0.6249(0.84)	-1.6475(0.74)
TAX(I^1)	-3.00(0.04)[a]	-3.621(0.04)[a]	-2.9555(0.05)[a]	-5.0507(0.00)[a]
PC(I^0)	-1.68(0.438)	-0.8451(0.94)	-1.6571(0.440)	-1.4401(0.82)
PC(I^1)	-2.54(0.06)[a]	-4.0069(0.02)[a]	-2.8354(0.06)[a]	-6.3774(0.00)[a]
G(I^0)	-1.57(0.49)	-3.0538(0.11)	-1.5050(0.5153)	-1.5109(0.79)
G(I^1)	-6.4578(0.00)[a]	-6.3198(0.01)[a]	-6.5028(0.000)[a]	-6.3610(0.00)[a]
Y(I^0)	-1.6618(0.43)	-0.8451(0.94)	-1.6571(0.44)	-1.4401(0.82)
Y(I^1)	-2.8354(0.06)[a]	-4.0069(0.02)[a]	-2.8354(0.06)[a]	-6.3774(0.00)[a]
r(I^0)	-2.3224(0.17)	-2.3278(0.40)	-2.7428(0.0806)	-2.7732(0.21)
r(I^1)	-3.1797(0.03)[a]	-4.5433(0.00)[a]	-5.1414(0.00)[a]	-5.0087(0.00)[a]

Note: 'a', gives 1% significance level.

The structural break test reveals five breaks in Model A. The first, in 1992, may be due to inflation caused by privatisation; the second, in 1994 and 1995 may be due to higher inflation which caused the consumer price index to shot up by 27.5 % and imposition of a 17% value-added tax on goods.

The third may be due to a 48% fall in state-owned enterprises in 2003, as trade barriers, tariffs and regulations have been lowered and the banking sector has been reformed, while the fourth may be due to the global financial crisis in 2008.

Table 7.2: Results of one structural break Zivot and Andrews

Variable	CAD	BD	REER	MS	INT	INF	TAX	PC	G	Y
Test-stat (α)	-3.17	-2.54	-3.15	-3.07	-3.22	-4.92	-3.86	-2.23	-2.81	-3.64
Time of Break	2008	2008	1992	1994	2003	2003	1995	2012	2012	2008
Lags (k)	0	2	2	0	0	0	1	1	2	0

Note: Structural breaks are based on breaks in trend and lag structure by AIC.

The fifth in 2012 is due to decreasing domestic consumption rate, the market for real estate was unstable, and population was ageing and inefficient central banking policy. The ZA test with one structural break, as all six variables are non-stationary at a 1% level.

7.5.2 Testing Ricardian theorem based on Buiter and Tobin (1979) consumption function

We applied Engle & Granger (1987) two step cointegration method to test Ricardian Equivalence hypothesis for China. In our study we used Buiter & Tobin (1979) model subject to budget constraints, based on the maximization function. The model results are given in table 7.3.

For China, the results based on empirical research contradict the RE theorem. In several cases, the results of equation (7) refute the RE theorem:

Table 7.3: Results of REH for China

Variables and Equation no.	Coefficient (2)	t-Stats (3)	R^2 and DW Stats (4)
9. PC = f (Y, G, T)			
Constant	17.9746	4.6763	0.9992
Y	-0.1744	-3.7303	1.2532
G	0.5554	11.1833	
T	-0.3831	-6.7673	
∆PC = f (∆Y, ∆G, ∆T) ECM without intercept			
∆Y	-0.1174	-2.4738	0.9228
∆G	0.9642	11.5025	1.3559
∆T	-0.1848	-1.5722	
10. PC = f (Y, T, BD)			
Constant	58.3644	29.1334	0.9363
Y	-0.4225	-4.1561	1.2824
T	-0.9240	-15.0909	
BD	-0.4561	-1.4245	
∆PC = f (∆Y, ∆T, ∆BD) ECM without intercept			
∆Y	-0.2769	-2.1850	0.3503
∆T	-0.5109	-1.5375	1.6843
∆BD	0.0057	0.0146	

a) Private spending (c) consists of per capita income (Y), public expenditure (G) and taxes (T).
b) The tax variable has a negative association with private consumption, which is statistically important (C).

The RE theorem is denied by the calculation of the Buiter-Tobin equation subject to the coefficient restriction. Subject to constraints, the calculation of equation (8) with intercept rejects the RE theorem on different grounds:

(a) A negative and statistically important Y coefficient will decrease by a rise of one percent in the Y-coefficient (-0,422) of real private consumption.

(b) The tax rate is negative and statistically significant for an improvement of one per cent of actual private demand by the tax rate decrease (-0,924). The coefficient of taxes is negative and statistically significant; a rise of 1% of TAX would decrease actual private spending (-0.924) percent.

(c) The BD coefficient is of negative value and statistically significant, with the 1% growth in BD being a reduction in real private consumption (-0.456).

(d) A1 = a2 constraints are not reached.

(e) The ECM demonstrates the interaction between the short and long-term dynamics of the variables. The ECM value for Y and T is negative and statistically meaningful for private use and denies China's RE theorem

7.5.3 Results of ARDL Bound testing

The ARDL model first gives the coefficient results and F statistics. The F = 9.439 is more than the crucial upper bound value of 3.99 at 5%. The results show that the variables have a long-term association. The ARDL model are presented in Table 7.4.

Table 7.4: Results of ARDL model of China (BD)

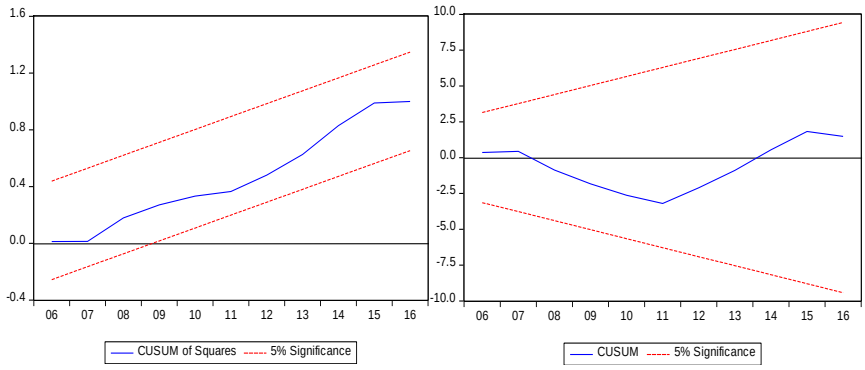
Variables	**Coefficient**	**t-value**	**Prob**
BD(-1)	.52504	4.3020	.001*
BD(-2)	-.47852	4.4321	.000*
CAD	.13298	4.6230	.000*
DIR	.22922	3.0986	.007*
INT(-1)	-.14730	1.5119	.150
INT(-2)	-.38099	4.6848	.000*
INF	.009286	.4124	.685
INF(-1)	.041560	1.6862	.111
INF(-2)	.057117	2.5665	.021**
INF(-3)	.084059	3.5271	.003*
MS	-.010333	.78506	.444
REER	.0013332	.18609	.855
REER(-1)	-.017791	2.1974	.043**
Calculated F-statistic		***F*= 9.439**	
90% LB	90% UB	95%	95% UB

		LB	
2.05	3.33	2.51	3.99
Serial correlation: .01999 (.964); **Normality:** .94082 (.625); **Heteroscedasticity:** .58695 (.444)			

Note: "*" "**" denotes significance at 1% and 5% level.

The test results indicate that all the variables have a co-integration relationship. We have done an autocorrelation, normality and heteroscedasticity test and the F-statistic is higher than the critical upper limit value.

Figure 7.3: CUSUM and CUSUMSQ stability tests



The results are shows stability based on the respective P-values and the CUSUM and CUSUMSQ tests are given in Figure 7.3.

7.5.4 Results of ARDL Cointegration

The findings identify a cointegration relationship with the help of the bound test between the variables. We estimate the model with long-run and short-run relationships among the

variables after finding the cointegration. Table 7.5 provides the results of equations (11) and (12).

Table 7.5: Results of ARDL long-run and Short-run of China (∆BD)

	Variables	Coefficient	t-statistic	Prob
ADJ(ECM)	BD(-1)	-0.95348	9.4018	0.000*
Long Run	CAD	0.13946	4.905	0.000*
	INT	-0.31366	2.924	0.010*
	INF	0.20139	3.6196	0.002*
	MS	-0.010837	.77795	0.448
	REER	-0.017262	9.9136	0.000*
Short Run	∆BD (-1)	0.47852	4.432	0.000*
	∆CAD	0.13298	4.6230	0.000*
	∆INT	0.22922	3.0986	0.006*
	∆INT(-1)	0.38099	4.6848	0.000*
	∆INF	0.00928	-0.4125	0.685
	∆INF(-1)	-0.14118	4.2123	0.000*
	∆INF(-2)	-0.084059	3.5271	0.002*
	∆MS	-0.010333	0.7850	0.442
	∆REER	0.001332	0.1860	0.854
R-squared = 0 .8326 ; F-Stat = 16.815 (.000); DW Stat = 1.9049				

Note: Superscripts "*" "**" "***" denote 1%, 5% and 10% significance level.

The model finds evidence in support for twin deficit for China. Thus, our study upholds the empirical validity of the Keynesian proposition for China, while rejecting the Ricardian equivalence hypothesis. For BD, CAD, INF and INT, the short-run coefficients are significant, indicating that a slight deviation in the BD has a significant impact on

CAD; similarly, most macroeconomic variables have a significant impact on the CAD. The value of ECM is negative (-0.95348) which shows the speed of adjustment is higher and is converging towards equilibrium, with the exogenous shocks and endogenous shocks.

One of the world's most interconnected economies, the Chinese economy has emerged as a dominant player in the global economy. In the early 1990s, it was reported in the Chinese print media that although the Chinese economy was expanding rapidly, the deficits still existed. This was primarily referred to as 'hard deficits' because they were funded by raising the money and increases inflation in the economy. Deficit financing will also raise interest rates because the government may allow investors and businesses to purchase more government bonds until the monetary accommodation of the deficit is ruled out. If government bond sales do not rise immediately in relation to the increase in the debt, additional funds may be lent by the government. This, in fact, affects the formation of private investment. The Congressional Budget Office has, summarized such a reduction in the need for resources from the private sector as a "modestly negative" effect of tax cuts or federal deficit expenditure on long-term economic growth.

This analysis shows that in interest rate has a notable impact on BD and CAD. Chinese banks are growing interest rates on home loans that were previously very low, but this is causing serious economic problems due to its economic bubble, especially in the real estate sector. This is similar to the American bubble, in which most people were unable to repay loans, creating a financial crisis. Still, China must work within the existing bubble, even though it creates a lack of investments and can cause trouble for economies worldwide. The debt bubble is due to the elimination of loan quotas for banks in an

attempt to increase small business. These companies are still struggling to repay that debt, which is almost half the amount of GDP of both private and public debt (The Economist, 2015).

While empirical research shows a statistically significant relationship between BD and interest rates, there are differences on the magnitude of the impact. Chinese needs to take care of lower interest rate rather than higher interest rate especially on home loans which was very low; in real estate market which has created a serious trouble in the economy.

It is also important to note that the concept of the deficit includes hard and soft deficits. The “hard” part of the deficit, being financed by printing money, is inflationary. But these deficits are under reported in the Chinese economy. Moreover, hard deficits and consequent inflation increases capital inflows (to prevent interest rates from rising) and causes current account deficit.

Shen and Chen (1981) said that the bottle-necks in few of the sectors could be lead a higher impact on growth such as energy, communications and transport sectors that are of vital importance for the long-term growth of China. However, given the reluctance of the non-government investors to venture into such low pay-back sectors, the government policy to balance budget by cutting its capital expenditure can severely restrict the development of these sectors (Colm & Young, 1968).

The obvious reason for the external surplus, however, is that, by rising FDI inflows, the economy follows an export-driven growth model. China's demographic boom has produced an economic miracle in the growing tide of economies, enabling them to invest in education and skilled workers that will support the economy as a result. Our results suggest that there cointegration relation among the variables.

7.5.5 Granger Causality

The G-causality approach is used to test the association between BD and the CAD. We need to ensure that all the variables after differentiation should be stationary before checking causality. The lag option is based on the criterion for knowledge from Akaike (AIC). The Granger causality findings are summarized in Table 7.6 below.

Table 7.6: Results of Granger causality Wald test

Equation	Chi^2-test	P-Value	Null-Hypothesis	Direction
CAD to BD	6.6633	0.036**	Accepted	Bidirectional causality
BD to CAD	14.461	0.001*	Accepted	
BD to REER	.91584	0.633	Accepted	No-causality
REER to BD	.73626	0.692	Accepted	
BD to INF	20.562	0.000*	Accepted	Unidirectional causality
INF to BD	.0443	0.978	Rejected	
BD to INT	41.229	0.000*	Rejected	Unidirectional causality
INT to BD	.88837	0.641	Accepted	
BD to MS	21.341	0.000*	Accepted	Unidirectional causality
MS to BD	1.2322	0.540	Rejected	
CAD to REER	.01713	0.991	Accepted	No-causality
REER to CAD	1.3946	0.498	Accepted	
CAD to INF	4.8845	0.087***	Accepted	Unidirectional causality
INF to CAD	1.0292	0.598	Rejected	

CAD to INT	9.4179	0.009*	Accepted	Unidirectional causality
INT to CAD	.57516	0.750	Rejected	
CAD to MS	10.077	0.006*	Accepted	Bidirectional causality
MS to CAD	7.5888	0.022**	Accepted	

Note**:** "***" "**" "*" indicates significance 10%, 5% and 1% levels.

Table 7.6 lists the outcomes of the Granger causality test. The findings indicate that the BD and the CAD have inverse causality. There is, however, a unidirectional causality from BD to other parallel variables and the CAD to other parameters of the formula, but true successful exchange rate variables are negligible. The unidirectional causality from budget gap to inflation and interest rate may have major negative consequences. The interest rate bubble and higher inflated housing prices are becoming a challenge for the Chinese economy, as they are now nearing the prices of the US bubble before the financial crisis popped it. For example, if the US increases interest rates, the money will flow out of the Chinese market, which could cause a similar crisis in China. It will be a challenge for the monetary authority to bring stability in China where inflation, interest rate bubble and exchange rate volatility are of primary concern. Due to a rise in domestic demand, increasing inflation will dramatically increase capital inflows; this can lead to a current account deficit, as it now accounts for more than half of GDP. Economic indebtedness is at its height, which can crush the financial cycle and start a financial crisis.

Thus, the results of Granger causality give us more evidences in support of the Keynesian proposition for China in the light of above data. The reverse causality was not apparent

because Chinese economy is one of the most integrated economies with higher capital outflows, export-led growth and export promotion due to market liquidity and flexible governmental policies. While the capital inflow determines a tight fiscal policy to avoid overheating of economy (see Castillo and Barco (2008) and Rossini et al. (2008).

7.5.6 Generalized Impulse Response of China

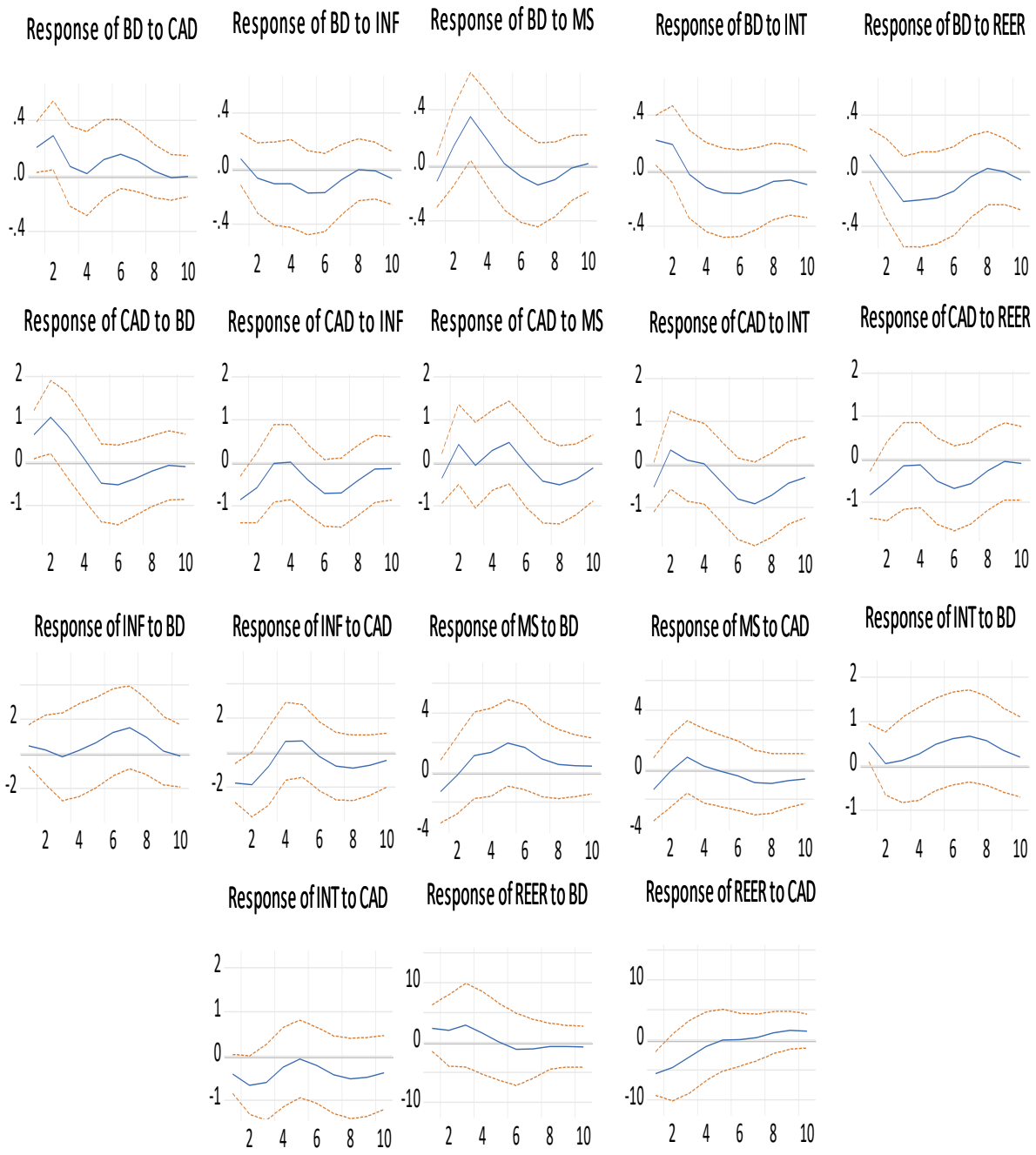
Based, on the Granger causality outcomes, policy makers cannot predict the future policy based on the present results. Secondly, these results can be clarified with sample tests that may give more explanation on the dynamic properties of this relationship Masih and Masih (1995). We apply to generalize response functions (GIR) which investigates the time impacts of a one-time shock to every factor. Koop et al. (1996) propose an alternate sort of impulse function, which are independent of the order of variables and are known as generalized impulse responses (GIR). σ_{jj} is the variance of the jjth variable.

$$\Theta \frac{g}{i} = \emptyset_i \sigma_{jj} - \frac{1}{2} \sum, \qquad (19)$$

Figure 7.4 gives the GIR functions among the variables with regard to the one standard innovation to CAD, BD, INF, INT, REER and MS for the future 10 years.

The results seem more reliable because Chinese economy follows an export-driven growth model by increasing FDI inflows, which may be the reason for positive response of BD to CAD. The positive inflation shock deteriorates both BD and CAD, over the future 10 years. The positive interest rate shock has had a positive effect on both the budget deficit and the current account deficit for the first three years, and has turned negative over the last seven years.

Figure 7.4: Response to Generalized one S.D. Innovation



The adversely effect of interest rate on CAD and BD, implying that it will boast inflow of trade and then appreciation of the real currency, which would inevitably lead to a surplus and have a negative effect on the budgetary deficit as well as development of the Chinese economy.

The positive shock of the effective real exchange rate suggests that both BD and CAD will be negative over the whole duration. The optimistic influence of the money supply on the budget balance over the first four years and the budget deficit over the next six years has deteriorated. In the other side, in cyclical fashion, the money supply has a favorable influence in the first 5 years of the current account deficit and then a negative impact in the last 5 years. Finally, the positive shock of the current-account deficit, inflation, currency and interest rate is negative, which shows CAD is going to be negatively affected by these variables if they are not controlled.

7.6 Conclusions

The dubious opinion on the twin deficit is based on two contending hypotheses: the Keynesian and the Ricardian hypothesis. This chapter examined the linkage between BD and CAD with a concentration on the effect of macroeconomic factors on the two deficits.

The study finds long-term association among the variables. The results find both CAD is and BD are closely associated. Our results indicate that rising money supply and the exchange rate raises the BD and then the CAD. The findings accept the Mundell-Fleming paradigm and to the Keynesian preposition. The influence of the CAD and the exchange rate is deemed exogenous. A long-lasting, stationary association between BD and CAD, interest rates, inflation, money supply and exchange rate has been developed for China. Granger's causal tests demonstrated bidirectional causality between the two deficits and macroeconomic factors to BD and CAD.

The IRF's finding reveals that a favorable interest-rate shock has had a positive influence on the budget deficit. The interest rate, though, has a detrimental effect on the current-account deficit, which implies that an interest-rate rise contributes to capital inflow and an acceleration of the actual exchange rate, which ultimately leads to a CAD and correlates to the Mundell Fleming model. The true solution to the dilemma of BD and CAD resides in a cohesive fiscal and monetary package. It must rely on a steady interest rate; inflation goal and monetary position complement budget cuts.