Comments on the Interim Report

By Leigh Harkness

The Savings Working Group's Interim Report states that one of the objectives of the SWG is to "stimulate public debate".

To participate in that debate, I present the following comments on the Interim Report:

Clear Explanation

The Report acknowledges the problem: "*New Zealand has run current account deficits in every year since 1974*."

It goes on to interpret that to mean: *"This has made us continually reliant on foreign finance, particularly debt, to fund domestic investment."*

The term "domestic investment" can mean different things depending upon whether one interprets it in real or monetary terms. In real terms, investment means the provision of a physical structure such as building and machinery. In monetary terms, it means the injection of money into the economy, such as through an increase in bank credit.

The interpretation of "domestic investment" as meaning monetary investment is confirmed later in the Report when it states that "*the private sector share of the debt is largely brought in through the banks*." It would help clarify any future report if "investment" were more clearly defined.

The report goes on to say that: *"we've spent more money than we have, so we've borrowed the rest from overseas."*

This is a rather circuitous explanation. If money were explained to be a record of our entitlements and obligations, then we could say that "we have created and spent more money than we were entitled to (i.e., saved). Therefore, we have had to borrow money (entitlements) from overseas to make up for the money we spent that exceeded our entitlements". Such wording would give the SWG a better introduction when it comes to determining what is required to manage the money we create and spend.

A clear explanation of the cause of the current account deficit in New Zealand is necessary to justify the proposed policy response. I have attached an appendix that presents a formula for the current account balance. A copy of the spreadsheet used to generate the graphs with the formulas is available at: http://www.buoyanteconomies.com/CAD%20Formula.xls .

Engagement of the Reserve Bank of New Zealand

The qualification relating to the "debt largely brought in through the banks" that was "subject to their prudential requirements and hedged to the New Zealand dollar", appears to be a defensive comment from the Reserve Bank. The fact that the current account deficit and foreign debt is largely an outcome of monetary policy highlights the importance of the Reserve Bank and monetary policy.

The Reserve Bank needs to be committed to clearly explaining the problem and be engaged in determining an effective solution in the New Zealand banking context. There is a natural temptation to justify past action. However, if the Bank is to act professionally, it must look forward to a time when, as a result of its policies, the current account is in surplus, foreign debt is declining, employment is rising and inflation is low.

The country recognizes the significance of the problem of foreign debt. Now is the time for the Reserve Bank to take the lead in reducing the debt and restoring prosperity to the economy. Solving the current account deficit problem is an opportunity for the Reserve Bank, not a threat.

Similarly, to attribute the current account deficit to the fiscal deficit, or to saving in the household sector, undersells the importance of monetary policy.

The Right Vision

The Interim Report interprets the options as "akin to a choice between taking an unpleasant but effective medicine now, or rejecting the medicine and taking the risk of a life-threatening surgery in the future." It goes on to suggest scapegoats: "the adverse consequences of inappropriate and poorly managed policies, including policies more oriented to short-term political gains than long-term national interest." This type of broad unsubstantiated comment should be removed from the final report. It clouds the issue and reflects political motives, playing the man rather than the ball.

It is necessary to build a team that will guide New Zealand through the next stage of clearly diagnosing the cause of the New Zealand's current account deficit problems, prescribing an appropriate remedy and then implementing it.

New Zealand's problem is akin to a choice between continuing to bash its head against a brick wall, or stopping and going on with life. The economy is not a god to which we must make sacrifices before it will bring prosperity to the land.

When economic policy is set correctly, the economy will prosper. An appropriate policy will see government revenue increase, and that will eliminate the fiscal deficit. An appropriate policy will see people prospering and saving by repaying their debts.

The people of New Zealand have not caused the economic problems they now have. Those problems are shared by other countries that have implemented similar economic policies. The people have been the victim of inappropriate economic policies. If anyone is to be punished, it is not the people.

The road to prosperity is via hard work and increased productivity. That will come when the money flows to businesses and people in a manner that is sustainable. It is not via suffering and poverty.

Use of Economic Models

The SWG should be cautious when using economic models. Solutions applied in the past may have appeared effective in the models but have not been effective in reality. These models are incomplete, misguided, or otherwise flawed. The policies that may be effective in reality are unlikely to be shown to be effective in these models.

The SWG may be interested in a model that illustrates the effect on the economy of opening the economy to national savings in a manner similar to that explained in my earlier submission. Both options available provide for variable exchange rates. They differ only in that one is closed to international currency flows (the floating exchange rate system) and the other is open and allows international transaction to affect the money supply and the exchange rate to move to achieve full employment. It is available at: http://www.buoyanteconomies.com/MacroModel.htm .

Targeted Response

In the Interim Report, the SWG appears to be considering a "shot gun" approach to dealing with the current account deficit: it proposes to implement a raft of policies and hopes that one might be effective. Such an approach would be tantamount to admitting that the SWG has no clear picture of what the country needs to do to save and bring about current account surpluses.

Although the terms of reference do not require it, the policy recommendation should take a more surgical approach and target what the SWG believes is the primary cause of New Zealand's current account deficit. If it is correct, the policy will be effective and New Zealand will prosper. If it is wrong, the policy will be ineffective and the government and SWG would be wiser and know that they need to look elsewhere.

Conclusion

The recent current account surplus (based on seasonally adjusted data) indicates that a fiscal surplus is not necessary to have a current account surplus. The surplus was attained through the growth of national saving when loan repayments exceeded bank credit and total bank credit declined.

It is possible to continue that approach of raising national savings. However, it would lead to perpetual recessions: an outcome that indicates the failure of economic policy rather than success.

We now know that fiscal policy and superannuation savings policy are both ineffective at controlling the current account deficit. The SWG appears to share that view and in its Interim Report concludes that it is still considering other serious problems and policy choices.

I look forward to the final report.

Leigh Harkness

Formula for the Current Account Balance

Introduction

This paper presents models that explain how growth in the quantity of money determines the current account balance. Money should constrain an economy's expenditure to its income. If the only source of money were from income, then a country could not buy more than it produced; it would generally have a surplus or balanced current account. Current account deficits are caused when additional money is created which finances national expenditure in excess of national income (production).

Considered are three sources of additional money:

- additional money that arises from national savings when foreign income (e.g., from exports) is greater than expenditure on foreign goods and services (e.g., on imports);
- additional money from the growth of bank lending; and
- additional money from net foreign capital inflow.

Also considered are three means of reducing the quantity of money:

- reduced money when expenditure on foreign goods and services is greater than foreign income;
- reduced money when loans are repaid to banks; and
- reduced money when there is a net international capital outflow.

It models the effect of these sources of money for countries with fixed exchange rates (Figures 1-7) and those with floating exchange rates (Figures 7-13). Finally, there is a model of an integrated monetary and exchange rate system that manages the current account balance (Figure 14).

An Analogy - Cause and effect

To understand what causes current account deficits, consider the following simple analogy. If an airline has an aircraft with 100 seats and sells 150 tickets for a flight, how many seats will it be short by? Obviously50. It is the same with the economy. Current account deficits occur when there are more tickets (money) issued than there are goods.

To solve the seating problem, should the airline buy a bigger plane? If it buys a 150 seat aircraft and now sells 250 seats for a flight, has the

problem been solved? Of course not. The deficiency has increased to 100 seats.

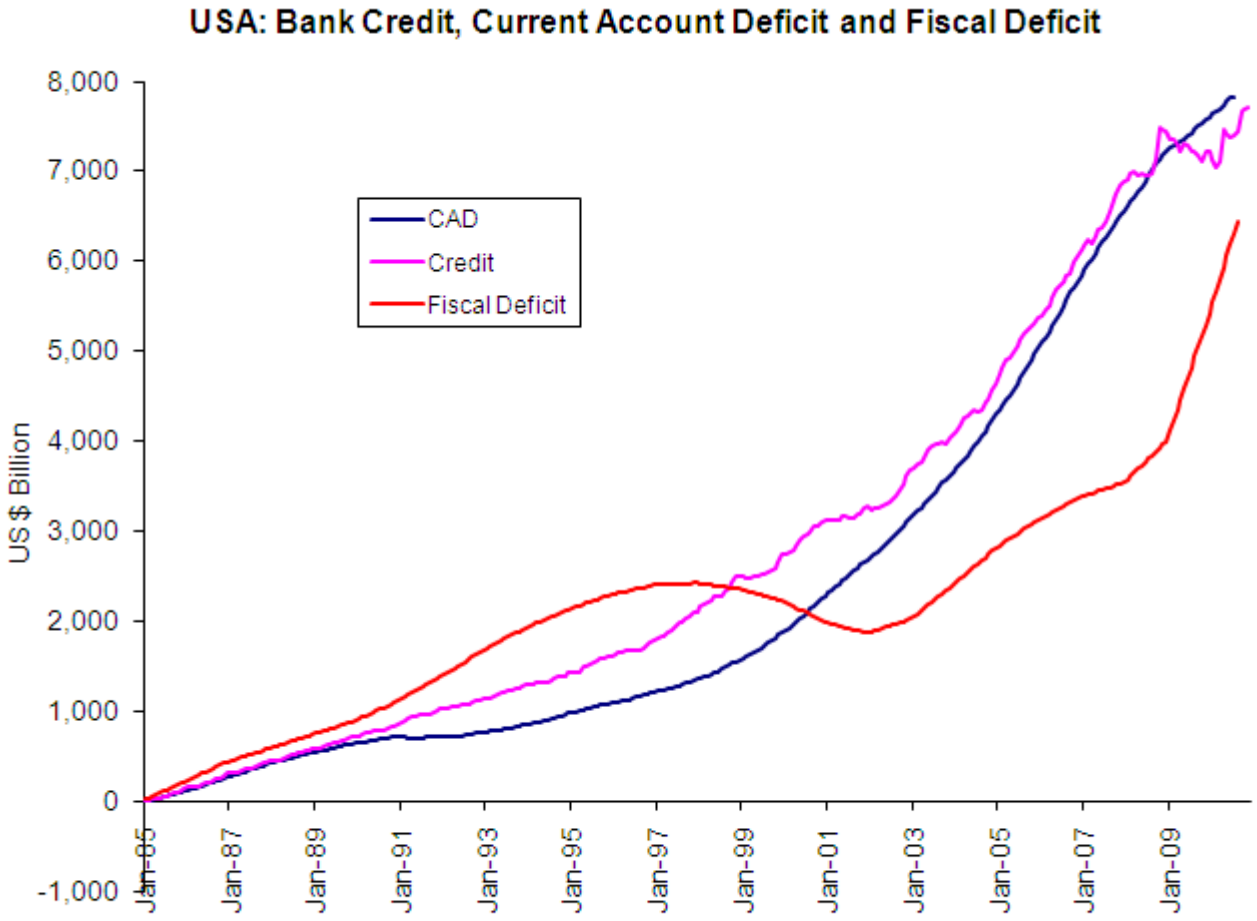
The solution for the airline is to link the availability of tickets to the availability of seats. Likewise, the solution for an economy is to link the creation of additional money (which represents current entitlements to goods and services) to the availability of additional current obligations to supply goods and services (national savings).

There is not a commonly accepted theory for the cause of a current account deficit. Many economists believe that people and businesses choose to have current account deficit. That is, they want to borrow more money now and so are prepared to build up foreign debt which they will repay in the future. These economists believe that financial institutions, pursuing their own interests, will achieve optimal outcomes for the economy. While the Global Financial Crisis may have revealed that some regulation may be necessary to avoid abuse by delinquent financial institutions, most of these economists continue to cling to their faith in the current financial system.

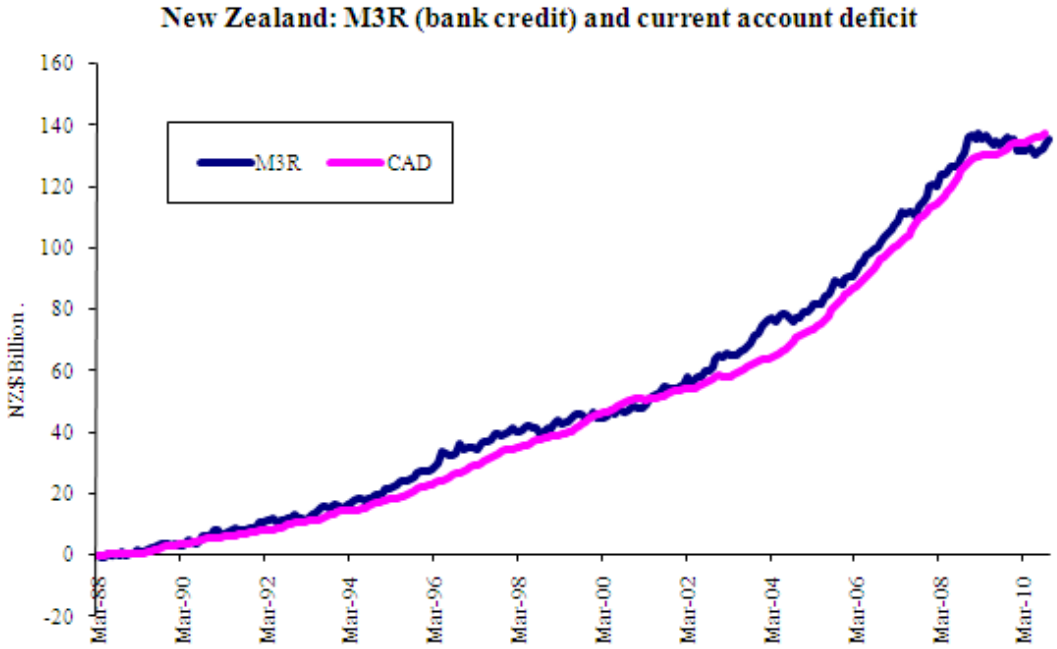
This paper explains that the current account balance depends upon the rules that govern the monetary system, particularly the growth of bank credit. People have the option of borrowing and repaying their own debts. But the country as a whole has no option but to go deeper and deeper into debt. It is a consequence of their monetary system.

That link is clearly evident in the following chart of the growth of bank credit and the current account deficit in the United States of America.

The amount of bank credit has been calculated from official US statistics.



A similar chart is available for New Zealand.



This graph clearly shows that the amount by which New Zealanders have bought more than they have produced is equal to the amount of additional money created from domestic sources. The Reserve Bank of New Zealand identifies this excessive amount of additional money in its monetary statistics and calls it M3R money.

The same relationship between the current account deficit and domestic sources of money can be found in other countries such as Australia and the Philippines. As for the USA, the central banks of these countries have not specifically identified money from domestic sources but that money can be extrapolated from the available statistics.

When we spend the money that we have earned, it does not cause us to buy more than we have produced. Such spending does not lead to current account deficits. The money we earn is like a receipt from the economy for supplying products and that money entitles us to buy products from the economy up to the value of what we have produced. This system ensures that those with money have something to buy. To use our airline analogy, it ensures that those who have tickets have a seat.

To start identifying a formula for the current account deficit, we will start with sources of money that do not cause current account deficits. But first, we need to clarify what we mean by the quantity of money.

The Quantity of Money

Economists tend to talk of the quantity of money in terms of "the supply of" and "the demand for" money. However, the amount of money in the

economy is relatively simple to explain. Regardless of whether it is supplied or demanded, there is a certain quantity of money in the economy and that is the money that we will deal with. It consists of bank deposits (excluding saving bank deposits), other negotiable bank instruments (including bills of exchange) and currency (notes and coins). We are not concerned about whether the money was supplied or demanded. It is the money that exists that we will consider.

Money from foreign reserves

To start building a formula for the current account deficit, let us assume that an economy has a fixed exchange rate and it's only source of money is from the growth of foreign reserves. These foreign reserves accrue when the money earned from exports and other foreign receipts is greater than the money spent on imports and other payments to foreign entities. That is:

$$R_t = R_{t-1} + X_{t-1} - M_{t-1} \qquad (1)$$

Where:

R_t is the level of foreign reserves at time "t";

R_{t-1} is the previous level of foreign reserves or the foreign reserves at time "t-1";

X_{t-1} are exports in time "t-1"; and

M_{t-1} are imports in time "t-1"

The foreign reserves are assets of the banking system. Money is on the liabilities side of the banks' balance sheets. When banks buy foreign currency from exporters, they give them domestic currency in exchange. Both currency and bank deposits are liabilities of the banking system.

As far as people in the economy are concerned, they earn money either from selling products to the domestic market or selling products overseas as exports. Therefore, the quantity of money in the economy that they have to spend can be given by:

$$L_t = N_{t-1} + X_{t-1} \qquad (2)$$

Where:

L_t is the quantity of money in the economy at time "t" available to be spent;

N_{t-1} is income from the sale of products to the domestic economy in time "t-1".

To simplify the model, we will assume that "t" is the time taken to earn the amount of money L_t. In that way, we can treat L_t not only as a stock of money but as the flow of money earned from domestic sales and from exports. Therefore, we can say that:

$$Y_t = N_t + X_t \qquad (3)$$

Where:

Y_t is the income earned in time "t".

We will assume that people spend their income or money on either domestic products or imports. That is:

$$L_t = N_t + M_t \qquad (4)$$

The quantity of money and income will continue to grow while exports are greater than imports.

Let us assume that spending on imports is a proportion of total spending such that:

$$M_t = mL_t \qquad (5)$$

Where:

"m" is the proportion of total available money spent on imports or the marginal propensity to import.

By substituting equation (2) $(L_t = N_{t-1} + X_{t-1})$ into equation (5) and the result into equation (4), we can conclude that:

$$L_t = N_t + m(N_{t-1} + X_{t-1}) \qquad (6)$$

Figure 1 below diagrammatically represents this formula. It assumes that exports are \$5 B and the value of "m", the marginal propensity to import, is 0.25 or 25%. In the first period, there is no money to spend so nothing is spent on imports or domestic products. In the second period, there is only the \$5 B earned from exports to spend. Of this, \$1.25 B is spent on imports and \$3.75 B on domestic products. In the third period, there is \$8.75 B (5+3.75) to spend.

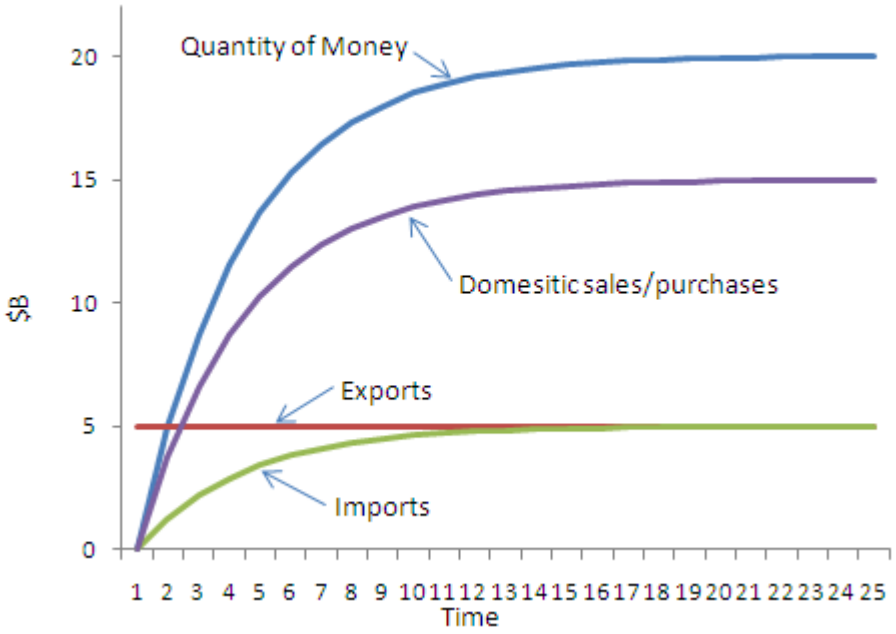


Figure 1: Foreign source of money

The quantity of money continues to grow, but more slowly, until it approaches $20 B. When the quantity of money reaches $20 B, imports would be $5 B and equal to exports. At this point, the quantity of money cannot increase any further. It is said to be at equilibrium. This equilibrium quantity of money can be defined as:

$$L^* = X/m \qquad (7)$$

Where L^* is the equilibrium quantity of money.

The quantity of money at a time "t" is defined as the income from domestic sales and foreign sources. If the quantity of money is in equilibrium, then income is also at equilibrium. In other words, the economy grows while it is in disequilibrium. When the economy is at equilibrium, it stops growing.

Note that the current account has been in surplus or balanced throughout this example. If the only source of money is from the growth of foreign reserves generated by exports, the current account will be balanced or in surplus.

In this example, all additional money is created through national savings. Also, the growth in the quantity of money in any period is equal to the current account balance.

It was not necessary for any individual to defer spending for the nation to accumulate national savings. National savings occurred because the

nation deferred spending on imports and spent that money on domestic products instead.

Money from bank credit

Money can also be created through the growth of bank credit. The growth in bank credit is equal to new loans less loan repayments. If we assume that bank credit is the only source of new money and there is no international trade, then we can say that the quantity of money in the economy can be given by:

$$L_t = N_{t-1} + C_{rt} - A_t \qquad (8)$$

Where:

C_{rt} is the amount of new bank lending in time "t";

A_t is the loan repayment in time "t".

As all money here is created by bank credit, all money is equivalent to the outstanding loans. We will assume that loan repayments in each period are a proportion of outstanding debt, such that:

$$A_t = aL_{t-1} \qquad (9)$$

Where:

a is the proportion of outstanding debt repaid in a period. It is the inverse of the average term of outstanding loans.

Substituting equation (9) into equation (8) we can conclude that:

$$L_t = N_t = N_{t-1} + C_{rt} - aL_{t-1} \qquad (10)$$

This formula defines the quantity of money in time "t" as equal to the money earned from selling products in the domestic economy, plus new bank loans less loan repayments. This domestic source of money is represented in Figure 2. In this example, loans are assumed to be \$5 B per period (C_{rt} = \$5 B) and loan repayments in each period are 25% of the outstanding balance at the end of the previous period (a= 0.25).

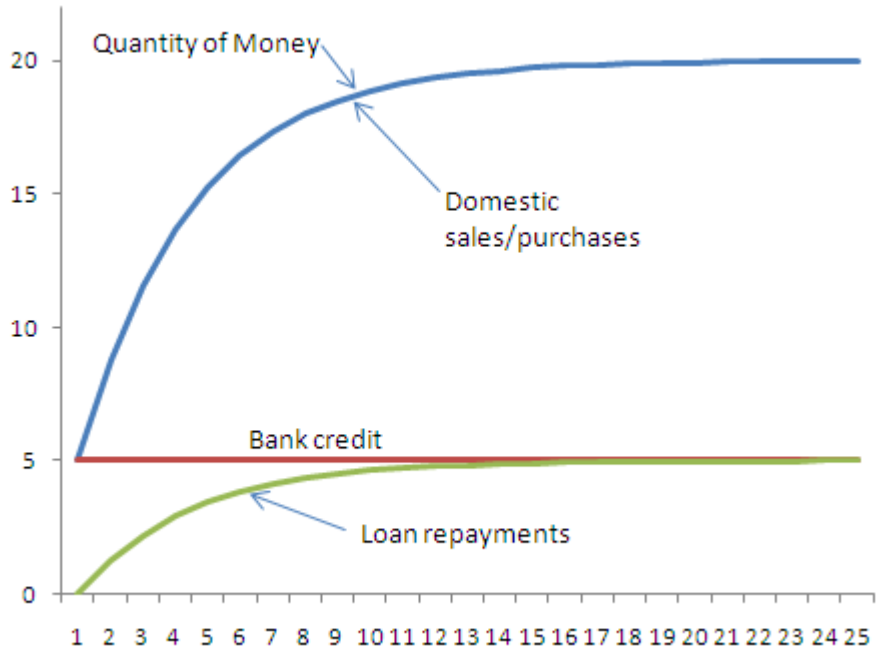


Figure 2: Domestic source of money

In this example, the equilibrium quantity of money is $20 B. That is, total lending will be stable when loan repayments equal new lending. That occurs when the quantity of bank debt, or money, is $20 B. The equilibrium quantity of money from domestic sources (bank credit) is given by the following equation:

$$L^* = C_r/a \qquad (11)$$

This model is a purely theoretical one of an economy with money. It does not consider the effect of international trade. Hence, there is no current account balance. Even so, the equilibrium quantity of money from domestic sources is useful concept in explaining the cause of the current account balance.

Money from foreign and domestic sources

In a country with both foreign and domestic sources of money the total quantity of money is the sum of both sources. That is:

$$L_t = L_{ft} + L_{ct} \qquad (12)$$

Where:

L_{ft} is the quantity of money from foreign sources and from equation (2) $[L_t = N_{t-1} + X_{t-1}]$ may be written as:

$$L_{ft} = N_{t-1} + X_{t-1} \quad (13)$$

L_{ct} is the quantity of money from domestic sources and from equation (10) may be written as:

$$L_{ct} = N_{t-1} + C_{rt} - aL_{ct-1} \quad (14)$$

The following equation combines the two sources of money given by equations (13) and (14). We can retain a single variable (N_{t-1}) for the domestic production for the domestic economy in period t-1:

$$L_t = N_{t-1} + C_{rt} - aL_{ct-1} + X_{t-1} \quad (15)$$

This equation for the money to be spent is spent on domestic products and imports as in equation (4) $[L_t = N_t + M_t]$. As in equation (6) $[L_t = N_t + m(N_{t-1} + X_{t-1})]$ we apply the marginal propensity to import "m" to the money created from all sources. The loan repayments factor relate only to domestic debt, the domestic source of money.

This model is presented in Figure 3. Exports are assumed to be \$5 B and the marginal propensity to import "m" is 25% of the money spent. Bank credit "C_{rt}" is assumed to be \$5 B also, and the rate of loan repayments "a" is 25% of domestic loans outstanding with the banks.

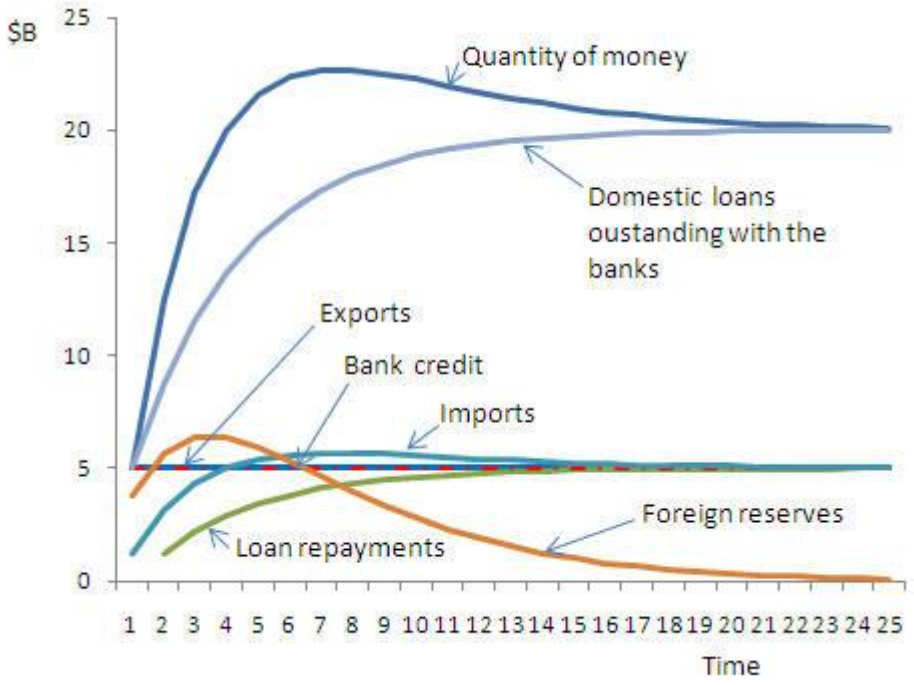


Figure 3: Interaction of Foreign and Domestic sources of money

Although the two sources of money are combined in this model, the equilibrium quantity of money remains at \$20 B. The current account

balance can be traced by following the difference between imports and exports and the slope of the foreign reserves curve. Initially, the current account is in surplus with exports exceeding exports. After period 4 there is a current account deficit with imports exceeding exports. From period 8, imports start to decline and approach the level of exports. In equilibrium, imports equal exports, the current account is balanced and foreign reserves are zero.

The zero balance in the level of foreign reserves in this special example is a key to understanding the cause of the current account deficit. We saw in Figure 1 that the equilibrium level of money from foreign sources was $20 B and this created foreign reserves of an equivalent amount. That money was created because the economy saved. It sold more than it purchased because it exported more than it imported. If we use our initial analogy of the airline, these reserves are the spare seats. They represent a foreign obligation to provide products (seats) to the domestic economy.

The money created by bank credit does not come from saving. It comes from lending. As was explained above, the money people earn from selling goods and services enables them to buy the equivalent of what they have produced. If additional money is created, it enables the economy to buy more than it has produced. In our analogy of the airline, bank credit issues additional tickets.

Balancing the current account requires the balancing of the foreign and domestic sources of money. That does not mean that we need equal quantities of money from the two sources. In the Figure 3 example, the net quantity of money created from foreign reserves was zero and there was $20 B created from bank credit. The element that must be balanced is the equilibrium level of money from foreign reserves relative to the equilibrium level of money from domestic sources. From equations (7) $[L^* = X/m]$ and (11) $[L^* = C_r/a]$, this can be put as:

$$CAB = X/m - C_r/a \qquad (16)$$

Where "CAB" means the current account balance and relates to the long term balance.

In the Figure 3 example, the equilibrium quantity of money from foreign trade was $20 B and the equilibrium quantity of money from domestic sources was also $20 B. As a result the current account was balanced in equilibrium.

Current account deficit and money

If we assume that the equilibrium quantity of money from domestic credit is greater than the equilibrium quantity of money from foreign sources

the outcome will be a net current account deficit in the long term. Figure 4 assumes that the rate of loan repayment has reduced from 25% per period to 12.5%. This is equivalent to increasing the average term of bank loans from 4 periods to 8 periods.

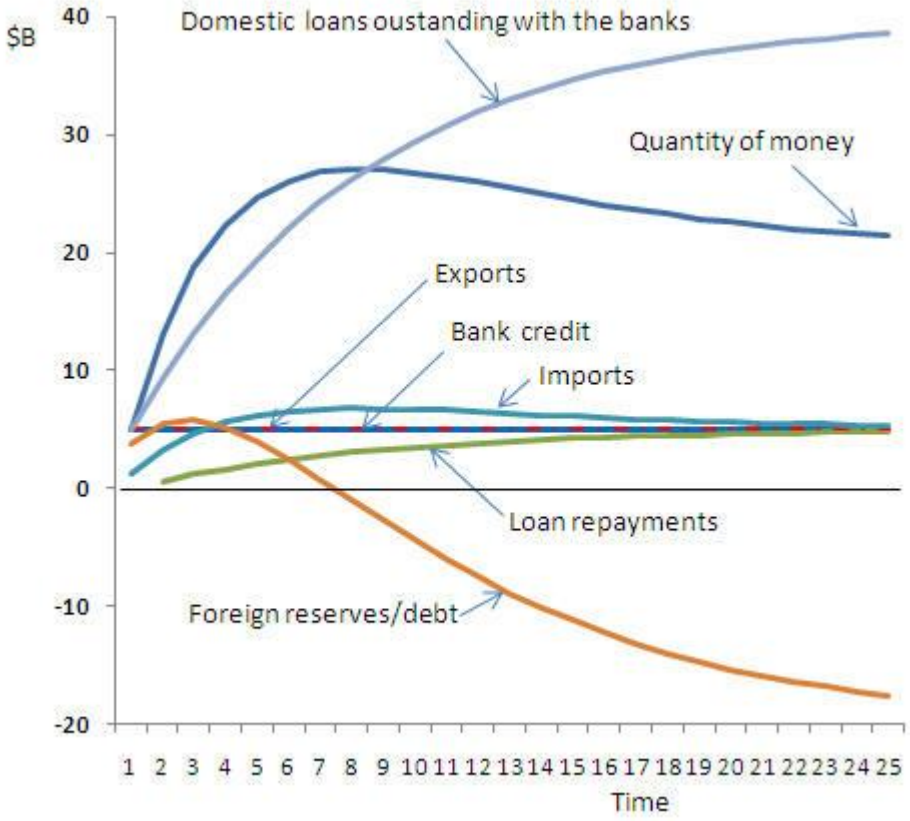


Figure 4: Current account deficit

In the Figure 4 example, the economy has a current account surplus for the first 3 periods after which the current account balance turns to a deficit. When the economy reaches equilibrium, the current account is balanced but there is an accumulated foreign debt of $20 B.

Applying the formula for the current account balance, the equilibrium quantity of money from foreign sources would have been $20 B (5/0.25). The equilibrium quantity of money from domestic sources would have been $40 B (5/0.125). While the current account has stabilized, at the end of the time series the current account balance is a deficit of $20 B.

Some of the features of this economy is that the growth of bank credit is greater than the income of the economy. Also, it is evident that the amount by which the growth of bank loans exceeds the quantity of money is equal to the level of foreign debt.

Current account surplus and money

In the following example, we will assume that the equilibrium quantity of money from bank credit is less than the equilibrium quantity of money from foreign sources. To do so, we will assume that the rate of loan repayment is 0.4, equivalent to a term of two and a half periods for the average loan. All the other variables remain as they were. Applying equation (16) [$CAB = X/m - C_r/a$] we can determine that the equilibrium quantity of money from domestic sources would be $12.5 B while the equilibrium quantity of money from foreign reserves remains at $20 B. Therefore, the long term current account surplus would be $7.5 B. This is evident in Figure 5 below.

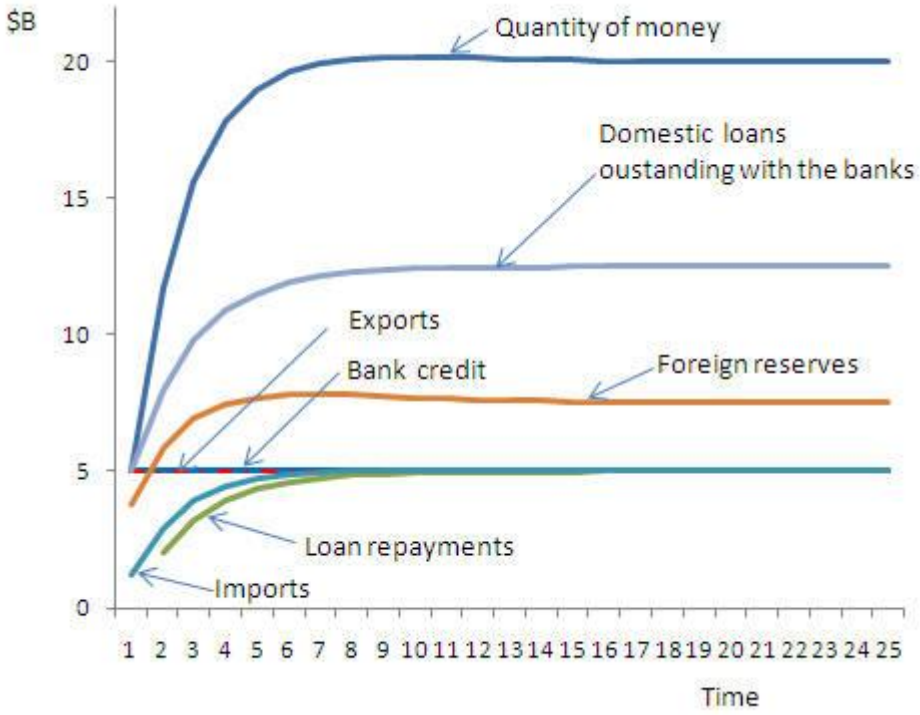


Figure 5: Current account surplus

The example presented in Figure 5 differs from Figure 4 in that the growth of domestic loans outstanding with the banks is now less than the growth in the total quantity of money. Foreign reserves have contributed to the quantity of money.

The rate of repayment of bank loans is particularly significant to the equilibrium level of money from bank credit. The longer the term of the loans, the more likely it is that the equilibrium quantity of money from bank credit is greater than the equilibrium quantity of money from foreign reserves.

This relationship suggests that a country with a current account deficit should aim to reduce the term of bank loans. Commercial or trading bank credit should not be used for long term loans such as home mortgages. Other forms of finance should be used for such loans (e.g., savings bank loans, superannuation funds, etc).

Current account balance and capital flows

International capital flows also have an effect on the quantity of money in an economy with fixed exchange rates. We can include capital inflow to equation (15) such that:

$$L_t = N_{t-1} + C_{rt} - aL_{ct-1} + X_{t-1} + K_{t-1} \qquad (17)$$

Where:

K_{t-1} is the net foreign capital inflow in the previous period.

Foreign capital inflow adds the quantity of money in much the same way as increased exports. The equilibrium quantity of money can be put as:

$$L^* = (X + K)/m \qquad (18)$$

However, capital flows are not income. They represent an increase in foreign debt or an increase in foreign equity in the economy. If we were to consider only the balance of payments, that is the level of foreign reserves, they could be but put as:

$$R_t = R_{t-1} + X_{t-1} + K_{t-1} - M_{t-1} \qquad (19)$$

Drawing on equation (16) [$CAB = X/m - C_r/a$], the equilibrium level of foreign reserves can be put as:

$$R^* = (X + K)/m - C_r/a \qquad (20)$$

While foreign reserves can move to a stable equilibrium, there can not be a stable equilibrium for the current account balance unless there is a mechanism to turn it off or reverse it. This is evident in Figure 6 below which uses the same assumptions used in Figure 3 but with the inclusion of foreign capital inflow of $1 B in each period.

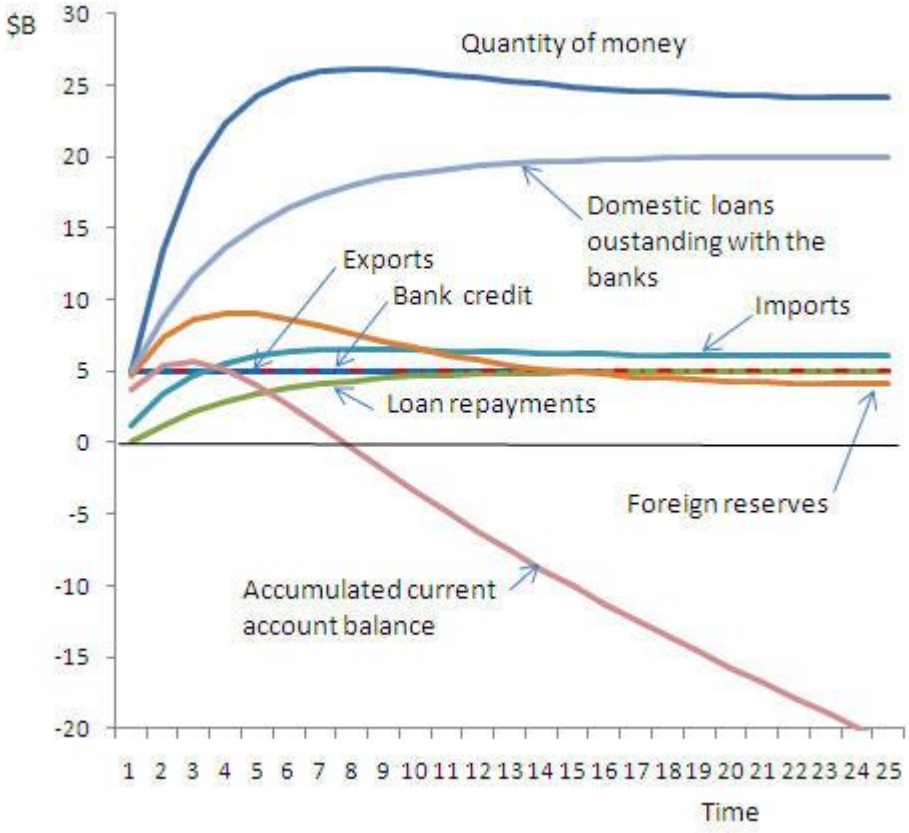


Figure 6: Net capital inflow and the current account balance

Relative to the example in Figure 3, the capital inflow has increased the equilibrium quantity of money by $4 B to $24 B. Also, the equilibrium level of foreign reserves has increased from zero to $4 B, consistent with equation (20). However, the economy experiences a perpetual current account deficit. So the current account balance formula (16) [$CAB = X/m - C_r/a$] can be modified be subtracting the accumulated capital inflow such that:

$$CAB = X/m - C_r/a - sK \qquad (21)$$

Where sK is the sum of foreign capital inflows over the relevant period.

Essentially, the equation is saying that the current account balance is equal to national savings less the growth in bank credit and less international borrowing.

The same approach can be applied to assess the impact on an economy of net capital outflow. In Figure 7 the value of capital (K) which was +1 in Figure 6 is changed to -1, representing a net capital outflow. This lowers the equilibrium quantity of money from $20 B to $16 B, consistent with equation (18).

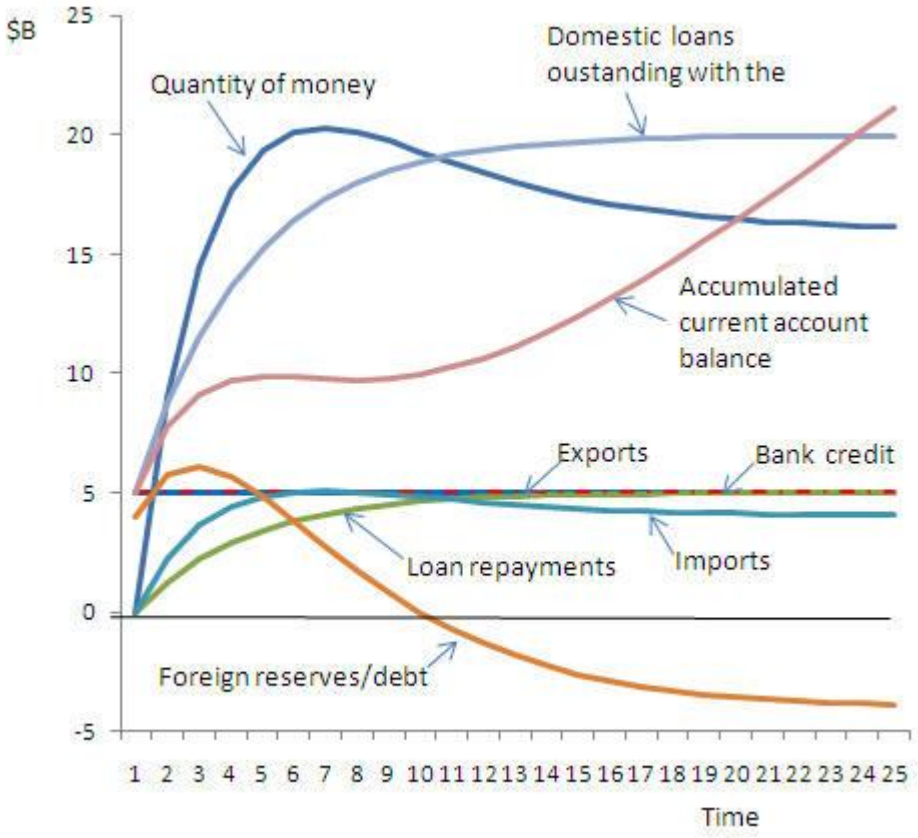


Figure 7: Net capital outflow and the current account balance

Consistent with equation (20) $[R^* = (X + K)/m - C_r/a]$ official foreign reserves have fallen below zero to stabilize at a foreign debt of $4 B. Following the decline in the quantity of money available to spend, the equilibrium level of imports has fallen from $5 B to $4 B. The economy experiences current account surpluses which stabilize at $1 B per period. The accumulated current account surplus continues to rise while the capital outflow continues.

The current account balance with floating exchange rates

The analysis above reveals the significance of financial deregulation on countries with fixed exchange rates. That is, increasing total bank lending lowers any current account surplus, raises any current account deficits and could turn an economy with a current account surplus into one with a current account deficit.

It also suggests that devaluing a currency would help to reduce a current account deficit if it reduces the value of "m", the marginal propensity to import. Countries have moved to the floating exchange rate system expecting that the exchange rate would move to balance the current account.

However, the floating the exchange rate system has not eliminated the current account deficit. Rather, the relationship between the current account and bank credit has become even more evident as can be observed in the relationship between bank credit and the accumulated current account deficit for Australia, New Zealand, the Philippines and the USA.

The following analysis initially considers some of the popular myths about the floating exchange rate. It then proposes an explanation that is consistent with the statistics on the relationship between the current account and the growth of bank credit. Finally it presents a variation to the floating exchange rate system that provides opportunities to balance the current account while maintaining market determined exchange rates.

Floating exchange rate achieves external balance hypothesis

Some proponents of the floating exchange rate system believe that the exchange rate should adjust to bring about a balance between the foreign receipts and payments. To assess that hypothesis, let us assume that the exchange rate does adjust to balance imports and exports. To start with we will assume that there are no capital inflows. We will assume the same economy presented in Figure 3 above but with floating exchange rates.

In that case, exports would be given by:

$$X_t = X/e_t \qquad (22)$$

Where:

e_t is the exchange rate at time "t"; and

X is the value of exports in terms of foreign currency, which is assumed to be constant.

This means that if the exchange rate appreciates, the value of exports will fall in terms of domestic currency. If the currency depreciates, the value of exports will rise in terms of domestic currency.

We will assume that imports are given by:

$$M_t = e_t mL_t \qquad (23)$$

That is, the higher the exchange rate, the greater the imports.

Without capital flows, under the floating exchange rate system, imports would equal exports. That is:

$$M_t = X_t \qquad (24)$$

Substitution equations (22) and (23) into equation (24) means that:

$$e_t m L_t = X/e_t \qquad (25)$$

Which can be rewritten:

$$e_t^2 = X/mL_t$$

$$e_t = \sqrt{(X/mL_t)} \qquad (26)$$

Substituting equations (22) into equation (15) $[L_t = N_{t-1} + C_{rt} - aL_{ct-1} + X_{t-1}]$ provides the equation for the quantity of money earned in the economy.

$$L_t = N_{t-1} + C_{rt} - aL_{ct-1} + X/e_{t-1} \qquad (27)$$

This money is spent on domestic products and imports. As in earlier models, imports increase with the quantity of money. But this time the exchange rate depreciates over time to adjust exports up and imports down so that they remain equal. The outcome is modelled and presented in Figure 8 using the exchange rate presented in equation (26).

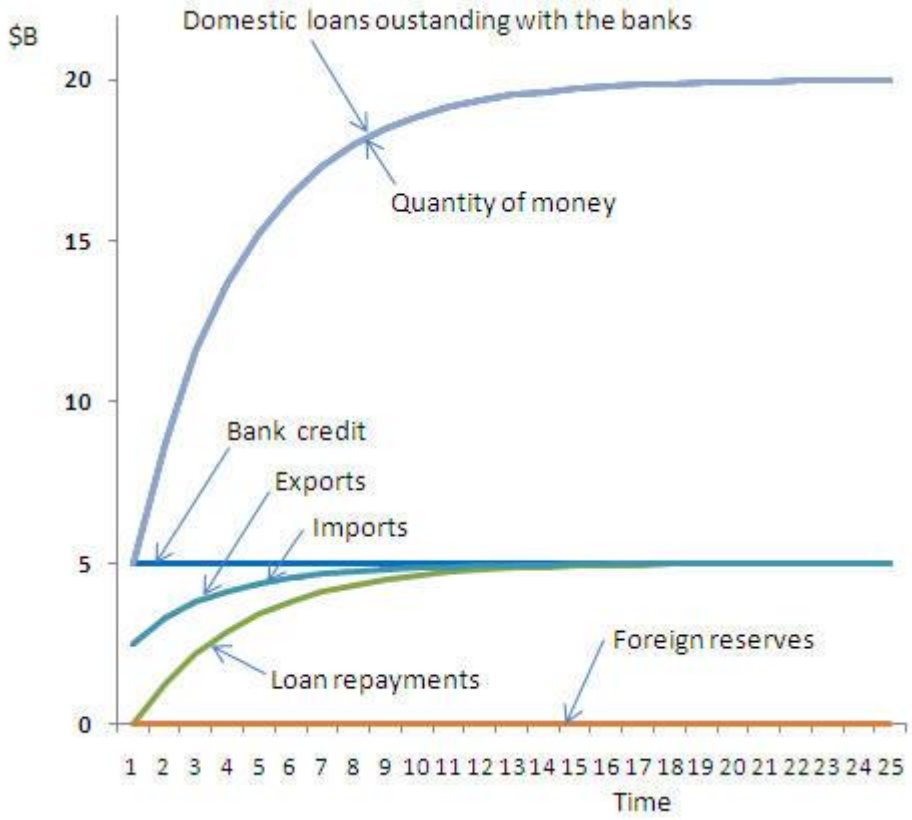


Figure 8: Credit growth with floating exchange rates

In this model, there is always external balance so there is no injection of money from exports or leakage of currency to imports. As in Figure 3, the quantity of money grows to $20 B, following the introduction of bank credit of $5 B per period and repayments equal to 25% of loans outstanding. All money is created from bank credit so that the quantity of money is equal to the domestic loans outstanding with the banks.

This outcome is similar to the equilibrium outcome in Figure 3. Yet while it is theoretically possible, there is no sustained period of time in the data for Australia, New Zealand, the USA and the Philippines where there is evidence of such an outcome. Therefore, the exchange rate is not having the effect that is being modelled. The floating exchange rate system is not bringing about external (international) balance in these countries.

Floating exchange rates and the capital inflow hypothesis

The other common explanation for the current account deficit is that it is caused by foreign capital inflows.

Let us continue with the floating exchange rate model used to derive Figure (8) but assume that foreign investors wish to invest $1 B of foreign currency, as was assumed in Figure (6) with fixed exchange rates.

In that case, foreign currency receipts would be made up of exports and foreign capital given by:

$$X_t + K_t = (X+K)/e_t \qquad (28)$$

Where "K" is the value of foreign capital inflow in term of foreign currency, which is assumed to be constant.

Under the floating exchange rate system imports must equal exports plus foreign capital inflow. That is:

$$M_t = X_t + K_t \qquad (29)$$

Substituting equations (22) and (28) into equation (29) defines the equilibrium situation of imports equalling exports and foreign capital with the exchange rate adjusting to bring about balance.

$$e_t mL_t = (X+K)/e_t \qquad (30)$$

Solving this equation for "e" determines the exchange rate to achieve this outcome that outcome to be:

$$e_t^2 = (X+K)/mL_t$$

$$e_t = \sqrt{((X+K)/mL_t)} \qquad (31)$$

Substituting equation (28) into equation (17)[$L_t = N_{t-1} + C_{rt} - aL_{ct-1} + X_{t-1} + K_{t-1}$] provides the equation for the money income of the economy.

$$L_t = N_{t-1} + C_{rt} - aL_{ct-1} + X/e_{t-1} + K/e_{t-1} \qquad (32)$$

Again, the money earned is spent on domestic products and imports. Using the exchange rate presented in equation (31), the monetary income shown in equation (32) and the assuming a capital inflow of $1 B, the modelled outcome is presented in Figure 9.

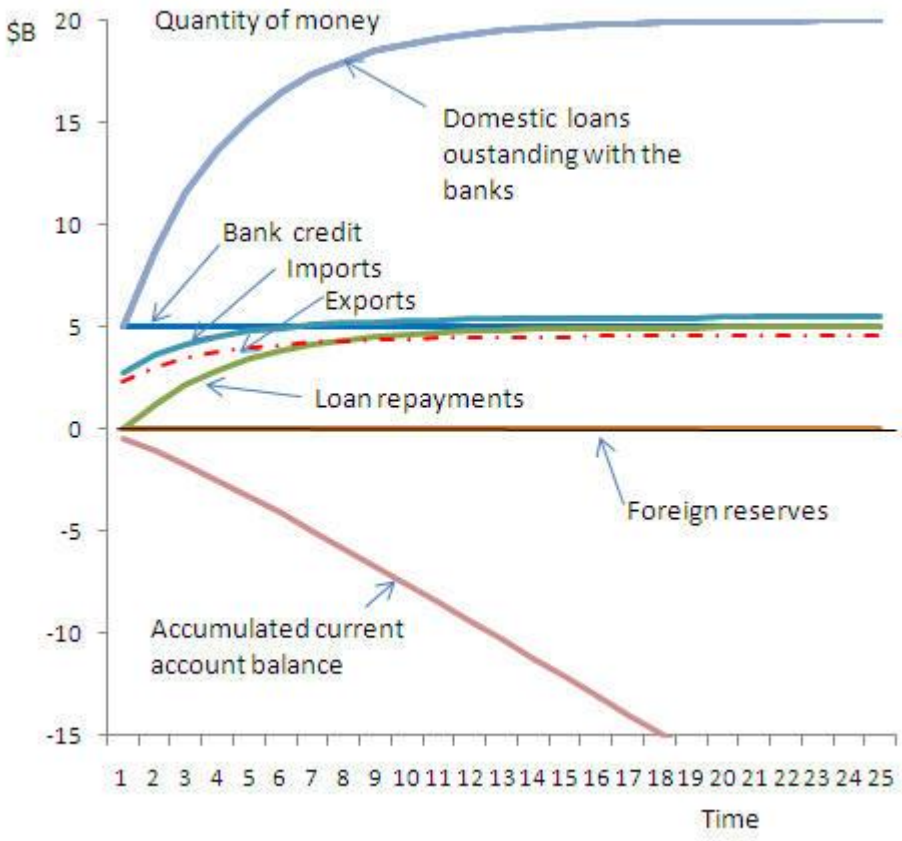


Figure 9: Capital inflow generating current account deficits

The current account deficit is the amount by which imports exceed exports and it is accumulated each period as the "Accumulated current account deficit" line. This is equal, also, to the accumulated capital inflow which is an indicator of the level of foreign debt and equity accumulated. It is clearly evident that Figure 9 and the associated theory and model does not reflect nor explain the relationship between the current account deficit and bank credit that is evident in the data for Australia, New Zealand, the USA and the Philippines.

In all four countries, the current account deficit is generally equal to the growth of bank credit. Although the exchange rate has varied in each of these countries over the period shown, those variations have not affected the basic relationship.

The demand and supply constraint hypothesis

The quantity of money can be defined in just the same way under the floating exchange rate system as under the fixed exchange rate system. That is equation (17) still holds under the floating exchange rate system. That is:

$$L_t = N_{t-1} + C_{rt} - aL_{ct-1} + X_{t-1} - mL_{t-1} + K_{t-1} \qquad (17)$$

The major change under the floating exchange rate system is the requirement that international payments and receipts must be equal. That is:

$$M_t = X_t + K_t \qquad (29)$$

It is evident from the statistics for countries with floating exchange rates such as Australia, New Zealand, the USA and the Philippines that the current account deficit is equal to the growth of money from bank credit (bank loans less loan repayments). That is:

$$M_t - X_t = dC_{rt} \qquad (33)$$

Where dC_{rt} is the growth in bank credit in a period and is equal to bank credit in a period less loan repayments (of principal) in that period which is given by:

$$dC_{rt} = C_{rt} - aL_{ct-1} \qquad (34)$$

The reason why the current account deficit should equal the growth in bank credit is not so clearly evident. However, in equation (3) we defined income in a period "t" as:

$$Y_t = N_t + X_t \qquad (3)$$

The only way an economy with a floating exchange rate (without additional money from foreign sources) can spend more than it earns is by creating additional money from bank credit. Therefore we can say that total money available to be spent is equal to income plus the growth in bank credit:

$$L_t = Y_t + dC_{rt} \qquad (35)$$

If we substitute equation (3) into equation (35) we can say that the money we have to spend is equal to exports plus bank credit:

$$L_t = N_t + X_t + dC_{rt} \qquad (36)$$

We assumed earlier in equation (4) that we spend our money on domestic products and imports:

$$L_t = N_t + M_t \qquad (4)$$

Therefore, substituting equation (36) into equation (4) we can say that:

$$N_t + X_t + dC_{rt} = N_t + M_t \qquad (37)$$

This is the demand and supply constraint hypothesis. The left hand side of the equation represents the demand constraint, the money available to be spent. The right hand side of the equation represents the supply constraint; what can be bought. That is, can be simplified to:

$$X_t + dC_{rt} = M_t \qquad (38)$$

In equation (38) the left hand side of the equation represents the money that is available to be spent on the foreign exchange market. The right hand side represents what it can be spent on. It can be rewritten as equation (33);

$$M_t - X_t = dC_{rt} \qquad (33)$$

This is the standard Keynesian explanation for the current account deficit in which the growth in credit is the amount by which investment exceeds saving and government expenditure exceeds taxes. The only way that investment can exceed saving and government expenditure exceed taxes is to add to the domestic money supply. That is, to raise bank credit.

Substitution equations (22) $[X_t = X/e_t]$ and (23) $[M_t = e_t mL_t]$ into equation (33) means that:

$$e_t mL_t - X/e_t = dC_{rt} \qquad (39)$$

which may be rewritten as:

$$e_t mL_t - dC_{rt} - X/e_t = 0$$

$$e_t^2 mL_t - e_t dC_{rt} - X = 0 \qquad (40)$$

Equation (39) is in the quadratic form "$ax^2 + bx + c = 0$" which can be solved with the standard formula for solving a quadratic equation. Therefore, the exchange rate that solves equation (39) is:

$$e_t = (dC_{rt} +/- \sqrt{(dC_{rt}^2 + 4mLX)})/(2mL_t) \quad (41)$$

Equation (17)$[L_t = N_{t-1} + C_{rt} - aL_{ct-1} + X_{t-1} - mL_{t-1} + K_{t-1}]$, is modified by substitution equation (34) for credit growth, equation (22) for exports and equation (33) for imports such that:

$$L_t = N_{t-1} + dC_{rt} + X/e_{t-1} - e_{t-1}mL_{t-1} + K_{t-1} \quad (42)$$

It uses equation (41) for the exchange rate. This ensures that the external balance in terms of foreign currency is maintained. That is:

$$M_t = X_t + K_t \quad (29)$$

It also ensures that internal balance is maintained in terms of domestic currency. That is:

$$M_t = X_t + dC_{rt} \quad (38)$$

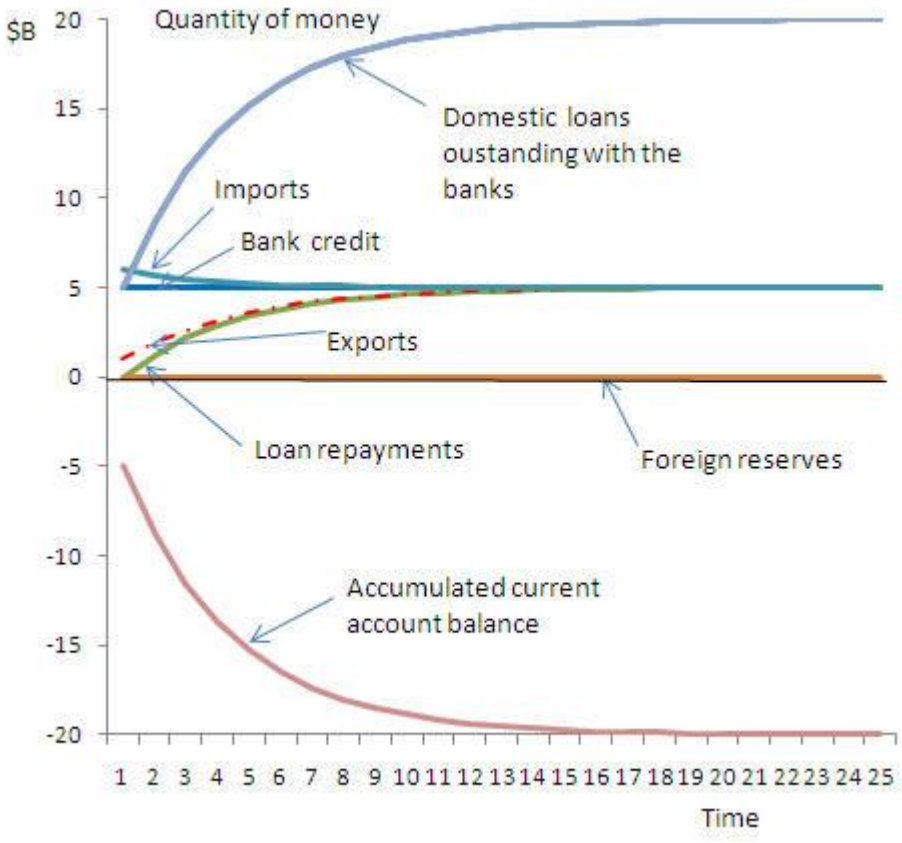


Figure 10: Money supply and current account balance with floating exchange rate system

The relationship present in Figure 10 is a product of the floating exchange rate system.

To compare the quantity of money with the current account balance, Figure 11 plots the current account deficit (rather than the current account balance) and shows the foreign capital inflow.

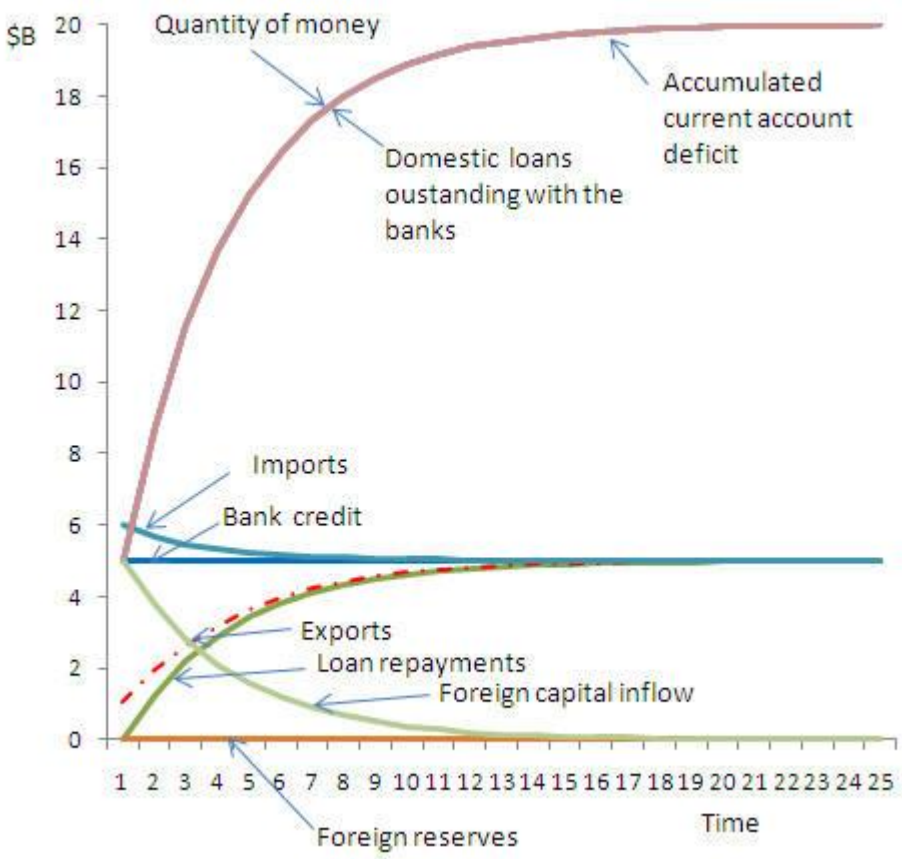


Figure 11: Money supply and current account deficit with floating exchange rate system

Figure 11 shows how the difference between imports and exports is met by foreign capital inflow. Also, foreign capital inflow is equal to the growth of bank credit. However, foreign capital does not normally drive the outcome. It is bank credit that drives the flows in the studied countries.

The demand and supply constraint hypothesis with net private capital outflow

While the supply constraint hypothesis may apply to countries such as the USA and Australia with net capital inflow, the question arises as to whether it explains the outcomes of countries such as Japan that have a current account surplus.

To asses the outcome, we will assume that the economy spends not only on domestic products and imports but makes a fixed foreign investment

(private capital outflow). Therefore, we will modify equation (4) such that spending is given by:

$$L_t = N_t + M_t + K_{ot} \quad (43)$$

Where:

K_{ot} is a fixed amount of capital outflow that is invested in each period "t".

In a similar approach to that used to create equation (37), we substitute equation (36)$[L_t = N_t + X_t + dC_{rt}]$ into equation (43) to determine that:

$$N_t + X_t + dC_{rt} = N_t + M_t + K_{ot} \quad (44)$$

As in equation (37), the left hand side of the equation represents the demand constraint, the money available to be spent. The right hand side of the equation represents the supply constraint; what can be bought, including foreign investments. That is, can be simplified to:

$$X_t + dC_{rt} - K_{ot} = M_t \quad (45)$$

As in equation (38) the left hand side of the equation represents the money that is available to be spent on the foreign exchange market. The right hand side represents what it can be spent on. It can be rewritten as:

$$M_t - X_t = dC_{rt} - K_{ot} \quad (46)$$

In this equation, the capital outflow represents national savings. Therefore, the current account deficit is to the growth of bank credit less national savings.

Substitution equations (22) $[X_t = X/e_t]$ and (23) $[M_t = e_t m L_t]$ into equation (46) means that:

$$e_t m L_t - X/e_t = dC_{rt} - K_{ot} \quad (47)$$

which may be rewritten as:

$$e_t m L_t - (dC_{rt} - K_{ot}) - X/e_t = 0$$

$$e_t^2 m L_t - e_t(dC_{rt} - K_{ot}) - X = 0 \quad (48)$$

Equation (48) can be solved with the standard formula for solving a quadratic equation. Therefore, the exchange rate that solves equation (39) is:

$$e_t = ((dC_{rt} - K_{ot}) +/- \sqrt{((dC_{rt} - K_{ot})^2 + 4mLX}))/(2mL_t) \quad (49)$$

Figure 12 plots equation (42), using equation (49) to determine the exchange rate.

$$L_t = N_{t-1} + dC_{rt} + X/e_{t-1} - e_{t-1}mL_{t-1} + K_{t-1} \qquad (42)$$

This model is similar to that used for Figures 10 and 11 except that it assumes investment overseas of $1.2 B in each period.

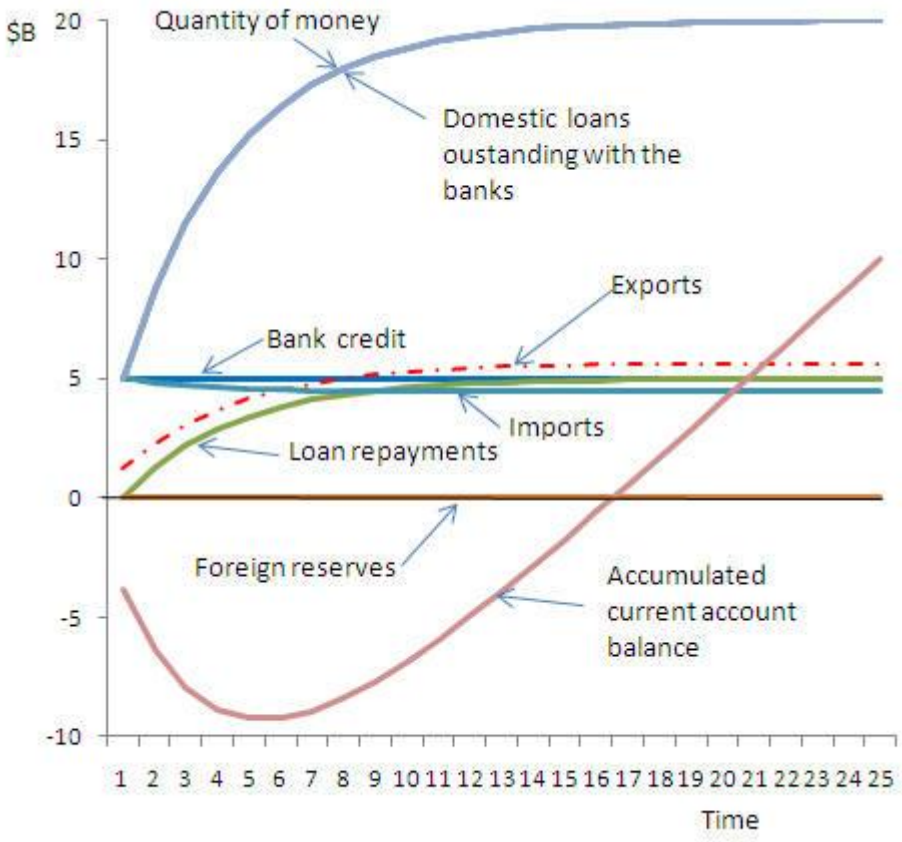


Figure 12: Private capital outflow and current account balance with floating exchange rate system

Initially, the growth in net bank credit is greater than the capital outflow. This causes current account deficits. However, when the loan repayments increase so that the investment overseas exceeds the growth of bank credit, the current account balance is reversed and the economy experiences current account surpluses. This is the experience of countries such as Japan whose net capital outflow is greater than the net growth in bank credit.

The demand and supply constraint hypothesis with net official capital outflow

The Central Bank of the Philippines has intervened in the floating exchange rate system to stabilize the exchange rate of the Peso. In the process its foreign reserves have been growing and the Philippines have been experiencing current account surpluses.

The following model extends the Figure 12 model to explain what is happening in the case of economies such as the Philippines that significantly increase their foreign reserves.

In an economy with private capital outflow, the investment reduces the expenditure on other products. However, when the banking system initiates capital outflow, it does not reduce expenditure on other products. That is, instead of equation (43) we can return to equation (4). That is, money can be spent on domestic products or imports:

$$L_t = N_t + M_t \qquad (4)$$

This is the only difference between private capital outflow and official capital outflow that raised foreign reserves. In the case of private capital outflow, from equation (43)$[L_t = N_t + M_t + K_{ot}]$ we can say that expenditure on domestic products can be put as:

$$N_{t-1} = L_{t-1} - M_{t-1} - K_{ot-1} \qquad (50)$$

In the case of official foreign investment, from equation (4) we can say that:

$$N_{t-1} = L_{t-1} - M_{t-1} \qquad (51)$$

This change alters the value of "N_{t-1}" in equation (42), that is, in:

$$L_t = N_{t-1} + dC_{rt} + X/e_{t-1} - e_{t-1}mL_{t-1} + K_{t-1} \qquad (42)$$

The foreign exchange market does not distinguish between private and official capital flows. Therefore, it is possible to retain equation (49)$[e_t = ((dC_{rt} - K_{ot}) +/- \sqrt{((dC_{rt} - K_{ot})^2 + 4mLX}))/(2mL_t)]$ used to define the exchange rate in the private capital outflow example except that we will replace private capital outflow with official capital flows that raise the foreign reserves of the banking system. That is:

$$e_t = ((dC_{rt} - dR_t) +/- \sqrt{((dC_{rt} - dR_t)^2 + 4mLX}))/(2mL_t) \qquad (52)$$

Where:

dR_t is the growth in the foreign reserves of the banking system in time "t".

Figure 13 plots the effect of this change. In this example, all the variables have the same values except that instead of private capital outflow of $1.2 B per period, the foreign reserves are increased $1.2 B in each period.

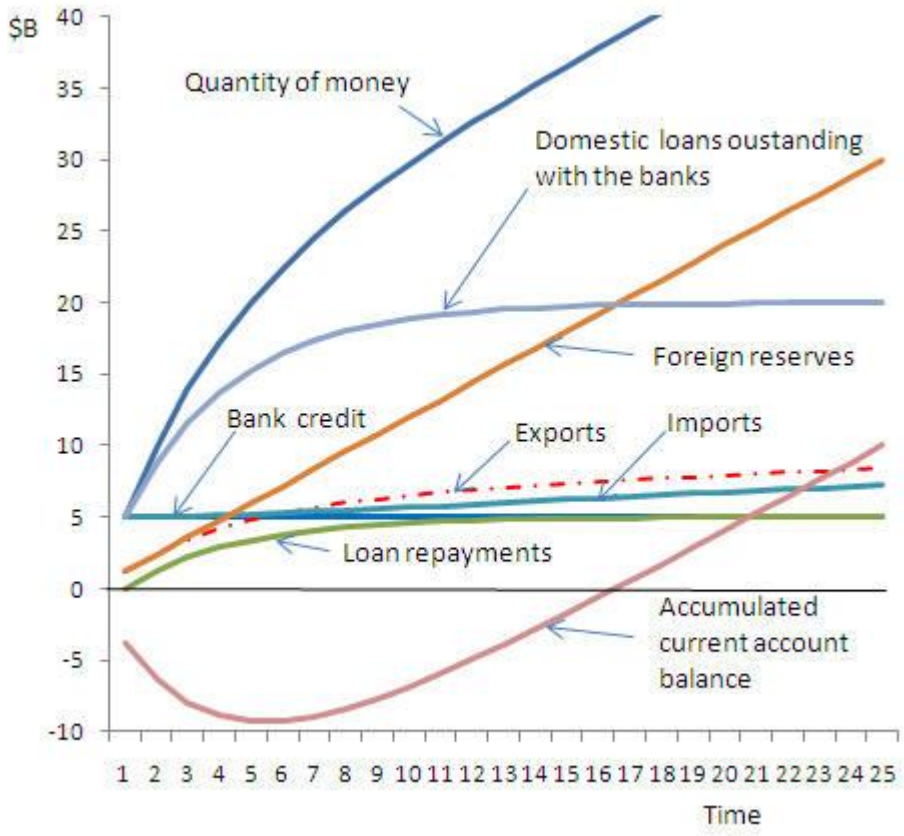


Figure 13: Official capital outflow and current account balance with floating exchange rate system

As in the example with private capital outflow, the country experiences a current account deficit while the growth of bank credit is greater than than the growth in foreign reserves. When the growth in foreign reserves is greater than the growth in bank credit, the economy experiences a current account surplus.

The major difference also evident is that the growth in foreign reserves adds to the quantity of money and stimulates the economy in a way that raises foreign reserves and brings about a current account surplus.

Given the massive debts accumulated by governments to stimulate their economies during the global financial crisis, the use of official capital outflow to stimulate the economy would avoid the debt burden and actually reduce net foreign debt.

Comment

This paper has shown that it is possible to find a unifying theory and a formula explaining the current account balance for countries with both fixed and floating exchange rates. The Demand and Supply Constraint Hypothesis is able to explain both current account deficits and current account surpluses under the floating exchange rate system. Also, it is able to explain the effect of different types of capital flows. These models are reflecting the behaviour of real economies and provide a reasonable foundation to evaluate alternative policies for managing economies.

To come back to the initial analogy, the monetary system economy is more complex than a simple airline ticketing system. Yet the basic principle holds true that if a country issues more money than its own ability to honour that money, it will accumulate current account deficits that can lead to large foreign debts.

The models used have been simple, in most cases without any growth in exports or credit. They are used as a teaching tool, not as a model of any particular economy.

The Optimum Exchange Rate System

It is possible to restructure the financial system so that financial institutions, acting in their own interest, will ensure balance of payments stability. The optimum exchange rate system and the guided exchange rate system are exchange rate systems that take into account the significance of monetary growth for the external balance. Both systems manage the growth of bank credit so that the money from bank credit does not cause balance of payments difficulties.

Figure 14 shows the model under the optimum exchange rate system which is intended to bring about full employment with low inflation, also. In this example, the full employment level of money is assumed to be $30 B. Up until period 6, the economy has applied the floating exchange rate system. Initially, the model is a continuation if the model used in Figures 10 and 11. When the optimum exchange rate comes into effect, the market moves the exchange rate to a level that would sustain the quantity of money (and income) at the full employment level.

The initial growth in foreign reserves allows the banks to increase lending. However, as the economy approaches the full employment level, monetary growth from bank credit and foreign reserves slow. Credit growth exceeds the growth of the foreign reserves but not so much as to create a current account deficit. The economy had accumulated current account deficits of $20 B in the past. However, the current account surpluses in the period with the optimum exchange rate system slightly reduce the overall accumulated current account deficit. The significance

of this system is that it is able to raise the quantity of money without causing a current account deficit.

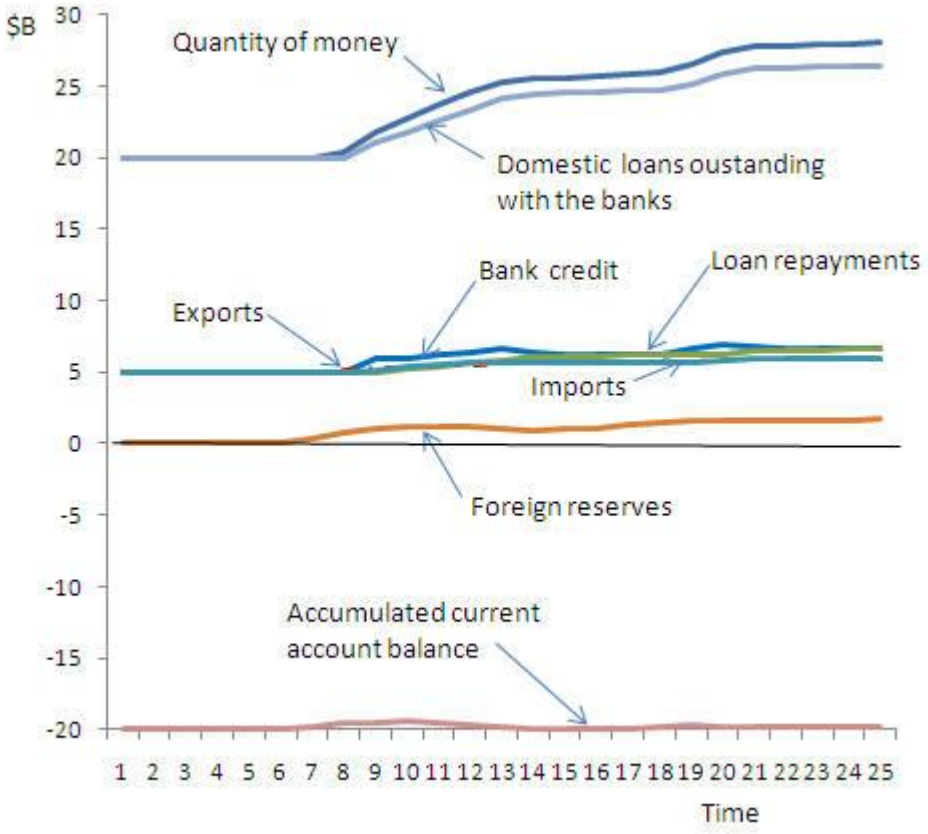


Figure 14: Economy with optimum exchange rate system

In this model, interest rates initially attract foreign capital. Hence foreign reserves grow more than the current account deficit. As full employment is approached, interest rates fall to a neutral level in terms of attracting foreign capital inflow. The quantity of money stabilizes at the level that would achieve full employment.

If economies are to grow in a sustainable manner with domestic and international stability, full employment and low inflation, they will need to adopt a monetary system that manages the growth of bank credit and manages the exchange rate.

In a real situation with the optimum exchange rate system, additional money from export growth may be supplemented with foreign capital to ensure balance of payments stability. The inflow of foreign capital may lead to a current account deficit. However, when full employment is attained, there would no longer be the same demand for investment and interest rates will fall. With lower interest rates, foreign capital inflows would decline enabling the attainment of a current account balance.

This paper has shown that persistent current account deficits indicate systemic problems in a country's monetary system. Such problems will not rectify themselves. These outcomes were created by the policies and rules were put in place. Those same policies and rules must be modified if the outcomes are to be changed.