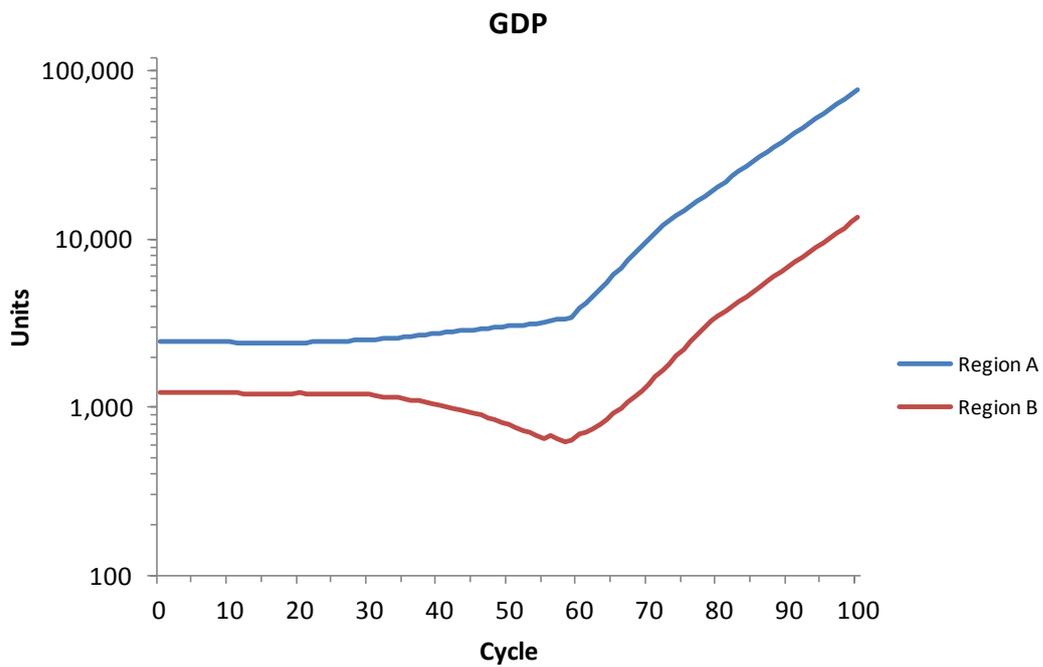# Saving the Euro

by

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GDP

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Contents

1   Introduction

This paper initially intended to explain how a country could leave the Euro and enable all members continue to prosper. However, in the process of writing it, it was found that the remaining Euro countries would be poorer for the loss of one of its members. Therefore, to bring prosperity to all countries, it was necessary to save the Euro.

We are all aware that the strong Euro is making economies in Southern Europe uncompetitive. Also, most countries have problems with mounting domestic and foreign debt. Therefore, what can be done to save the EMU and the Euro?

1.1   The Approach

Before it is possible to address that question, it is first necessary to diagnose the cause of the major monetary problems currently plaguing the EMU. Once the causes of those problems were diagnosed, this paper considers a number of alternative monetary configurations and assesses them according to their ability to resolve the problems identified and provide a sound foundation for the future growth and prosperity of the EMU.

1.2   The model

To consider the problems and assess solutions, a computer model of an economy was built consisting of two member states representing the EMU. The model allowed the basic economic problems experienced in the EMU to be replicated. Also, it allowed those problems to be analysed so as to diagnose the factors that were causing the problems. Furthermore, it allowed the future to be predicted, with and without the proposed optimal monetary configuration.

In the model, the two member states are called Region A and Region B. Region A is twice the size of Region B, but otherwise, the two are initially identical. Each region's economy contains six sectors:

- Household;
- Primary;
- Secondary (including manufacturing);
- Business and finance (treated as banking including the central bank);
- Other Tertiary (including construction); and
- Government.

In addition, there are export, import and a foreign capital market sectors.

The model comprises a matrix of these sectors in which the income earned by each sector and any funds borrowed are spent in: repaying debt, paying interest, buying imports or otherwise paying for goods and services from the region or from the other region. The income of each sector becomes part of the funds available to be spent by that sector in the next cycle. A cycle represented the period of time that it would take for all the money earned or borrowed in the economy to be spent once. A more detailed description of the model is provided in Appendix 1.

2   The Symptoms

2.1   Unified floating exchange rate model with credit and export growth

To simulate the problems in the EMU, the model was run until the type of problems currently experienced in the EMU became evident. To show that the model was initially stable, it was run for 9 cycles without any changes. From the 10th cycle, exports were increased by 1 per cent in both regions.   The rate of growth of exports was then raised by 0.5 per cent every 5 cycles.

From the 20th cycle, the increase in the rate of growth for exports in the secondary sector of Region A was raised by 2 per cent every 5 cycles while the rate of growth in the other sectors (including all sectors in Region B) continued to be increased by 0.5 per cent every 5 cycles. This was intended to represent an increase in exports of the manufacturing sector in Region A (representing Northern Europe) relative to other sectors in Region A and relative to all sectors in Region B.

The rate of growth of exports peaked in the 35th cycle with exports in the secondary/manufacturing sector in Region A growing at 9.5 per cent per cycle (before exchange rate adjustments). The rate of export growth in all the other sectors in both regions peaked at 3.5 per cent per cycle (before exchange rate adjustments).

The outcome of this scenario after applying the rules of the foreign exchange market is presented in Figures 1 and 2. Figure 2 uses a logarithmic scale on the vertical axis. Logarithmic scales are regularly used in graphs in this paper when they are able to more clearly illustrate the situation being explained.
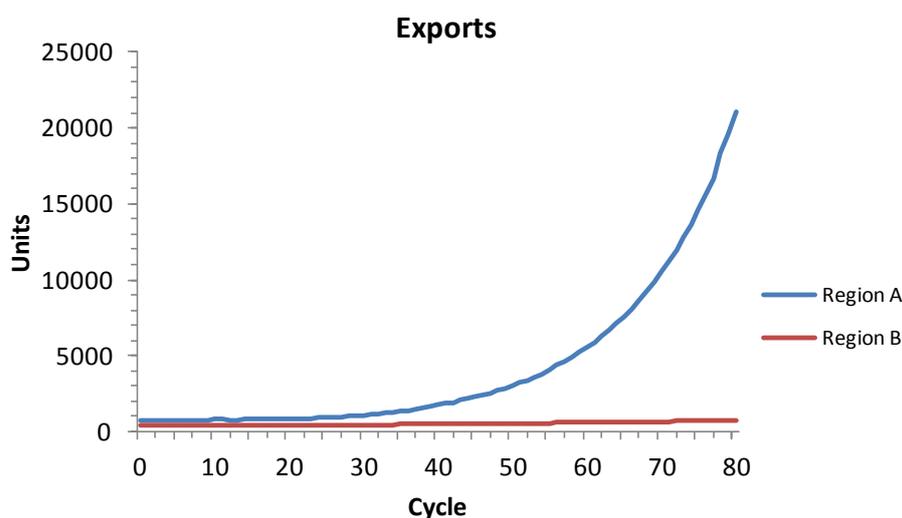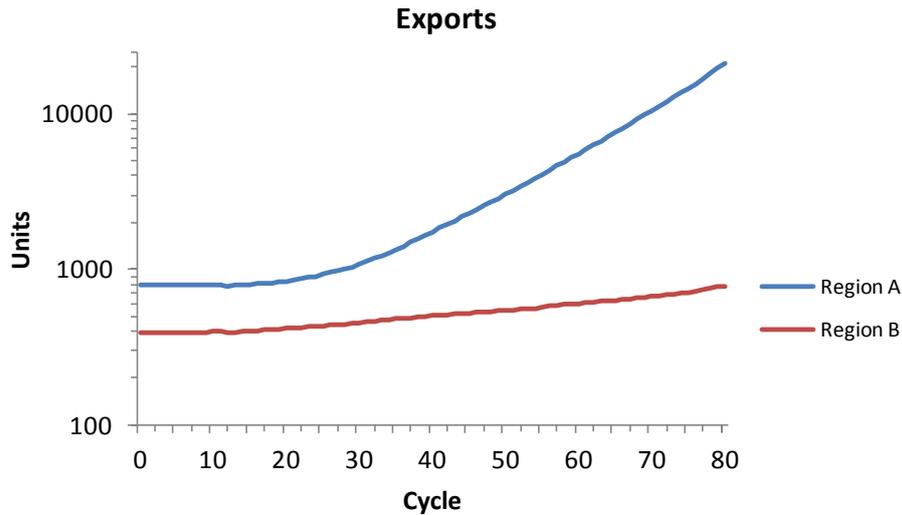

Figure 1. Export Growth

Figure 2. Export Growth with logarithmic scale

At the 12th cycle, the growth of bank credit was resumed in both regions in the model. In the earlier cycles, bank credit was assumed to equal loan repayments (of principal). The initial rate of credit growth was 2 per cent for the household and government sectors and 1 per cent for the remaining sectors. The rate of credit growth was increased by 0.5 per cent every 3 cycles up until the 27th cycle when it was held constant at a growth rate of 4.5 per cent per cycle for households and government, and 3.5 for the other sectors. This growth in bank credit is clearly seen in Figure 3 for Region A and for Region B (up to cycle 55).

Figure 3. Bank Credit Growth in the Model EMU

At cycle 10, interest rates were 3 per cent for households, 2 per cent for government and 2.5 per cent for the remaining industries. At 30 cycles, they were raised an additional one per cent across the board. The interest rate on international debt was initially 2.5 per cent while the income on foreign assets was 2 per cent. At 30 cycles, these interest rates were raised one per cent.

3

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Government fiscal policy also affected its borrowing requirement. The government is assumed to borrow to prevent real government expenditure falling below the initial level in the model. The Governments in both regions were assumed to fund 100 per cent of their borrowing requirements from the bond market, if possible.

In addition to these specified borrowing requirements, the finance and business sector, which represents the banks, borrowed any foreign capital funds that were not taken up by the other sectors.

The model has a debt servicing cost ceiling for each sector. When the debt servicing costs reached the predetermined proportion of a sector's income, the sector stoped borrowing. The impact of the ceiling on credit growth in Region B is clearly evident in Figure 3.

For households, the ceiling was set at 30 per cent of income and other available funds. The Household sectors of both regions borrowed only from banks. The Primary sectors borrow solely from banks, also. The Secondary sectors borrowed 25 per cent of their requirements from banks and the Other Tertiary sectors borrowed 40 per cent of their requirement from the banks. Their remaining borrowing requirements were met from the capital market. Figure 4 presents the outcome of this scenario for the growth of bank debt for Region B using a logarithmic index on the vertical axis.

Region B: Bank Debt by Sector
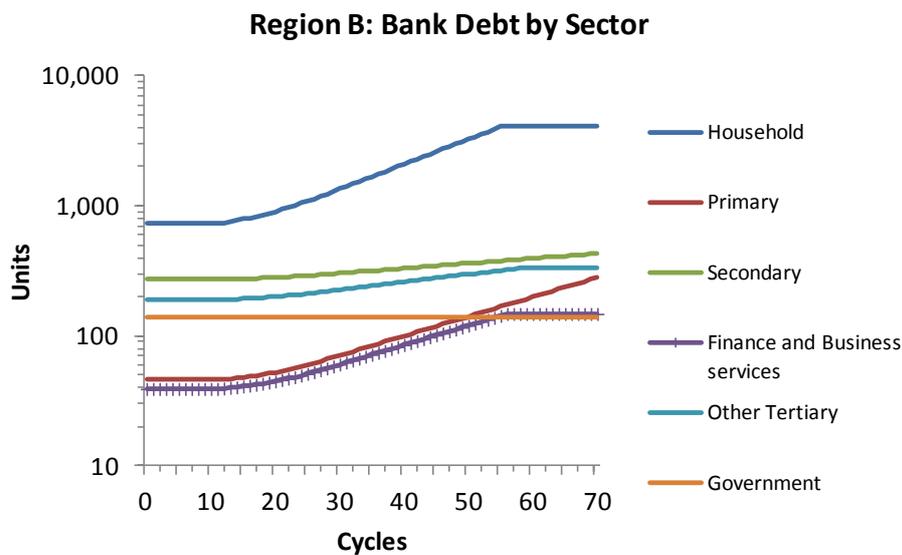
Figure 4. Region B: Bank Debt by Sector

As the household sectors were the main borrowers from the banks, when the household sector in Region B reached its debt serving ceiling in cycle 56, it had a dramatic effect on the total amount of bank lending in Region B, as was revealed in Figure 3.

The debt servicing cost ceiling for the Finance and Business sector (banks) was set at a high 70 per cent of all revenues, as this sector deals in debt. For other sectors, the ceiling was set at 20 per cent of revenues. The ceiling for government applied only to interest payments, not principal repayments. In all sectors, the ceiling was applied to interest only for loans from the capital or bond market. If the economy hits these debt servicing constraints,

adopting policies to effectively raise the debt servicing ceiling only extends the time before the ceiling is reached again. It does not solve the problem. The effect of the debt servicing ceilings on the total debt of the Household and Other Tertiary sectors in Region B is shown in Figure 5, which uses a logarithmic vertical scale.
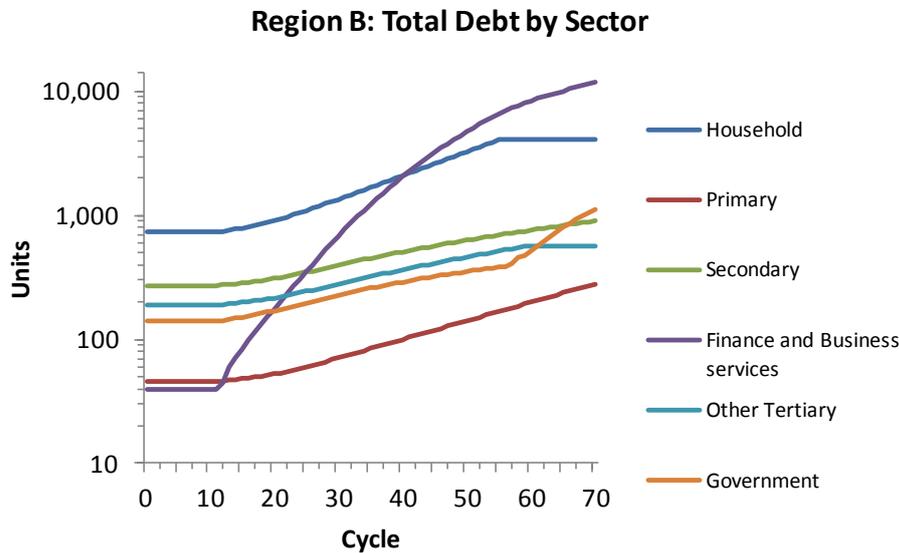

Figure 5. Region B: Total Debt by Sector

Government debt of Region B grows faster than the default level from the 57th cycle due to the policy of maintaining government expenditure in real terms.

The Other Tertiary sector in Region B hit its debt servicing ceiling in the 60th cycle. Government in Region B hit its debt servicing ceiling in the 71st cycle. These debt servicing ceilings are among the factors that have undermined the EMU. In Ireland, it was debt ceilings in the household sector. In other countries, the debt servicing ceilings have been in the Government sector.

The Finance and Business Services sector was assumed to initially hold positive net foreign reserve holdings. The subsequent growth of foreign debt was in the form of deposits of foreign residents with the financial sector or bank bonds issued by the financial sector and held by foreign residents. The growth of that debt reflected the growth of the international capital market in the EMU. The decline of net foreign assets and the subsequent growth of net foreign debt for both regions are shown in Figure 6.

Net foreign assets/debt
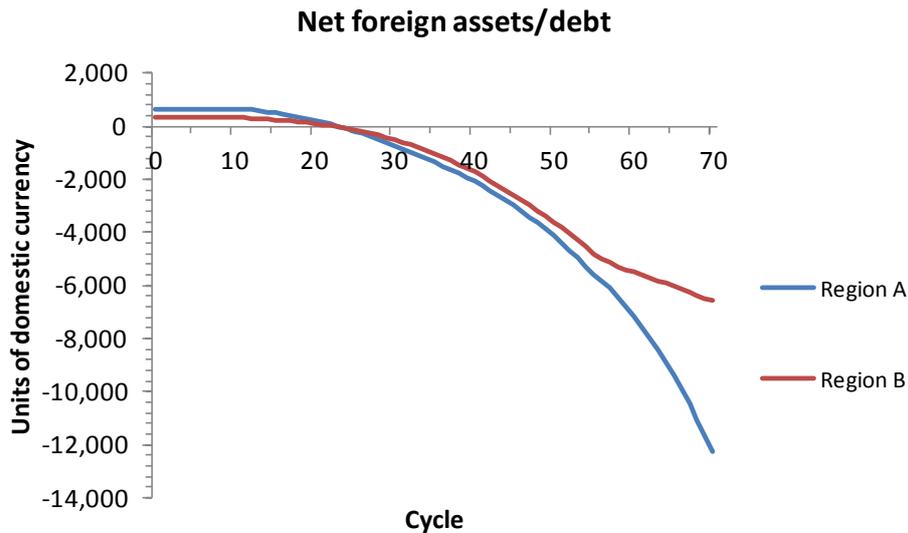
Figure 6. Net foreign assets and/or debt

Globalization is where international trade takes a growing share of the economy's economic activity. If we look at the ratio of exports to GDP for the two regions, we note that it rises for both countries as shown in Figure 7. In this example, the ratios reach levels that appear unrealistic. However, the model is intended to illustrate the behaviour of economies in the EMU and trade is a significant factor that we wish to consider. Therefore, the significance of trade to the economy was increased to highlight the trade issues. Also, much of the imports are re-exported. In this modelling exercise, we are interested in the trade dynamics and relativities, not the absolute level of trade.

Ratio of Exports to GDP

Figure 7. Ratio of Exports to GDP

Imports follow a similar pattern, as shown in Figure 8. As both Regions in the model start spending the same proportion of their income on imports and share the same exchange

rate, we can expect them to have similar levels of relative imports. As noted above, imports in the model are not just for consumption. They include inputs for production that are eventually delivered to the domestic economy, and to foreign markets as exports.
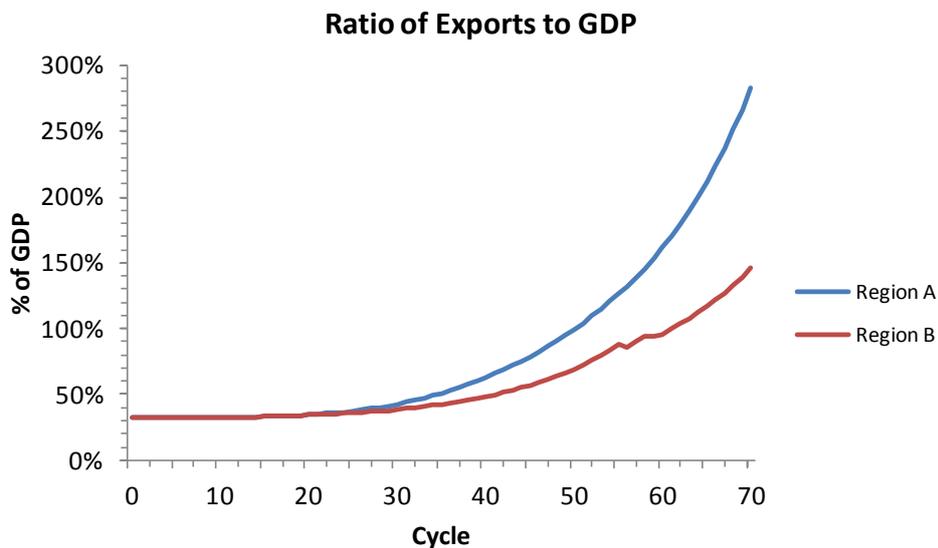
The share of spending on imports in Region B falls when the growth of credit declines in cycle 56.
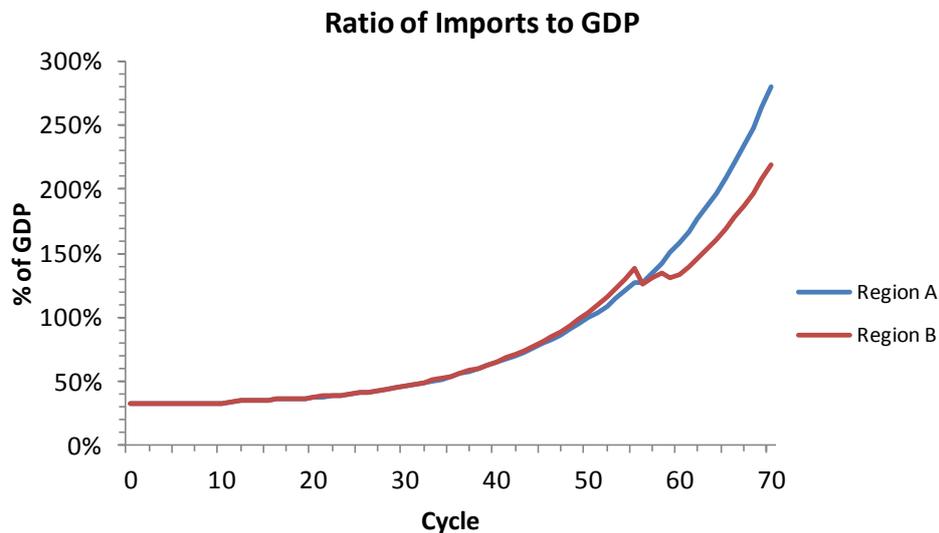
Figure 8. Ratio of Imports to GDP

In this model, GDP is measured as the income of the household sector and the income of government, plus exports less imports. The model does not distinguish between current and capital expenditure. Therefore, it is not possible to measure investment. The split between consumption and investment is not considered a significant issue in explaining the monetary problems facing the EMU. The GDP for Regions A and B are shown in Figure 9. In the model, the collapse of credit growth leads to a decline in imports. This decline in imports is achieved through a depreciation of the currency. That depreciation raises export revenues. The reduced imports and the increased exports cause GDP to rise.

GDP

Figure 9. GDP with export growth and credit growth

Although both Region A and Region B are initially stable and have a similar economic structure, the GDP of Region A grows while it declines in Region B. This divergence is evident after the 20th cycle when the manufacturing exports of Region A increase more rapidly than the exports in Region B.

Region B would have raised its exports if the exchange rate were fixed or stable. However, in the economic environment of a single exchange rate determined under the floating exchange rate system, the increase in exports in Region 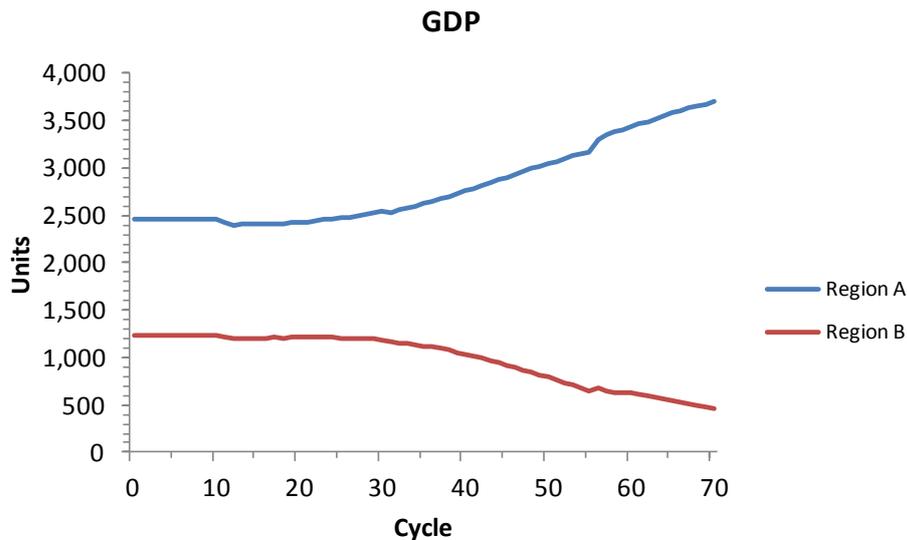A inflates the exchange rate for both economies. Region A is still able to achieve a net benefit from trade, while Region B is made uncompetitive and its GDP suffers. This is similar to the outcomes experienced in the EMU.

Many readers would be already aware that international competitiveness is one of the crucial issues that must be considered in saving the Euro. But it is only one of three major barriers to economic growth and stability that are identified in this paper. Those barriers are explained and analysed before proceeding to consider the optimum monetary reconfiguration for the EMU. These barriers are identified as:
- the "beggar thy brother";
- the "burden thy brother"; and
- the "burgle thy brother" barriers.

The barriers are discussed in the next chapter. In addition, we will consider how the interaction of these barriers affects economic growth in the member states of the EMU.

3 The Diagnosis

The floating exchange rate system requires international receipts and payments to be equal; that is, to be constantly in equilibrium. However, economic growth is achieved by creating disequilibrium. It is the process of moving from a point of disequilibrium towards a new equilibrium position that generates change, including economic growth. By constantly bringing about equilibrium in the foreign exchange market, the floating exchange rate system is placing barriers before the invisible hand that stimulates economic growth.

3.1 Beggar thy brother (the two speed economy)

One of the major barriers to economic growth in the EMU is that the exports of the leading economies, such as Germany, have been raising the value of the Euro and making the products of other economies less competitive on both the domestic and international markets. As acknowledged above, the floating exchange rate system requires international receipts and payments to be equal. Therefore, if one sector of the economy raises its exports, the exchange rate system requires:

- other sectors of the economy to reduce their export earnings; and/or
- the economy to shift its expenditure from domestic products to imports.

These outcomes are achieved by appreciating the exchange rate. The higher exchange rate reduces the incomes of other exporters. Also, it makes imports cheaper relative to domestic products. Therefore, the higher exchange rate undermines the competitiveness of both exporters and import competing industries.

The exchange rate effect can be studied in more detail in the model if we remove credit growth and consider only the effects of export growth. The effect of the different export growth rates on GDP (excluding credit growth) is shown in Figure 10. When the rate of growth rate of trade was equal (up to Cycle 20, as explained in 2.1) trade had no effect on the level of GDP. When (at cycle 20) exports in Region A started growing faster than in Region B, the GDP of Region A increased, while that of Region B decreased.
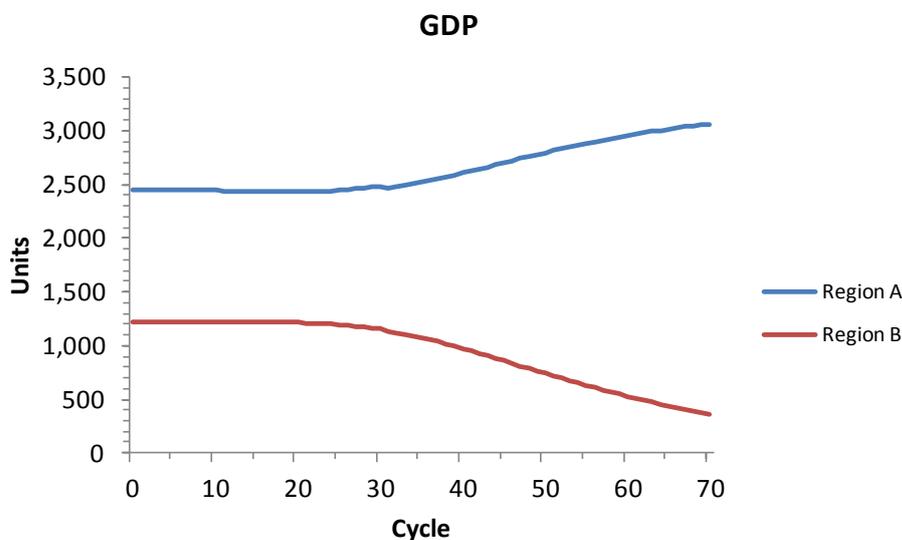

Figure 10. GDP with export growth and without credit growth

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The factors driving these changes can be considered in more detail if we distinguish between net non-EMU foreign income of a region and the intra-EMU foreign income. Figure 11 presents these flows for Region A.

Region A: Net Foreign Income
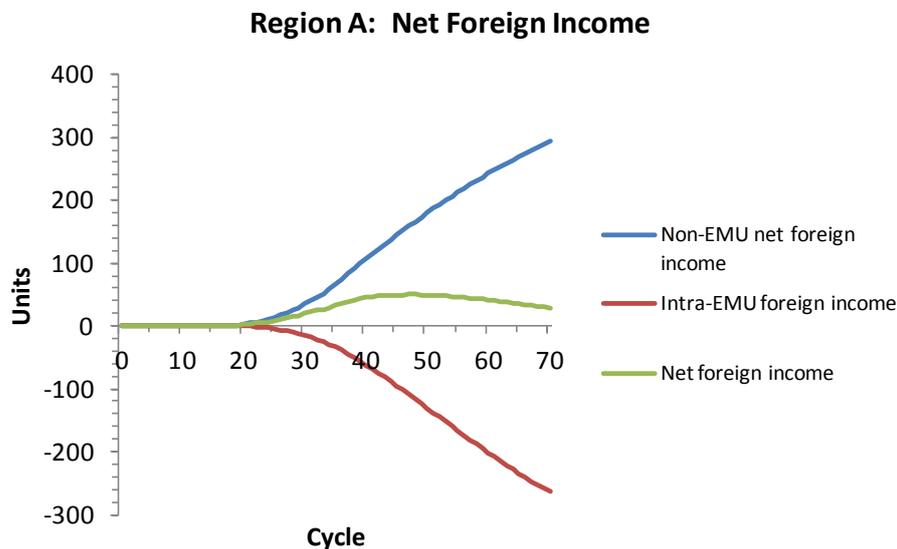
Figure 11. Region A: Net foreign income by source

The income from outside the EMU is initially stable in Region A and Region B. This is during the cycles in which the export growth rates are equal in both regions. When, from cycle 20, Region A's manufacturing exports to the rest of the world grows faster, its net income from outside the EMU rises. However, net income from the rest of the world to Region B declines by the same amount.

Also, the resulting higher income in Region A raises the imports of Region A from Region B. The net effect is that net foreign income rise for Region A because the growth in income from net exports outside of the EMU is greater than the rise in its imports from Region B.

Figure 12 presents the outcome for Region B, which, because of the nature of the floating exchange rate system, is the inverse of Region A. In Region B, the higher exchange rate lowers net foreign income from trade outside the EMU. Therefore, Region B's imports from the rest of the world are greater than its exports to it.

The foreign exchange market shifts the domestic funds from the excess imports in Region B to provide additional foreign income for the exporters in Region A. This transfer is largely compensated by the increased exports from Region B to Region A. But it does not fully compensate Region B. Therefore, Region B is made poorer by the increased exports to the rest of the world in Region A.

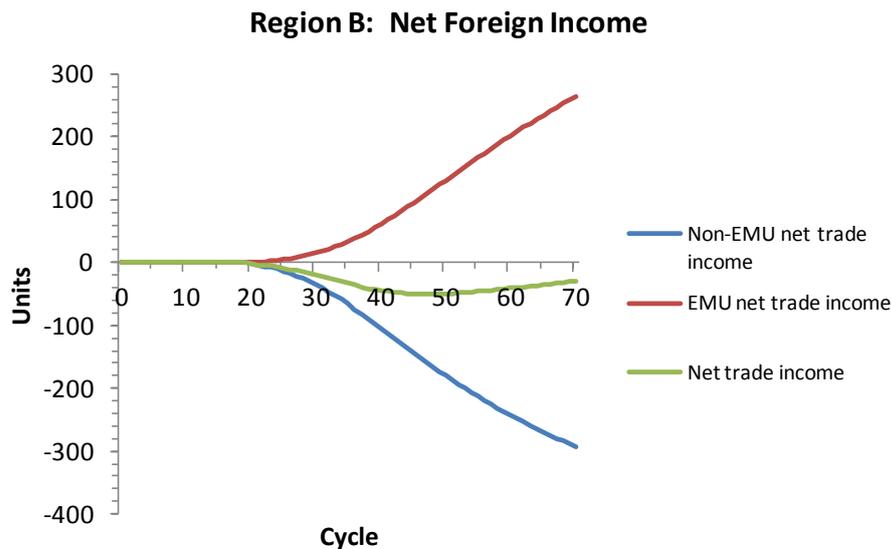**Region B: Net Foreign Income**

Figure 12. Region B: Net foreign income by source

The export growth in Region A has beggared Region B; its brother economy. If the Euro is to be saved, its monetary system would need to be reconfigured to preserve the gains from trade for Region A so that it can maintain its prosperity. Also, it should prevent the recurrence of the "beggar-thy-brother" outcomes within the remaining EMU.

3.2   Burden thy brother (the debt burden)

Another major barrier to economic stability and growth is the growth of the burden of debt. With the floating exchange rate system, the only way to increase the money supply is to borrow from the banking system. That raises debt. If there is a need for relatively more money in a part of the economy that does not contribute to GDP, then that spending will require additional money and raise the debt burden; the ratio of debt to GDP.   This problem of a rising debt burden for Australia is evident in Figure 13 and for the USA in Figure 14[1].

The rise of the ratio of debt to GDP for Australia is evident for most of the period since December 1983 when the Australian dollar was floated. The consistently rising ratio of debt to GDP suggests that the Australian float has been relatively clean with little official intervention in the exchange rate.

In the USA, the ratio of bank debt to GDP has increased since about 1996 culminating in the global financial crisis of 2008. Also, it can be seen from that graph that between about 1986 and 1996, the ratio was stable. That was a period when the US managed its floating exchange rate system[2].   Not only does this chart provide collaborating evidence of the existence of the barrier, it provides a clue about how to remove it.

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[1] A link to the data used to prepare this chart is available at: www.buoyanteconomies.com/USACAD.htm
[2] The exchange rate was initially managed in 1986 under the Plaza Accord.

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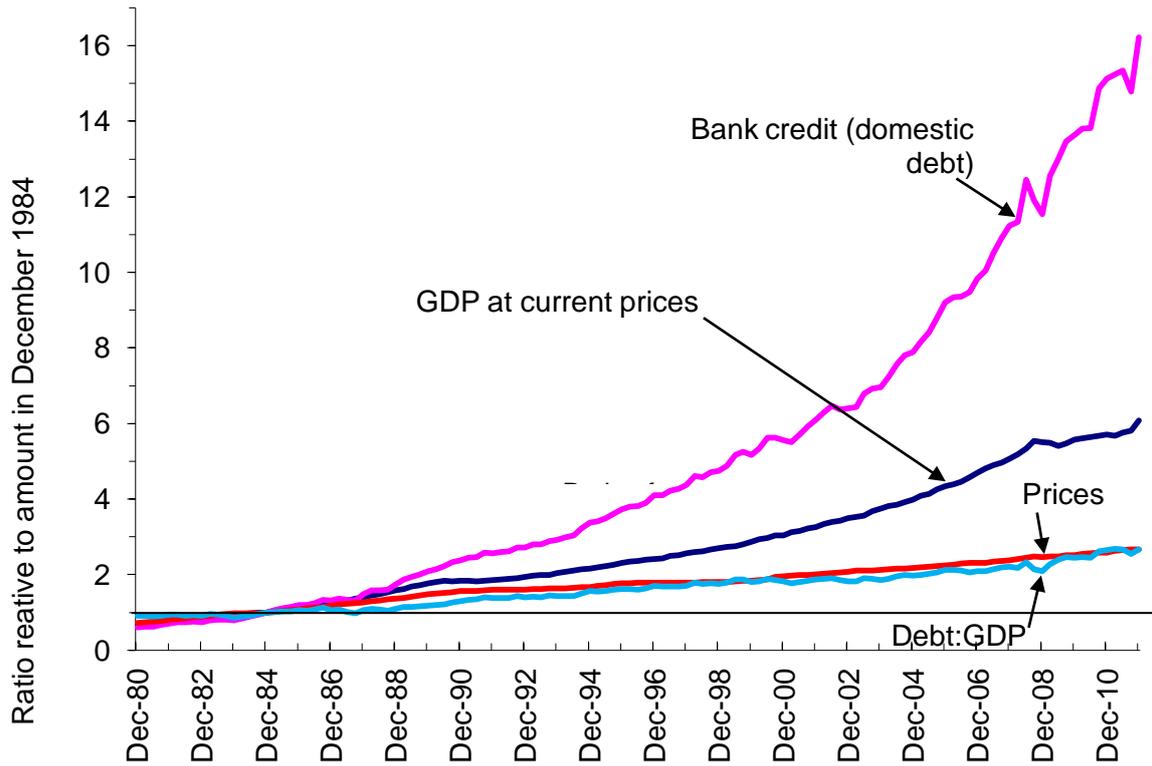
Figure 13. Australia: Ratio Bank Debt to GDP
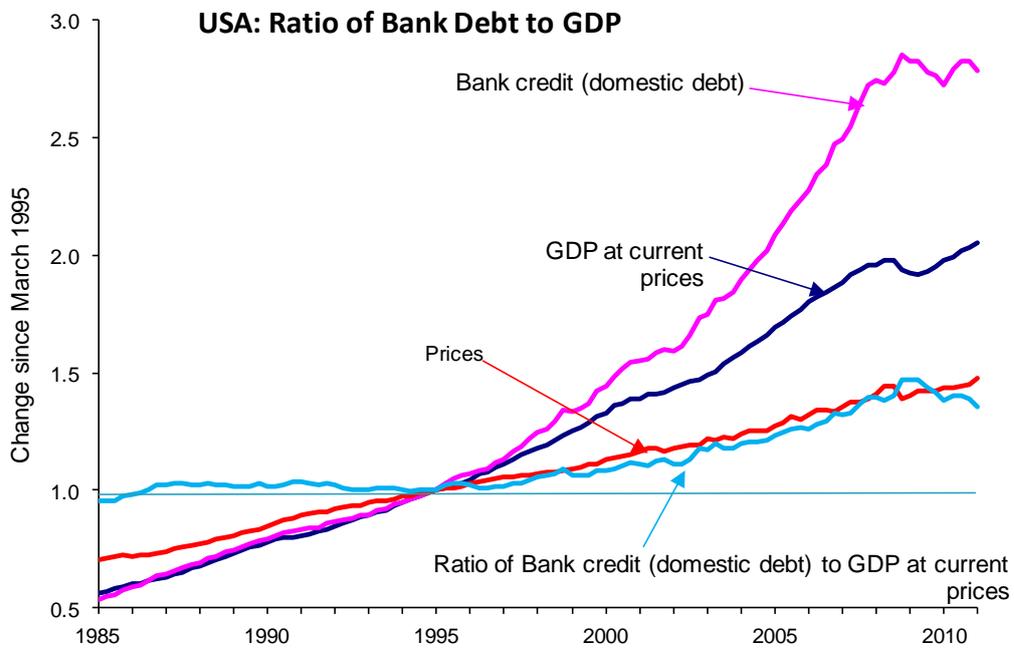
Figure 14. USA: Ratio Bank Debt to GDP

The ratio of debt to GDP in the modelled EMU is shown in Figure 15.

Model EMU: Ratio of bank debt to GDP
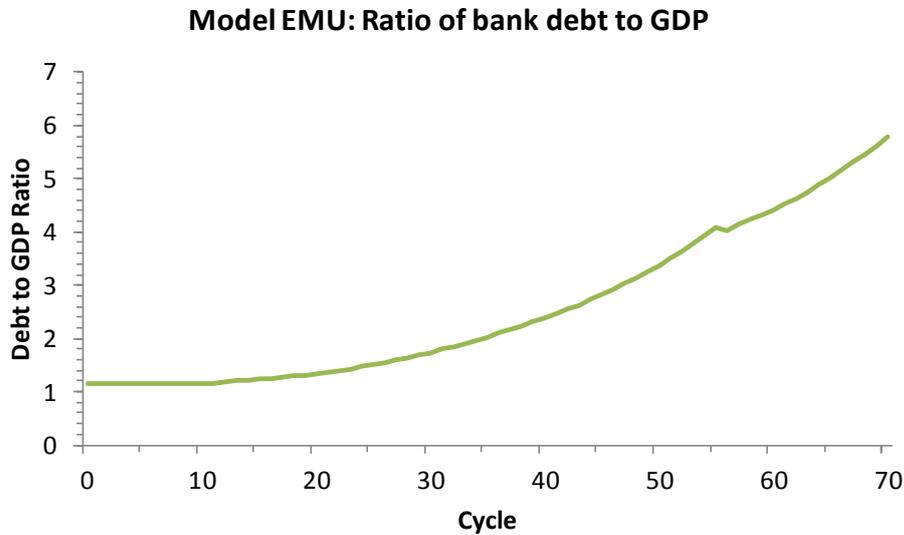
Figure 15. Model EMU: Ratio of Debt to GDP

Part of the reason for the faster growth of debt relative to GDP may be explained by the growth of debt servicing payments as a proportion of GDP. With a greater share of income (and the money stock) going to debt servicing (including foreign debt servicing), it leaves less money to be spent on consumption. This reduces GDP and therefore raises the ratio of debt to GDP. The growth of interest payments as a share of GDP in the EMU is shown in Figure 16.

Model EMU: Ratio of Interest payments to GDP
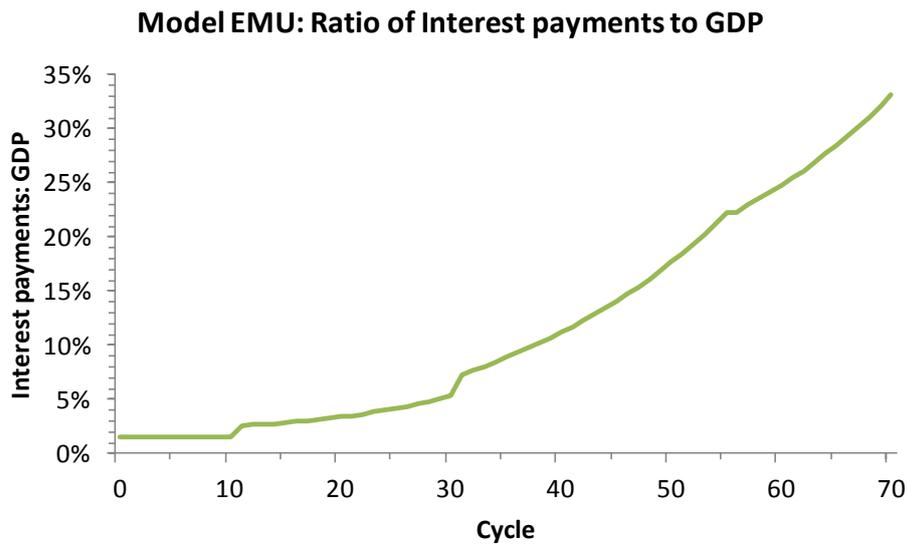
Figure 16. Ratio of interest payments to GDP

Another reason may be that the growth of imports as a share of GDP is greater than the share of revenue spent on exports (which contribute to GDP). This problem exists only when there is a floating exchange rate system. The funds consumed in purchasing imports may be all that is required to create this barrier to growth.

A reconfiguration of the Euro must deal with the "burden thy brother" problem. Rising debt levels may make banks prosperous for a short while. However, for the wider community that form the membership of the EMU, rising debts do not provide a sound foundation for prosperity.

3.3   Burgle thy brother (foreign debt)

Another of the major barriers to economic stability and growth in the EMU is the growth of foreign debt. If we consider the simplest of economies, a barter economy; it has no opportunity to create foreign debt. Each person trades their products for another's products. It is a reciprocal arrangement without any debt involved.

The principle of reciprocity is central to concept of trade. People produce goods and services in order to exchange them for other goods and services. The monetary system should facilitate that trade; and it does. Each person who sells goods and services in the economy earns money in exchange for the products sold. The money they earn enables them to buy goods and services of an equivalent value to those that they have sold. It is a system that is based upon reciprocity.

One of the features of the monetary system is that money constrains expenditure to income: demand to supply. If the only money people have to spend is the money they have earned, they can never buy more than has been produced.

Even if someone borrows money, it should not make a difference. When the lender transfers their money to the borrower, the lender is giving up their rights to the goods and services to which they are entitled. When the borrower spends that money, they are consuming goods and services of no greater value than the lender may have consumed, if they had retained their money.

A forger of money is someone who takes goods and services out of the economy without reciprocating. They are thieves or burglars; pillaging the economy. If forged funds were a significant part of the economy's money supply, they could cause the economy to buy more than it had produced.

Foreign debt is the result of a country buying more than it has produced. If the only money spent within an economy was the money that had been earned, then that country could not buy more than it had produced; it could not raise its foreign debt. If the only way a country

can buy more than it produces is to create additional money. Therefore, foreign debt must be caused by the creation of additional money.

Additional money may be created by international capital flows. However, under the floating exchange rate system, that is not possible because the system prevents foreign currency flows from affecting the domestic money supply. The only source of new money in an economy with floating exchange rates is from the banking system. Banks create additional money when they lend more than has been repaid to them to reduce the balance of existing loans. The repayments referred to here are the repayment of principal; not the payment of interest.

The government may create additional money if it treats the receipts from the sale of new notes and coins as revenue. That is a relatively insignificant portion of the total money created within an economy. Even so, if this were the practice of a government, it would be contributing to the growth of foreign debt.

Bank lending is a process whereby banks provide current entitlements to goods and services in exchange for future obligations; that is, for debt or obligation to repay the funds in future. The obligation to repay the funds in the future represents an obligation to supply goods and services to the economy in the future; that is, to earn the money and repay the debt. Essentially, banks are granting current entitlements (to goods and services) against future obligations to supply goods.

As far as the borrower is concerned, the loan is like any other loan. They receive entitlements now against an obligation to repay the loan, and pay interest on that loan.

However, the money that the banks lend does not reduce their spending. Nor does it reduce the spending of any other person in the economy. The banks do not take money out of their customers' accounts to transfer it to the borrower. When banks lend, they create additional money. That money has not earned any entitlement to goods and services from the economy. It is like forged money: it is "unentitled".

When borrowers repay the principal of their debt, they are transferring money that they have earned to the banks. When bank loans are repaid, the banks are reducing borrowers' deposits (entitlements) and reducing the borrowers' debt. This has the effect of reducing the money supply in the economy.

The money that is repaid is "entitled" money: it has been earned in exchange for goods and services. If banks subsequently lend an equivalent amount of money, that money would be "entitled" money. It would be replenishing the money supply and it would not cause the economy to buy more than it had produced.

This matter can be considered from a macro-economic perspective in a micro economy. The Kingdom of Tonga had its own currency before it established its first bank in 1974.

Before the bank was formed, the government provided a foreign exchange service. When people brought foreign currency into the Kingdom, the government would convert that money to domestic currency. The foreign currency would be added to the Kingdom's foreign reserves and the government would provide domestic notes and coins in exchange (or records of the additional funds in customers' deposit accounts).

When people spent their money on imports and foreign services, the government would convert the domestic money back to foreign currency, thereby reducing their foreign reserves. While that system persisted, the government always had sufficient foreign reserves to pay for all imports and it had no international financial problems.

After Tonga established a bank, it noticed that its foreign reserves were being depleted. Foreign money continued to be converted to domestic currency. However, now there was more foreign currency leaving the economy than was entering it. The government traced the source of that additional demand for foreign currency to the growth of bank credit. Bank lending enabled people to increase their spending. When the additional funds from the growth of bank credit were spent on imports, they depleted foreign reserves.

The government advised the bank to regulate its lending according to the level of foreign reserves. The bank was hostile to the proposal, citing that no other country in the world regulates bank lending in that way. Even so, the guidelines were kept in force and the bank came to accept the arrangement. As a result, the Kingdom of Tonga's monetary system continues to have adequate foreign reserves.

In this example, the foreign reserves held by the government represented the savings of the Kingdom. By allowing the bank to lend, the government was allowing it to use the Kingdom's savings. By restricting bank lending according to the level of foreign reserves, the government was linking the amount of bank lending to the amount of the Kingdom's savings.

The option existed at that time for the Tongan government to float the exchange rate rather than regulate bank lending. That approach would have preserved foreign reserves, and allowed the banks to continue to lend without regulation. Yet that approach would have treated a symptom of the problem rather than the cause of the problem. That is, it would protect official foreign reserves, but it would not have prevented the country from spending more than it earned and raising foreign debt.

When faced with a similar problem in 1973, the government of the United States of America chose to float its exchange rate. Its monetary system is managed by the Federal Reserve, the control of which is dominated by bankers. The bankers would have been reluctant to constrain the growth of bank lending. Also, Milton Friedman, the main proponent of the floating exchange rate system, was directly advising the President, Richard Nixon. Therefore, the decision to float may have been influenced by the personal interest of the

decision makers. It appears not to have been the result of a thorough diagnosis of the problem and a careful consideration of the alternative courses of action.

The float and the associated deregulation of bank credit have allowed banks to become very profitable. Yet the float has been responsible, also, for their demise. Bank lending can continue to grow only while there are plenty of potential borrowers with a capacity to borrow. When the economy has borrowed to its capacity, bank lending ceases to grow. Without monetary growth, the economy stalls thereby reducing the capacity of existing borrowers to service their debt. The subsequent growth in bad debts undermines the assets of the banking system and it collapses.

We could compare the current monetary system to a pyramid scheme: it works well for early participants. However, it is unstainable and collapses when it runs out of new participants.

The relationship between the growth of bank credit and the growth of foreign debt is best reflected in the relationship between the growth of bank credit and the current account deficit. Figure 17 presents the relationship between bank credit and the current account deficit for the USA. Also shown is the fiscal deficit. It is evident that there are other factors besides bank credit that are affecting the current account deficit. Even so, it is clearly evident that they are closely related. The fiscal deficit appears to be unrelated, because when it falls, the current account deficit continues to rise.
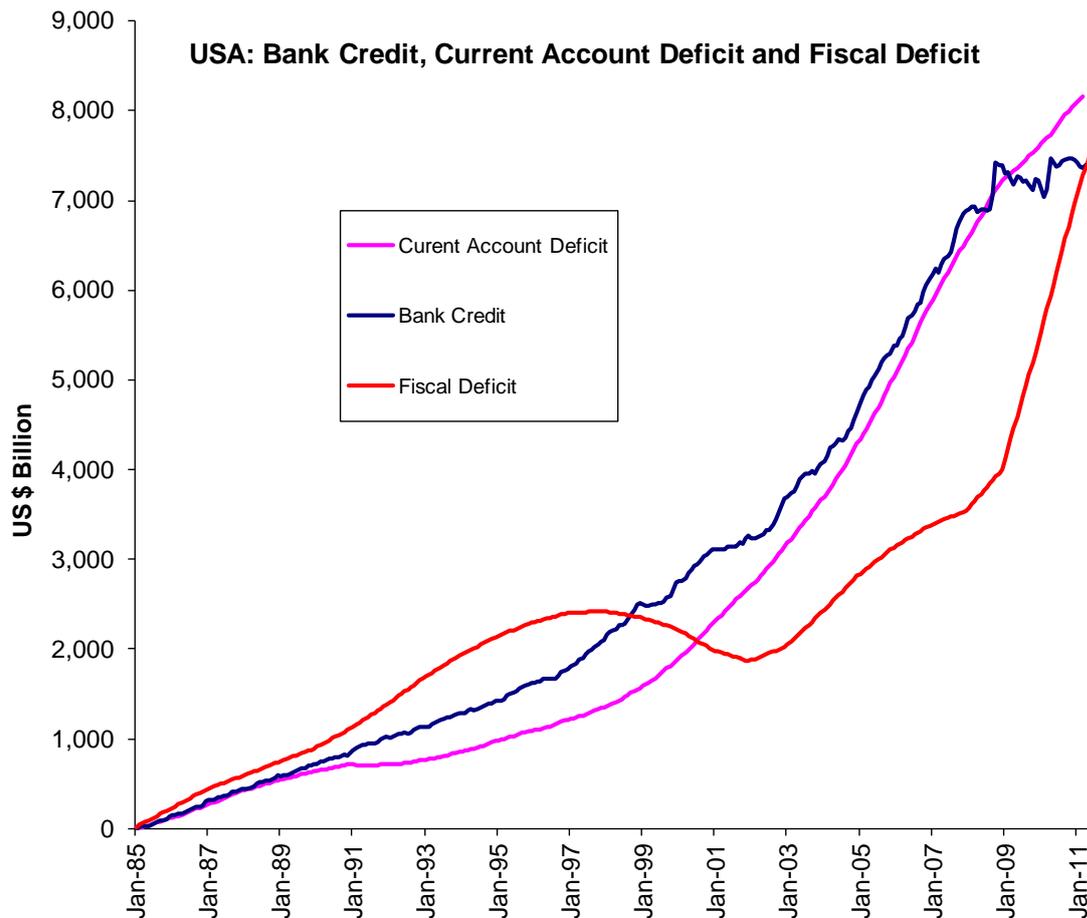
USA: Bank Credit, Current Account Deficit and Fiscal Deficit

Figure 17. USA Bank Credit, Current Account Deficit and Fiscal Deficit

The Reserve Bank of New Zealand is able to provide a clearer picture of the relationship between bank credit and the current account deficit. It publishes statistics on the amount of money created from domestic sources. It identifies this money as M3R. Figure 18 shows the close relationship between M3R and the current account deficit[3].

The Philippine economy has experienced a similar relationship between bank credit and the current account deficit as shown in Figure 19. The Research Department of the Central Bank of the Philippines became aware of that relationship in about 1997. By 2002, the Central Bank had modified its monetary system, enabling the Philippines to start experiencing current account surpluses. The Central Bank of the Philippines claims that it is using the floating exchange rate system. Also, it explains that it manages the exchange rate for the benefit of the Philippines.

The Philippines experience is relevant to the EMU because the Philippines maintained their nominal level of imports after 2002 while imports as a share of GDP were reduced significantly, indicating a significant rise in GDP.

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[3] A link to the data used in this chart is available at: www.buoyanteconomies.com/NZCADM3R.htm

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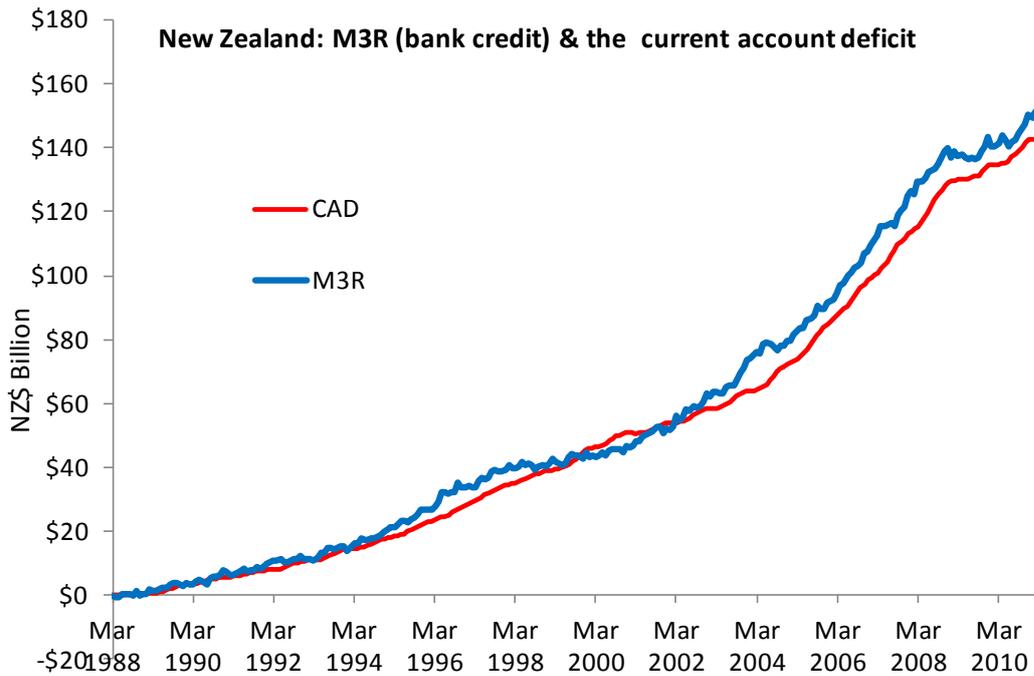
Figure 18. New Zealand: Domestic sources of money and the current account deficit
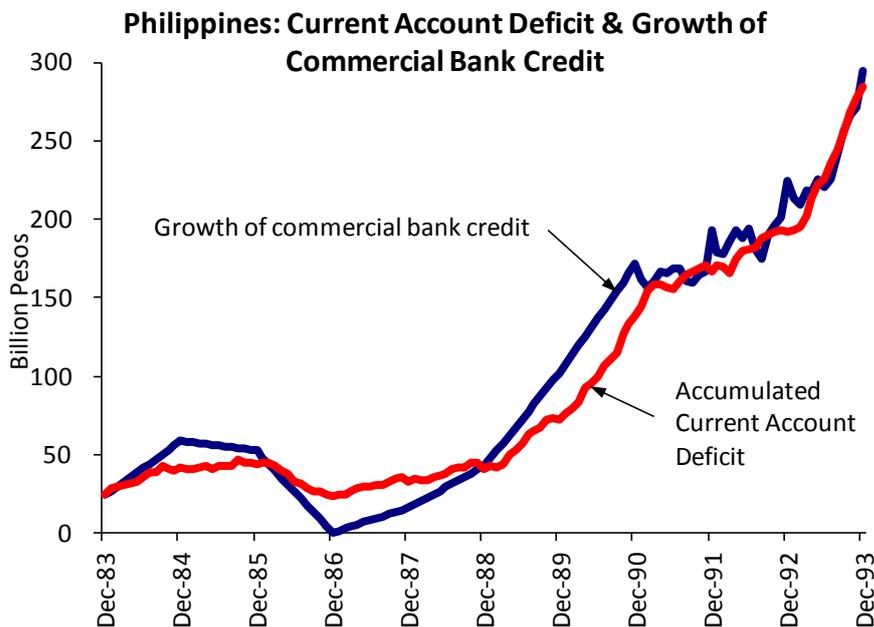
Figure 19. Philippines: Bank credit and current account deficit

Figure 20 depicts the relationship between currency in circulation and the current account deficit in India. Between 2000 and 2004, the exchange rate of India was managed. During that time, India experienced current account surpluses. When the economy was perceived to have stabilized, India reverted to the fully floating exchange rate system. Since then, the Indian current account deficit has returned to equal the growth in currency.
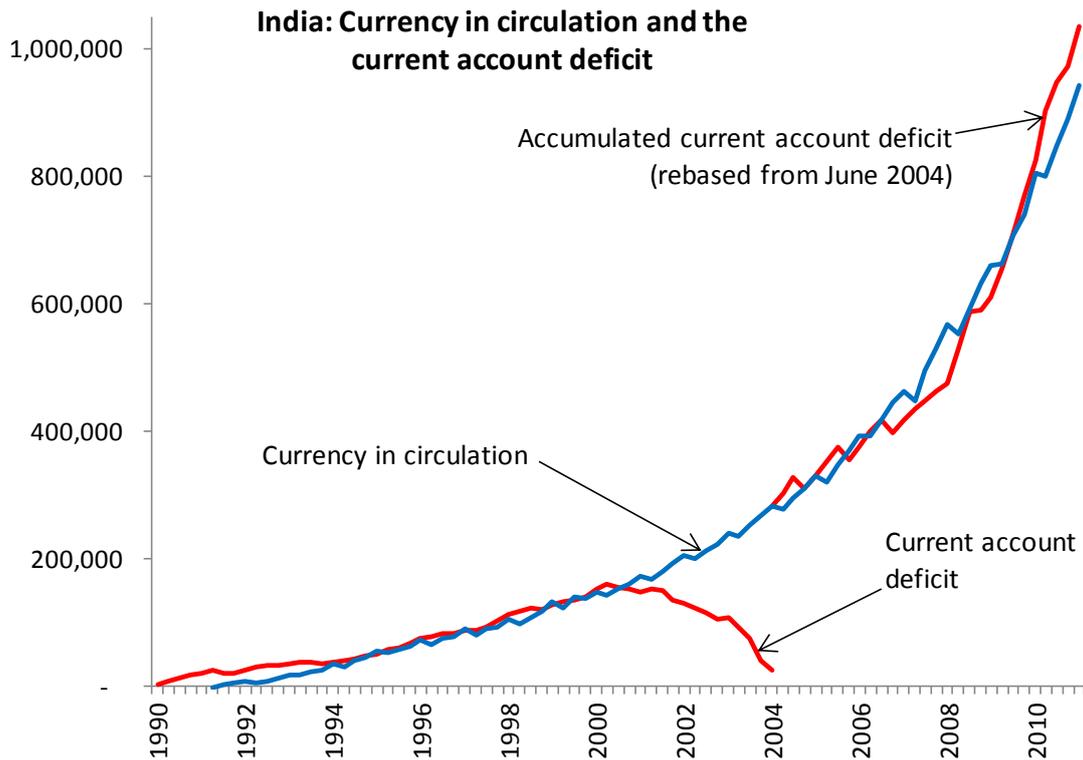
Figure 20. India: currency in circulation and the current account deficit

The reason for this relationship between the growth of bank credit and the current account deficit is that when the nation is using the floating exchange rate system, it does not build up any foreign reserves. That is, the nation does not save. Therefore, any additional money created by the growth of bank credit causes lending to exceed national savings, resulting in current account deficits. These deficits equal the amount of new credit created.

When the currency is fixed or managed, the economy is able to build up foreign reserves, or national savings. Therefore, when bank lending is less than national savings the nation experiences current account surpluses.

These national savings are not created by people holding their money and avoiding spending. While the money earned from exports is not spent on imports, as far as the rest of the world is concerned, it is being saved.

Money earned from international trade may be rapidly flowing through the domestic economy being spent on all manner of domestic goods and services. But that does not matter to the rest of the world: as far as it is concerned, the country is saving. When banks lend, they speed the process of money leaving the economy to be spent on imports. This affects national savings and/or national debt.

While bank lending is a legal activity, it has the same effect on the economy as the creation of forged money. The laws of economics are similar to the laws of gravity in that they

cannot be rescinded by an act of parliament.   As far as the economy is concerned, the growth of bank lending is an act of theft.

Bank lending, under the floating exchange rate system, is pillaging the economy on a far grander scale than any forger could imagine. The damage is not being inflicted on a foreign country, but upon the same economy that the banking system is intended to serve; upon its brother inhabitants and industries.

Banks may believe that they are innocent parties deserving support and compensation for the poor performance of their brother industries. However, the monetary system that has allowed the banks to become large and wealthy is responsible for overloading the economy with debt. If the economy sinks, the banks will sink with it. Banks need a prosperous economy if they are to sustain their prosperity.

A reconfiguration of the monetary system of the EMU must dismantle the "burgle thy brother" barrier to economic stability and growth. That does not mean that bank lending should be made illegal. But it does mean that bank lending needs to be managed in such a way that it is sustainable and contributes to the economic prosperity of the economy.

We would not tolerate an airline that persisted in issuing far more tickets than it had available seats. Likewise, we should not tolerate a banking system that persists in issuing far too much money.

3.4   Burgle and burden thy beggared brother

The above three barriers to economic prosperity can arise in any country using the floating exchange rate system.   Within the EMU, it is possible for these three barriers to interact and shift the consequences of the "burgling thy brother" barrier to the other regions within the EMU that are being hindered by the "beggar thy brother" barrier. If we look at the model of the EMU as a whole, the current account deficit is equal to the growth of bank credit, as shown in Figure 21.
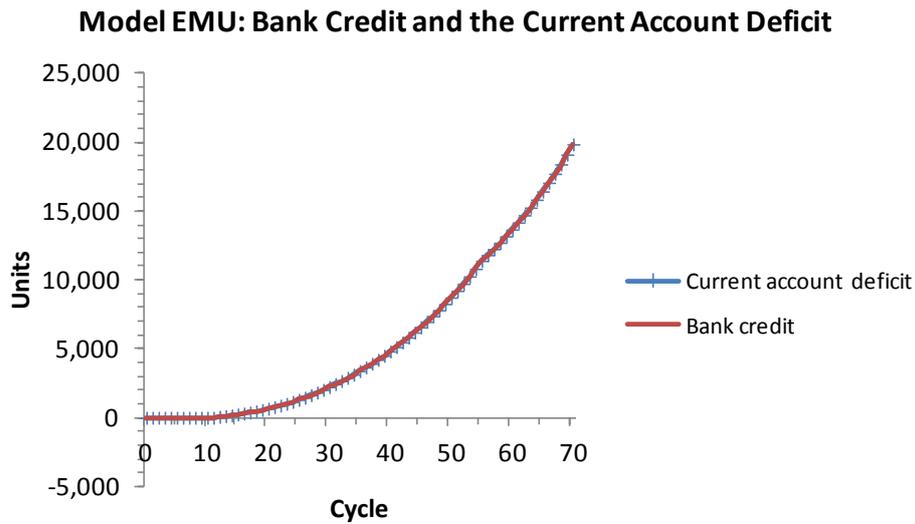
Model EMU: Bank Credit and the Current Account Deficit

However, when we look at the growth of bank credit and the current account deficit for Region B shown in Figure 22, we find that its current account deficit exceeds the growth of bank credit in that region.

Region B: Bank credit and the current account deficit
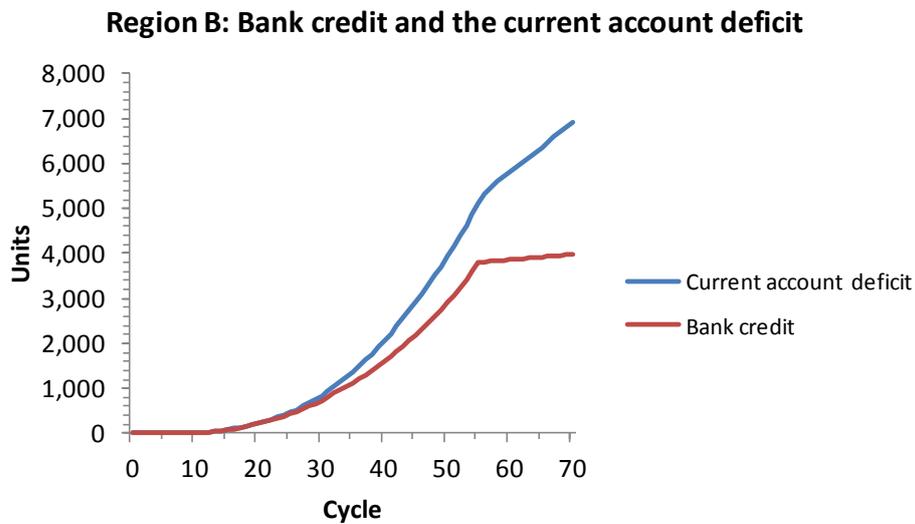
Figure 22. Region B: Bank credit and the current account deficit

For Region A, the current account deficit is less than the growth of bank credit as shown in Figure 23.

Region A: Bank Credit and the Current Account Deficit
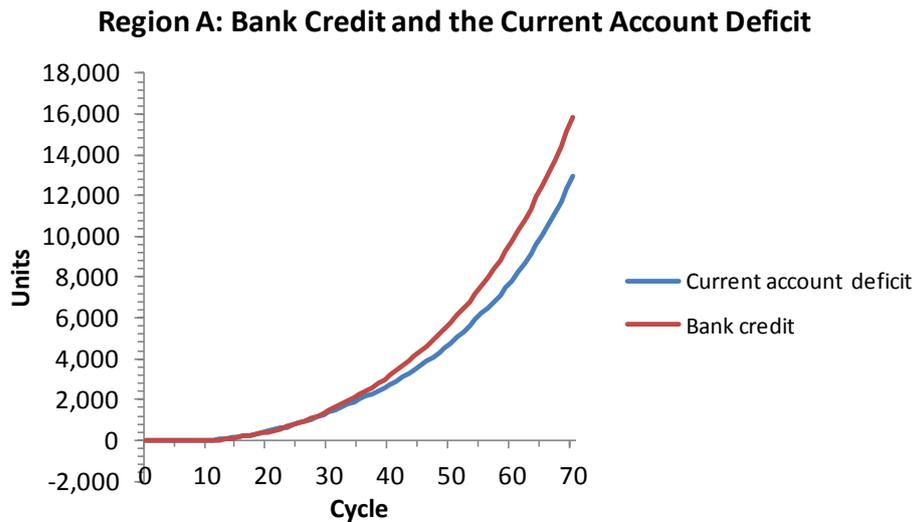
Figure 23, Region A: Bank credit and the current account deficit

Region A buys more imports from Region B, than Region B buys from Region A. Therefore, there is a net flow of money from Region A, to Region B, the lagging region. This additional income in Region B enables it to increase its imports from the rest of the world.

The EMU as a whole needs to borrow funds to pay for the additional imports from the rest of the world. However, if we attribute the outcome of each region's trade to that region, then Region A will accumulate foreign reserves (or lower levels of foreign debt) and Region B will accumulate higher levels of foreign debt.

This will occur even without credit growth. Figure 24 shows the growth in foreign reserves in Region A and the growth of foreign debt in Region B without any credit growth in either region.
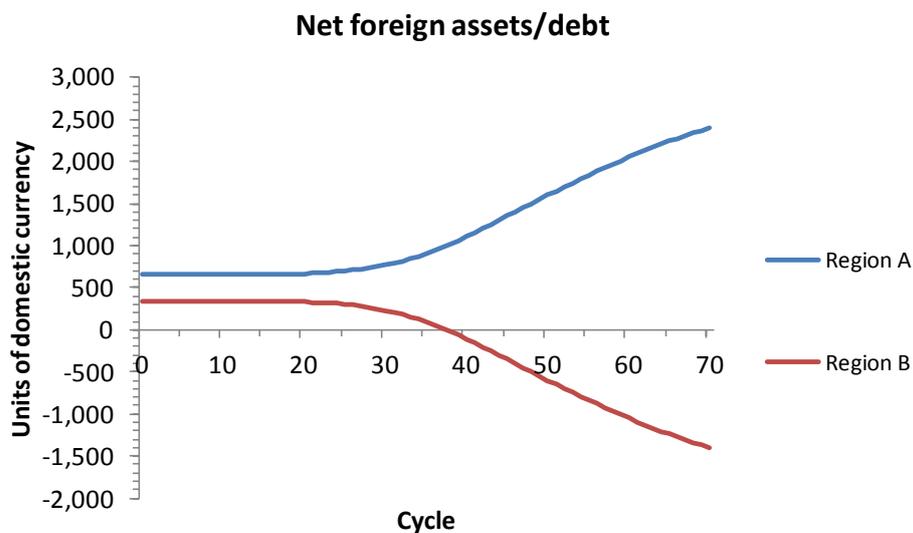
Figure 24. Net foreign assets and debt – with no credit growth

We saw in Figure 12 that Region B imports more from the rest of the world than it exports to it.   We acknowledged that export revenue from Region A compensated Region B for this deficit, so that the net deficit was relatively small.

However, it is the large net imports from the rest of the world that are generating the foreign debt; and that debt accrues to the net importer, Region B. The growth of that debt makes the beggared economy, Region B, appear to be responsible for a larger share of the current account deficit and the growing foreign debt. It should be responsible only for an amount equal to the growth of its bank credit.

The larger debt in Region B is not apparent in Figure 6 and Figure 29 which present the aggregate debts figures. This is because Region A is initially twice the size of Region B and the credit growth in Region A is much large than Region B. This hides the relative size of Region B's debt.

If we consider the burden of debt, represented by the ratio total debt to GDP shown in Figure 25, we can see that the debt burden is much larger in Region B, than in the leading export region, Region A.
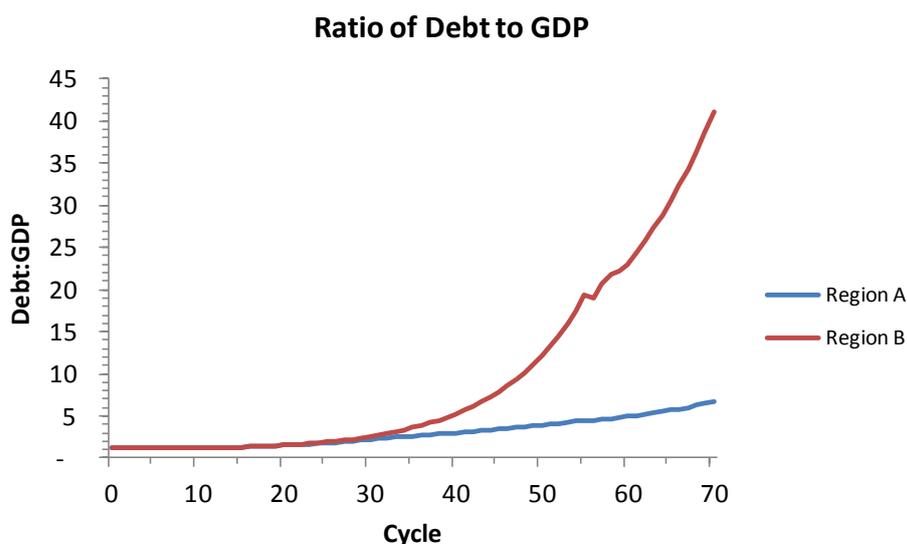
Ratio of Debt to GDP

Therefore, we can say that the "beggar thy brother" barrier in Region B, (caused by the growth of exports in Region A) is also shifting the consequences of the "burgle thy brother" barrier from Region A to Region B. This shift is raising the burden of foreign debt in Region B above what it otherwise would have been.

It is worth noting that the floating exchange rate system usually prevents economies from earning additional foreign funds. However, within the EMU, the prosperity of one region, Region A, is enhanced through international monetary flows via the foreign exchange market from the poorer members of the Union. That is, the money from Region B used to buy additional imports is transferred to exporters in Region A through the foreign exchange

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market. This has the effect of lowering incomes and increasing foreign debt in the lagging economy, Region B. The monetary system of the EMU must be reconfigured to remove these compounding barriers to economic growth.

3.5   Economic Anorexia

One of the attributes often viewed as a desirable feature of the floating exchange rate system is that it allows economies to maintain an "independent monetary policy". Milton Friedman considered this as a major attribute, essential to his proposal for an anti-cyclical monetary system.

Economists have nurtured this desire for an "independent monetary policy" and become paranoid about money entering the economy through international trade. Yet this money that they distain is no more than a record of income from foreign sources. If that money were to enter the economy, it would raise incomes and contribute to the prosperity of the economy. Also, it would raise foreign reserves, or national savings, and contribute towards establishing a sound foundation for the economy's monetary system.

To reject the money that could be sustaining the economy is a form of "economic anorexia". We saw that within the EMU, the transfer of funds within the EMU was contributing to the prosperity of some economies. Without those funds, the more prosperous countries within the EMU would be less prosperous. Revenues from international sources are a stimulus to the economy and isolating the economy from these funds makes the economy poorer.

Quarantining international monetary inflows from the economy distorts it. It forms the "beggar thy brother" barrier to economic stability and prosperity.

- It means that when one industry increases its exports, the market manipulates the exchange rate to make imports cheaper so that domestic demand shifts from domestic products to imports, starving the import competing industries of sustenance.
- It forces exporters to compete with each other, driving up the exchange rate and reducing their incomes.
- It means that industries undermine the prosperity of other domestic industries when they attempt to increase their prosperity in an economy.

The "independent monetary policy" feature of the floating exchange rate system is the foundation of the "burden thy brother" barrier. Debt would not be the only source of additional money if money was allowed to enter the economy from international trade. Also, revenue from international trade would allow national income to rise higher, thereby reducing the relative burden of the debt.

The "independent monetary policy" attribute is the keystone to the "burgle thy brother" barrier to economic stability and prosperity. It prevents economies from saving. Therefore,

when banks increase their lending by even the smallest amount, it means that they are lending more than has been saved. These loans enable:

- national expenditure to exceed national income;
- consumption to exceed production;
- demand to exceed supply.

Funds from international trade are essential to a balanced the monetary system. They are the national savings that offset the national "dis-saving" caused by the growth of bank lending.

Rather than enabling economies to conduct an independent monetary policy, the floating exchange rate system has caused nations to become dependent upon the monetary support of other economies. They depend upon foreign economies to provide the capital to fund the imports in excess of their exports. Therefore, it requires monetary dependence and raises foreign debt.

Also, the "independent monetary policy" undermines national economic independence and security. It causes economies to become increasing dependent upon other economies to supply basic needs that would otherwise be readily available from within the domestic economy.

Allowing international receipts to flow from one economy to another and increase the money supply in the recipient economy does not mean that the contributing economy, providing the funds, is poorer for it. Economies are interdependent. The foreign funds raise the income of the recipient economy. Also, they can enable banks to increased lending. These two sources of additional funds increase the demand for imports. This in turn contributes to the economic prosperity of the contributing economy. We have seen this occur in the model when the economic growth of Region A caused it to increase its demand for products from Region B.

Also, foreign reserves can be held as securities and in effect be lent back to the contributing economy. Hence, those funds can be retained within contributing economy to support its economic prosperity.

China provides a good example of this practice. Its economy prospers from the flow of international funds generated by its export growth. The growth of bank lending in China is less than the growth of its national savings. Therefore, it accumulates large foreign reserves. When China deposits its foreign reserves in another economy, it usually purchases financial securities that contribute to the financing requirements of that economy.

The floating exchange rate system is attributed with allowing the free flow of international capital. However, that is not the case. It is a system that is dependent on foreign capital flows.

Under the fixed exchange rate system, central banks were required to use their foreign reserves to pay for the imports financed by excessive bank credit. Under the floating exchange rate system, foreign capital is required to pay for the excess imports. Because there are no national savings, that excess is equal to the growth of bank lending. Foreign capital inflow is not free to exceed the excess demand caused by the growth of bank credit. Nor is it free to fall below that excess demand. This dependence on foreign capital means that the floating exchange rate system can result in unstable exchange rates.

International capital outflows are free to leave economies, as in Japan. The capital outflow provides additional funds to the foreign exchange market. It responds by deflating the exchange rate, making exports more competitive on the international market.

Also, without the discipline of rising foreign debt, central banks may allow unconstrained lending by commercial banks, because there are no apparent problems created by credit growth. This was the case in Japan and there was a time when Japanese banks grew from strength to strength.

However, bank lending inflated real estate prices and raised the burden of domestic debt in the economy. When there was a reduction in capital outflow, and a flow of funds back from the USA to Japan in the early 1990's it causes a downturn in the economy. Many borrowers were unable to carry the burden and the banks collapsed.

The floating exchange rate may appear to grant a form of freedom to international capital flows. However, it is not free for economies dependent upon foreign capital inflow. Countries that are net capital exporters may be free to export their capital. But they may not be free to repatriate those funds without undermining the stability and prosperity of their economy.

4   Continuation of Current Policy

The model was run beyond the initial crisis to observe what would happen if the current monetary system in the EMU was retained. To reflect policies among the lagging economies in response to the crisis, tax rates were increased 20 per cent across the board in Region B in the 59th cycle.   The outcome for GDP is presented in Figure 26 which uses a logarithmic scale.

GDP
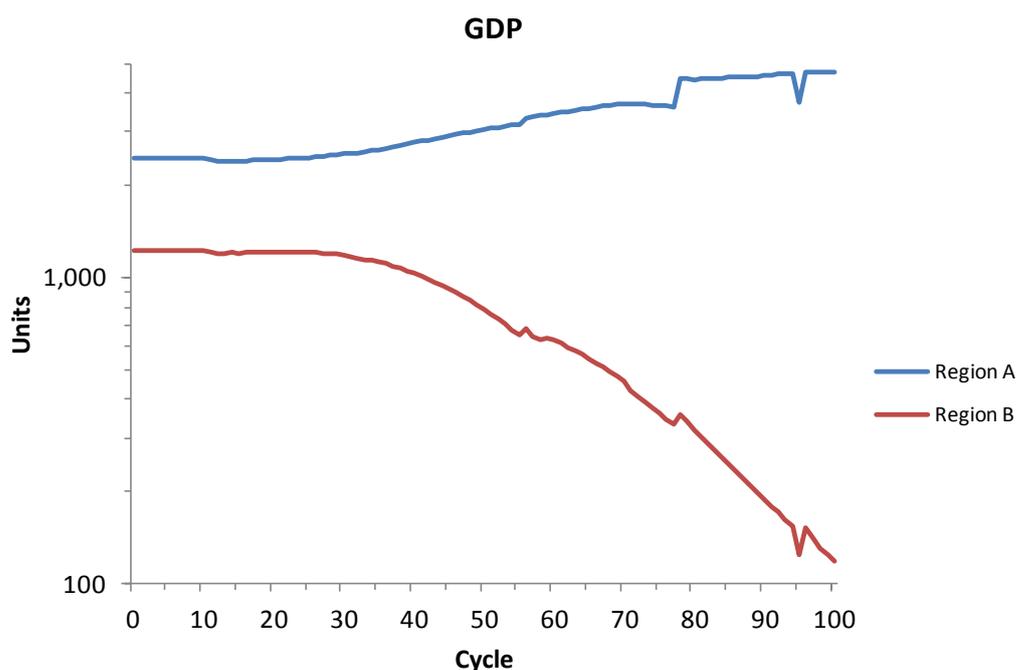
Figure 26. GDP in EMU without monetary reconfiguration

In Region A, GDP grows steadily and accelerates in the later periods. GDP in Region B continues to fall. Part of the reason for the falling income in Region B is that Region A drives up the exchange rate for the whole economy. This is the "beggar thy brother" problem considered above. As already discussed, the higher exchange rate makes it difficult of Region B to export to the rest of the world. Region A imports more from Region B than Region B imports from Region A, as shown in Figure 27. As we have already acknowledged above, the damage from the higher exchange rate outweighs the benefits of the demand from the more prosperous Region A.

 Despite being more prosperous, Region A is not stable. The modelled household sector in Region A reaches its debt ceiling in the 78th cycle. The growth in bank credit is shown in Figure 28. Bank credit grows briefly in the 95th cycle but generally, the household sector has reached its debt servicing ceiling and has stopped borrowing.

Region B: Net Foreign Income
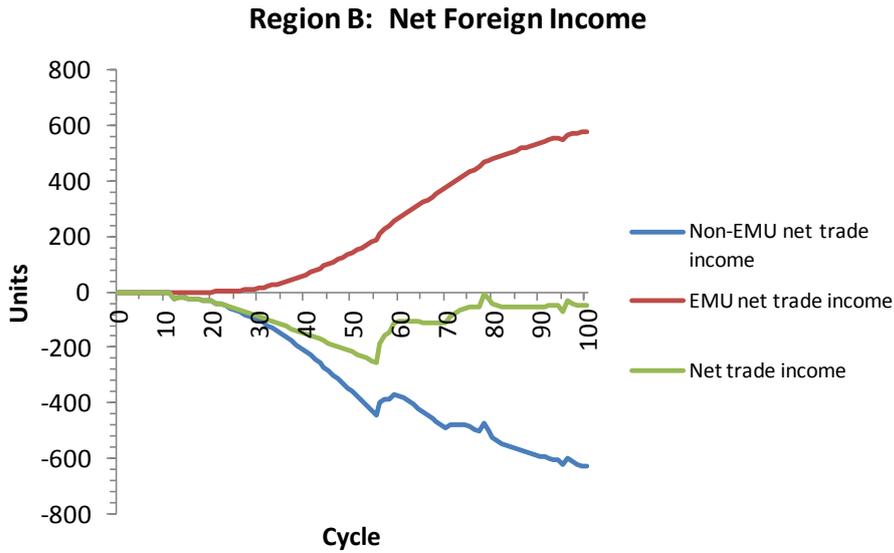
Figure 27. Net inter-regional revenue flows
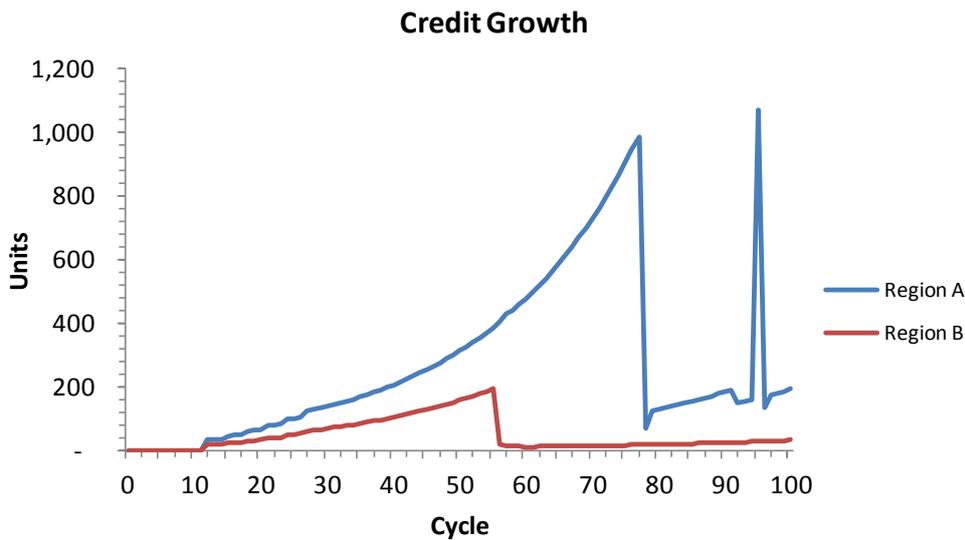
Credit Growth

Figure 28. Credit growth in the EMU

The growth in credit in Region A causes it to become increasingly indebted. As shown in Figure 29, the debt of Region A far exceeds the debt of Region B. The growth in debt servicing costs, the "burden thy brother" problem, weighs heavily on the household sector. However, the burden of debt stabilizes in Region A as a whole as shown in Figure 30, mainly due to cessation of household borrowing.

Net foreign assets/debt
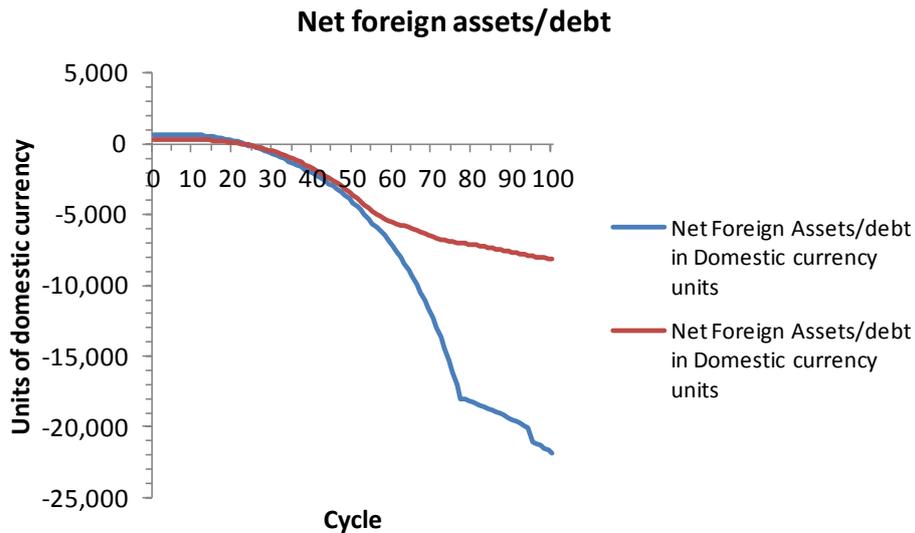
Figure 29. Foreign Assets/Debt of the EMU

Ratio of Interest payments to GDP
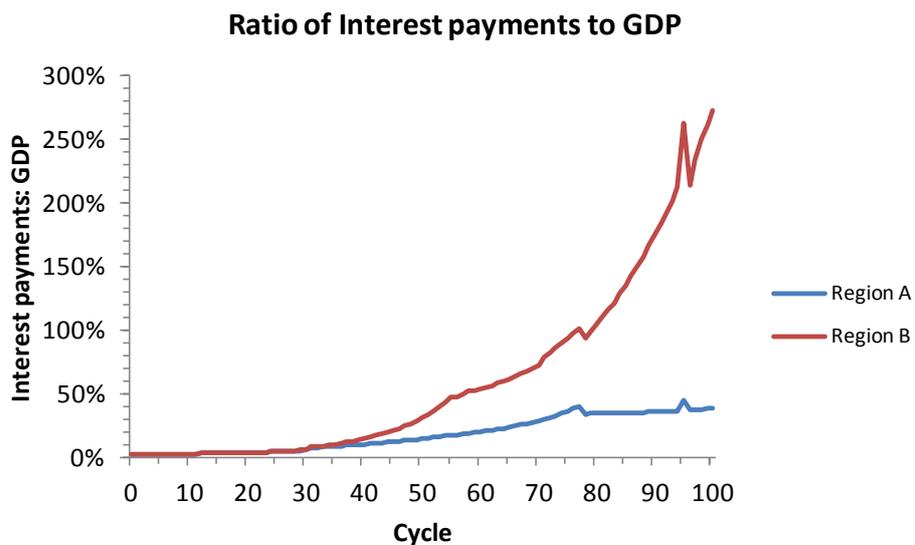
Figure 30. Ratio of interest payments to GDP

Figure 31 shows the incomes from internal sources. Primary industry grows as it is an input into the growing secondary export trade. However, the Other Tertiary sector suffers as it does not gain significantly from the secondary industry. When household credit hits its debt ceiling, the Other Tertiary sector takes another hit as a result of the decline in construction expenditure.

Region A: Income from domestic sources
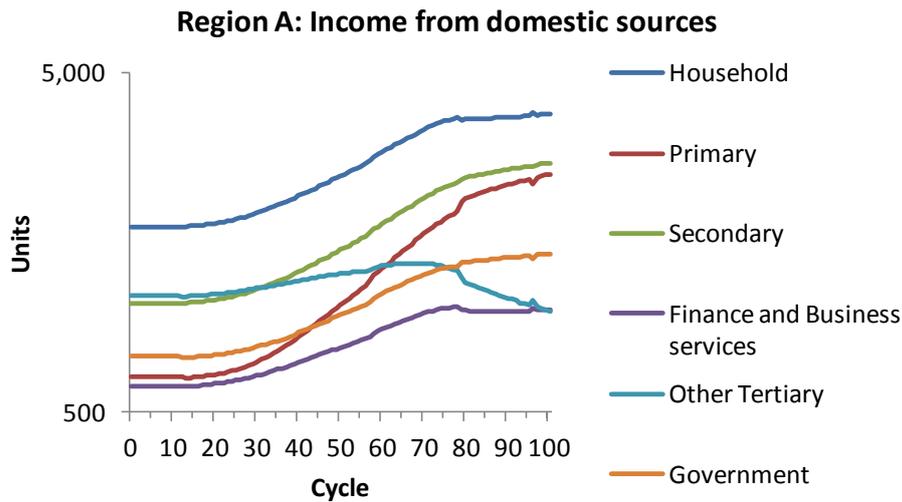
Figure 31.Region A: Income from domestic sources

In Region B, the situation was far worse than in Region A, as shown in Figure 32. Household incomes continued to fall. The policy of raising taxes appears not to have helped Region B.

Region B: Income from Domestic Sources
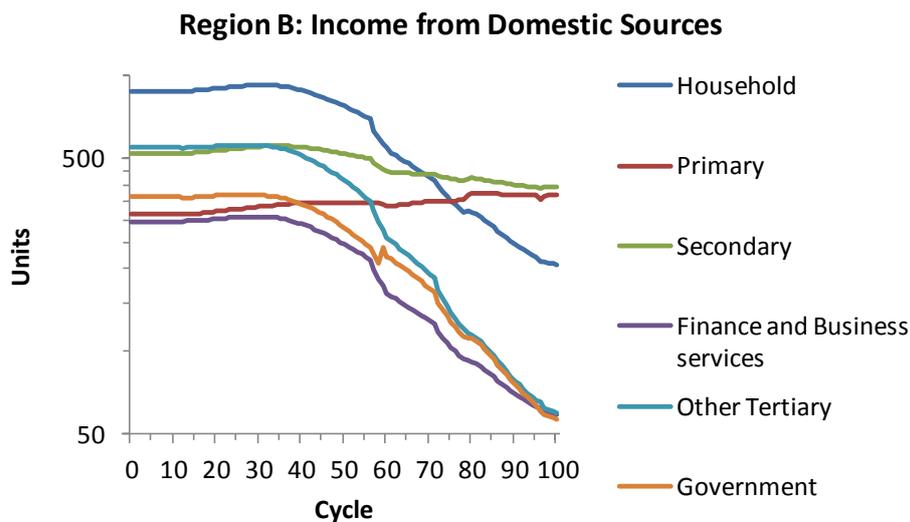
Figure 32. Region B: Income from Domestic Sources

Overall, we can expect the "beggar thy brother", "burden thy brother" and "burgle thy brother" barriers to persist in hindering the economic growth and prosperity of the EMU if its monetary system is not reconfigured. These barriers will not go away on their own volition. They must be removed.

To attempt to hold the EMU together using the current monetary system would leave a large part of the Union in poverty. Also, the regions that are currently prospering relative to the other economies are likely to suffer in future from excessive debt burdens.

5 Options for Monetary Reconfiguration

There have been suggestions that the countries failing within the EMU should leave the EMU and establish their own currencies. But if member countries leave the Euro, what exchange rate system should they adopt that would enable them to prosper? The computer model was built with the capacity to illustrate the operation of a number of monetary configurations. Five optional exchange rate systems are considered in this paper:

- the floating exchange rate system;
- the fixed exchange rate system, with the exchange rate tied to the other region;
- the fixed exchange rate system, with the exchange rate tied to a trade weighted basket of non-EMU trading currencies;
- a managed floating exchange rate system; and
- the optimum exchange rate system.

The model tested these options from the 60th cycle, preserving the economic situation that existed in the prior cycles under the floating exchange rate system but assuming now that Region B was no longer part of the single currency union. The following six combinations of exchange rate options were tested:

Region A	Region B
Floating	Floating
Floating	Fixed, tied to A
Floating	Fixed, tied to a basket of currencies
Floating	Managed float
Floating	Optimum exchange rate
Optimum exchange rate	Optimum exchange rate

In addition, the model was used to assess the effect of retaining all member states within the EMU but reconfiguring the monetary system for the whole EMU.

5.1 Region A, Floating; Region B, Floating separately

The floating exchange rate system is the system currently operating in the EMU. It requires that the exchange rate vary so that international financial transactions do not affect the domestic money supply.

The EMU is assumed to split into two monetary systems from the 60th cycle of the model with both parts running independent floating exchange rate systems. Before the split, taxes in Region B were raised 20 per cent at the 59th cycle. In the model, government policy is to ensure that its expenditure does not fall below the initial level of expenditure in real terms.

As shown in Figure 33, following the separation from the EMU, Region B responds well with a rise in GDP. There follows some instability that leads to a decline and the eventual collapse of the economy.

GDP
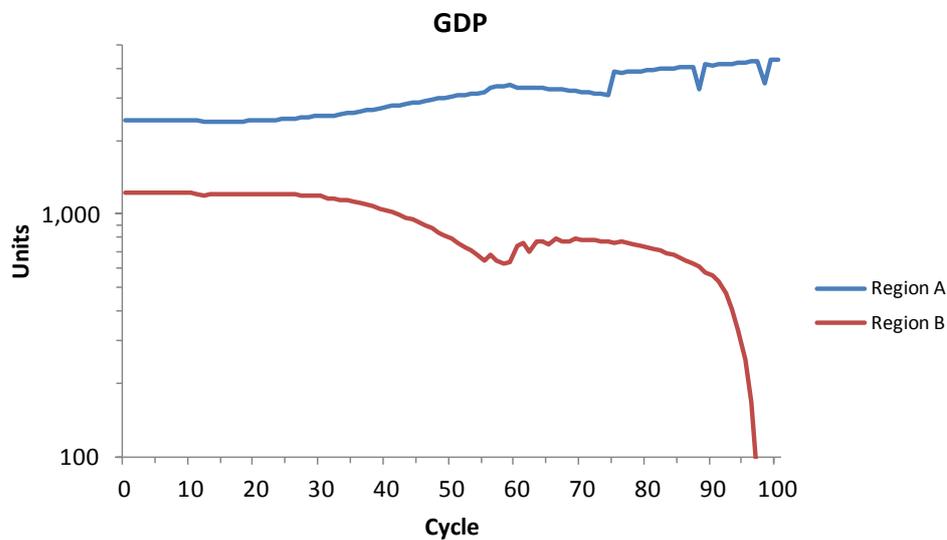
Figure 33. GDP with separate floating exchange rate systems

The burden of debt was too great for Region B to carry as shown in Figure 34. As GDP declines, the Region can no longer afford to pay the interest on its debt. GDP falls dramatically, after the 90th cycle, causing the ratio of debt to GDP to go off the chart.

In another test of the model, it was possible to obtain some growth by lowering interest rates and slowing credit growth. However, that only postponed the eventual collapse of this economy.

Ratio of Interest payments to GDP
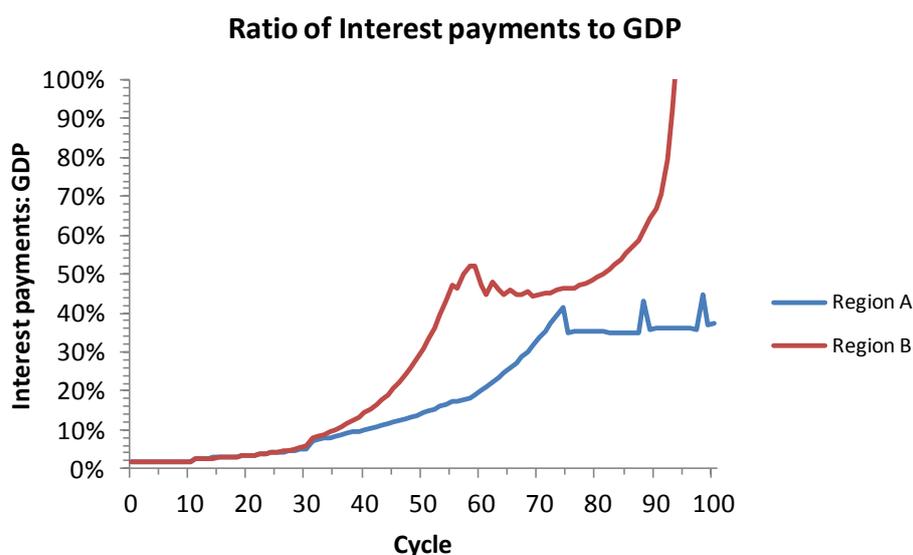
Figure 34. Ratio of Interest Payments to GDP with separate floating exchange rate systems

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The other significant factor was that the exchange rate system prevented Region B from prospering from trade. The foreign exchange flows are shown in Figure 35. The rising exchange rate is shown in Figure 36.
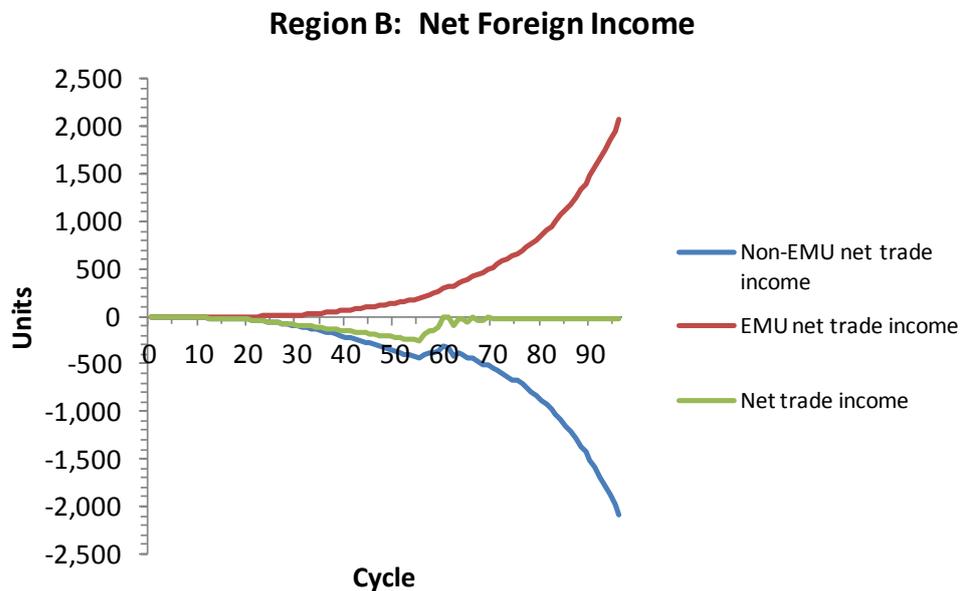
Region B: Net Foreign Income

Before the household sector in Region A reached its debt ceiling and the currency separation, Region B's net imports from the rest of the world were greater than its net exports to Region A. After the separation, the net imports from the rest of the world declined to be almost equal to the net exports to the Region A. While the external trade position had improved, it was not sufficient to stimulate the economy of Region B.
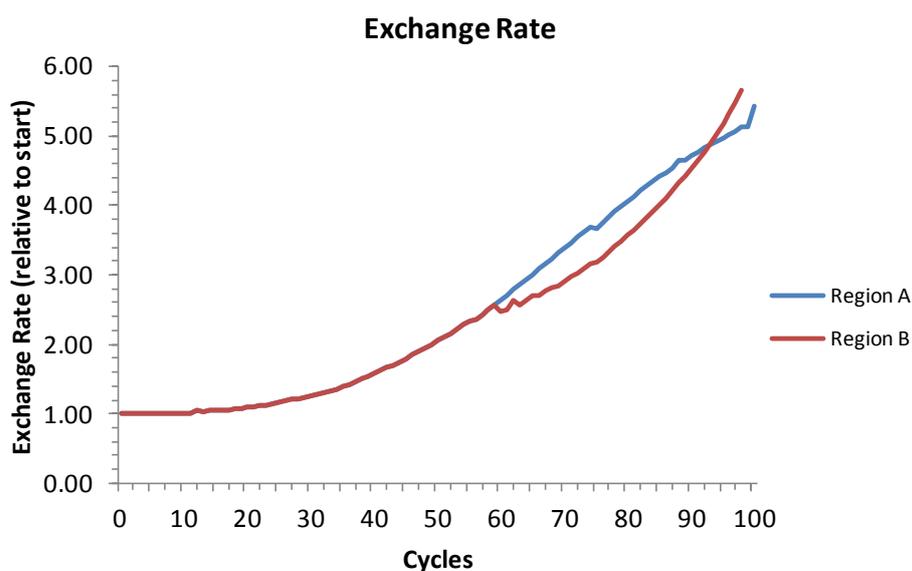
Exchange Rate

The economy of Region A did not respond well to the splitting up of EMU. Its GDP slowly declined immediately after the separation as shown in Figure 33. GDP did respond positively when the household sector hits its debt servicing ceiling in cycle 75. After an initial depreciation, following the collapse of household borrowing, the exchange rate started to appreciate at a slower rate, as shown in Figure 36. The lower exchange rate raised export incomes and reduced imports, thereby stimulating economic growth.

Even so, we must conclude that splitting the EMU and allowing each economy to continue on the floating exchange rate system is not a solution for those economies continuing in the Euro, nor for those economies that leave.

5.2 Region A, Floating; Region B, Fixed linked to A

Devaluing the exchange rate of Region B and linking it to the exchange rate of Region A was the second option considered. There were a number of possibilities available with this option. To test this approach, the exchange rate of the new currency was fixed at 20 per cent below the currency of Region A, representing the Euro. The 20 per cent depreciation was expected to be sufficient to reveal the benefits of this option. This is a fixed exchange rate option and it allows international transactions to affect the money supply.

The GDP of Region B initially responds dramatically to the separation and devaluation of its currency, as shown in Figure 37. That growth quickly settles down before rising again when the households in Region A reach their debt servicing ceiling. However, the separation has caused Region A to be less prosperous. Region A does not start to prosper again until its household sector hits its debt serving cost ceiling in cycle 75.
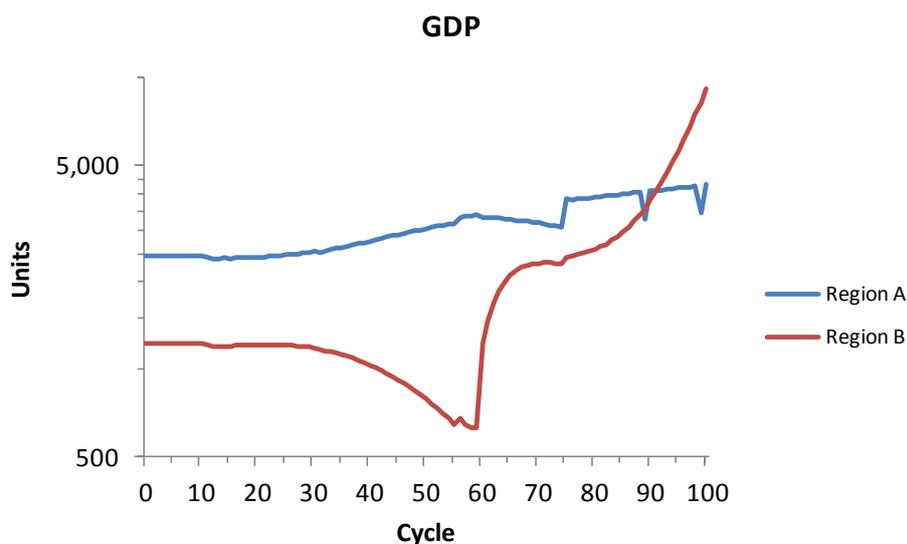
Figure 37. GDP with Region A floating and Region B exchange rate tied to exchange rate of Region A

As noted in the earlier option, GDP in Region A grows after cycle 75 because of the increased exports and lower imports. The devaluation of the exchange rate for Region B, shown in Figure 38, has an even more profound effect on its economy, as was shown in Figure 37.
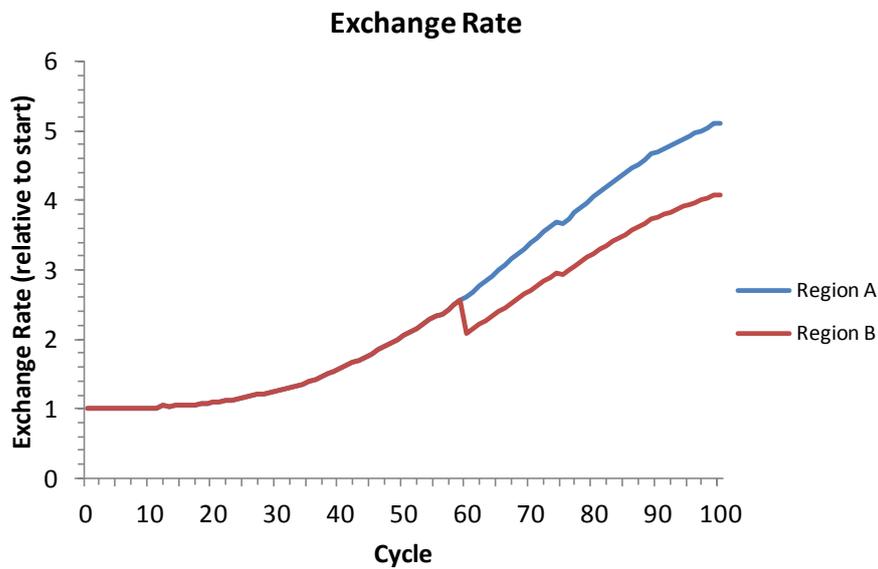
Exchange Rate

Figure 38: Exchange rates with Region B exchange rate linked to Region A's

Although the GDP of Region B grows rapidly, only the initial growth comes from a positive injection of foreign funds, as shown in Figure 39.

Region B: Net Foreign Income
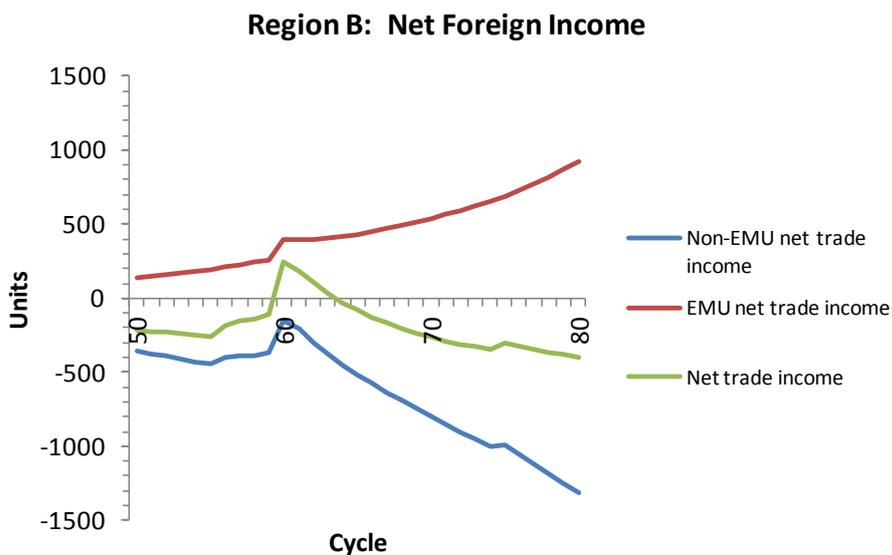
Figure 39. Region B: Net foreign income with a fixed exchange rate linked to Region A

The rise in GDP in Region B means that the debt ceilings are no longer binding and Region B households can afford to borrow again, as shown in Figure 40. It is this credit that drives the economic growth in Region B.
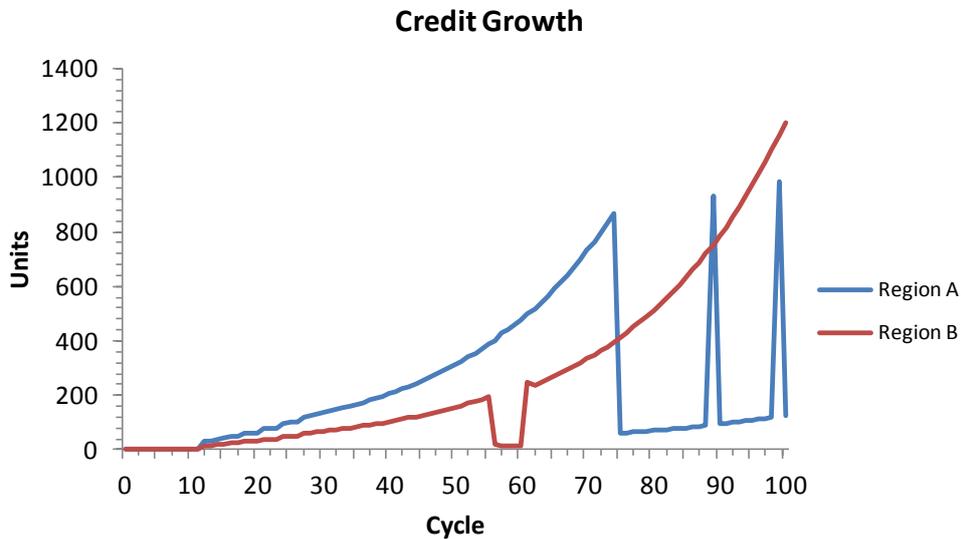
Figure 40. Credit growth with Region A floating and Region B exchange rate tied to A

Despite the improved GDP, not all the regions experience stability. Debt continues to grow in both regions and Region A experiences instability when households hit their debt ceiling, also shown in Figure 40.

For the whole economy, the debt burden does stabilize after households in Region A hit their debt servicing ceiling, as shown in Figure 41. Even so it remains high.
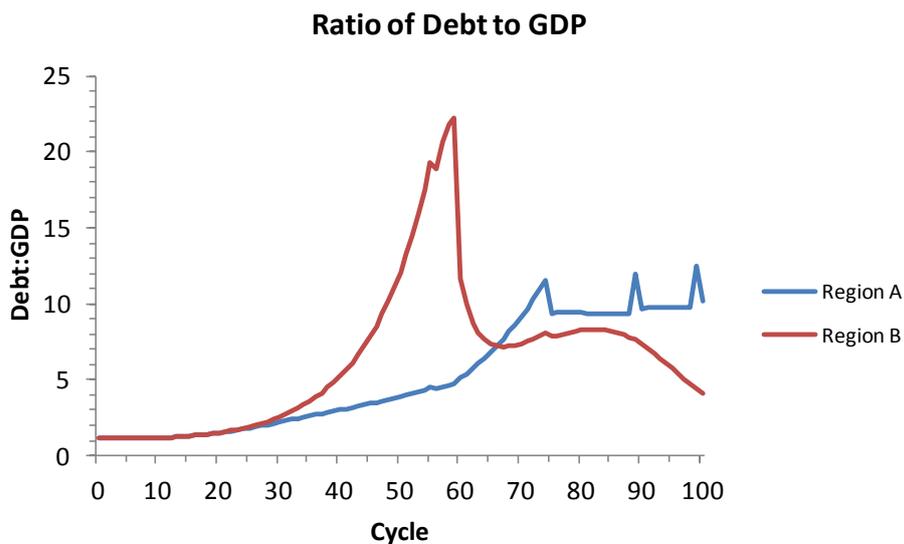
Figure 41. Ratio of Debt to GDP with the exchange rate of Region B tied to Region A

The separation of Region B from Region A by devaluing and linking its exchange rate to Region A's exchange rate does provide prosperity for Region B. However, the arrangement does not provide prosperity for Region A. Nor is it a stable economic foundation for the future growth and prosperity of these economies. These economies continue to be dependent upon the growth of debt.

5.3 Region A, Floating; Region B, Fixed

The option of a fixed currency tied to a basket of currencies outside of the EMU isolates the exchange rate of Region B completely from any the influence of the EMU. As with the previous fixed and linked system, international transactions affect the money supply. As in the previous example, the exchange rate was initially depreciated 20 per cent at cycle 60 and kept at that level, as shown in Figure 42.
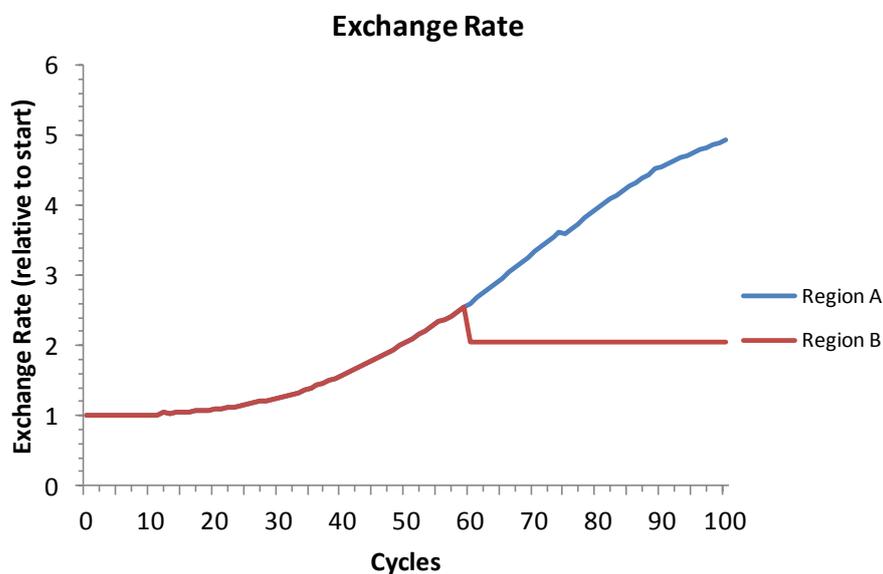
Figure 42. Exchange rates, Region A, floating; Region B, fixed

This option produced an immediate and rapid response as shown in Figure 43, which has a logarithmic vertical scale. The income of Region B quickly surpasses that of Region A, which had been the leading economy.

GDP
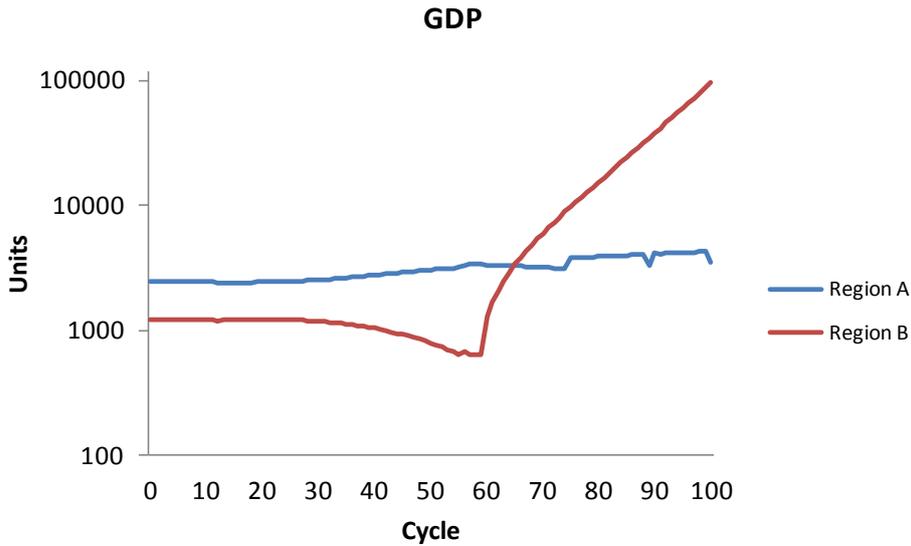
Figure 43. GDP, Region A, floating; Region B, fixed

The reason for this is clear when we look at the net flows of foreign income. Region A may be a large net exporter to the rest of the world but it is also a large importer. Following separation at cycle 60, its imports exceed its exports by the growth in bank credit. It earns no additional income for its growing exports. It only grows debt. When its household sector reaches its debt servicing ceiling, the resultant depreciation raises exports to the rest of the world. At that time, Region A increases its imports from Region B. The net effect is that Region A does not receive any stimulus from international trade. That is how it is meant to be under the floating exchange rate system.

Region A: Net Foreign Income
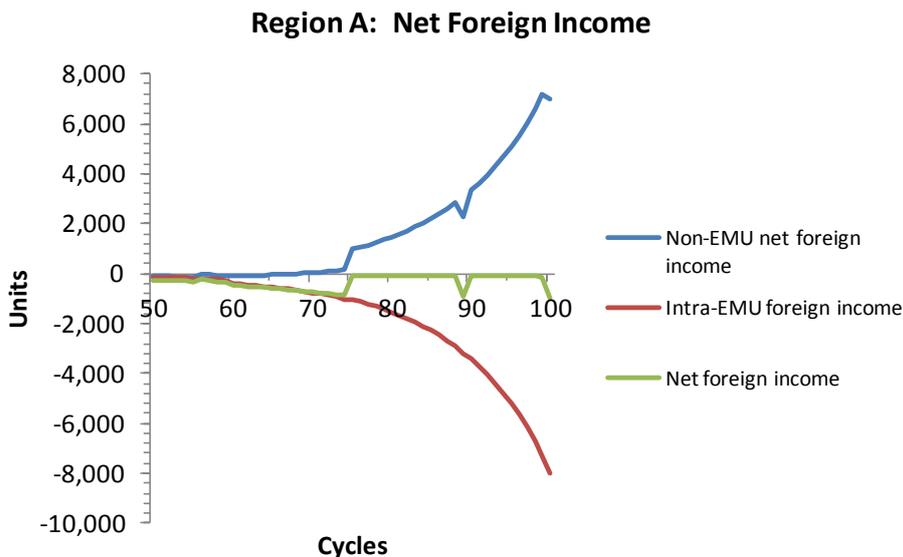
Figure 44. Region A: Net foreign income

Region B continues to be a net exporter to Region A and a net importer from the rest of the world. However, it has a large and positive net surplus of foreign income, as shown in Figure 45. This stimulates the whole economy.

Region B: Net Foreign Income
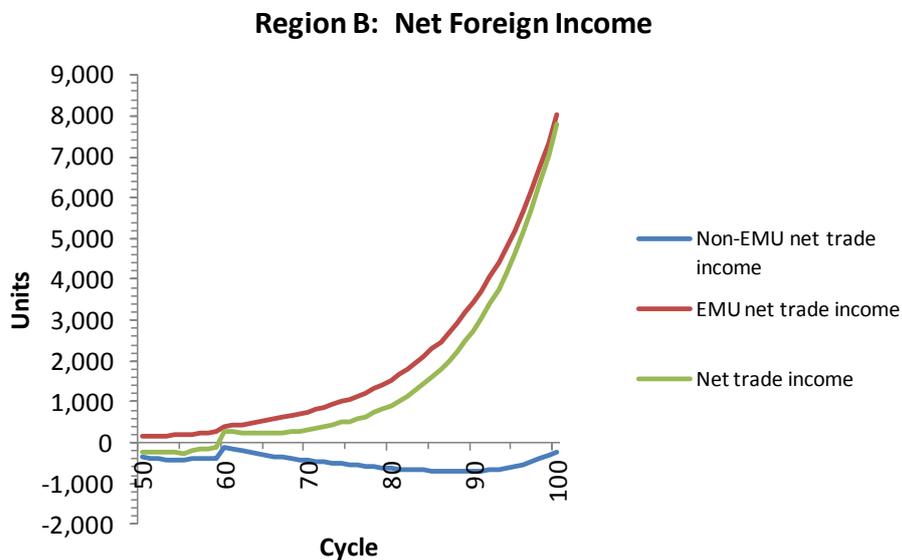
Figure 45. Region B, Net foreign income

This inflow of foreign funds quickly reduces the net debt of Region B, as shown in Figure 46. However, Region A experiences a slow growth in its debt burden because it continues to raise its total level of debt. For Region B, the rapid growth of its foreign reserves means that its net foreign debt has been eliminated and it has net foreign reserves, as shown in Figure 47.
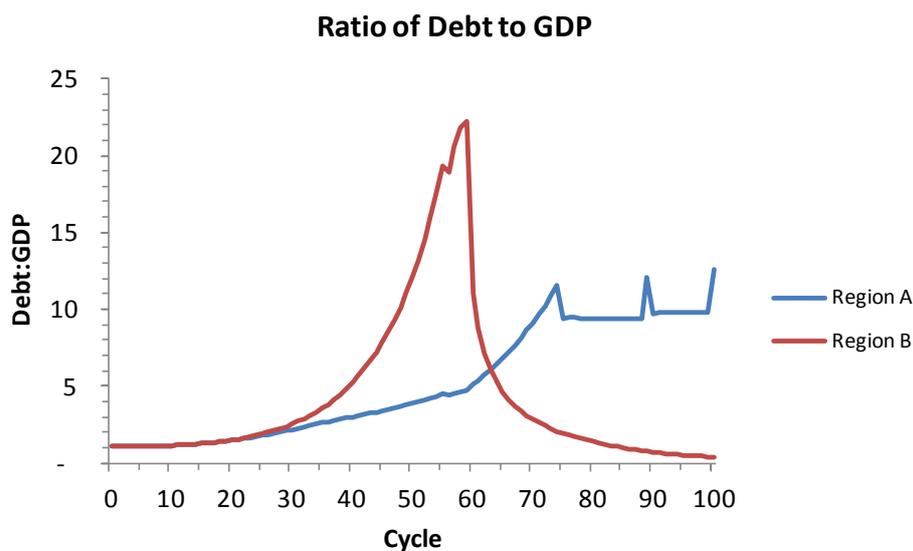
Ratio of Debt to GDP

Figure 46. Ratio of Debt to GDP
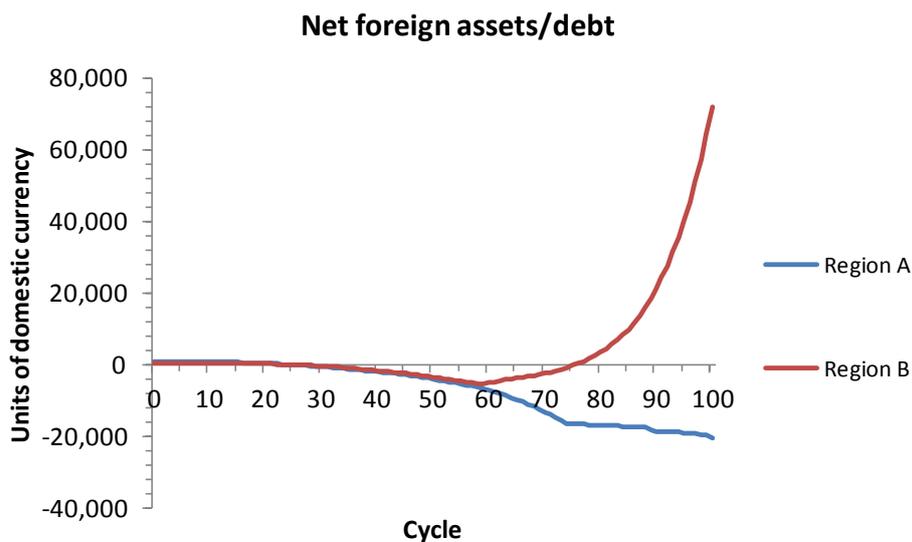
Net foreign assets/debt

This option highlights the amount of damage that the floating exchange rate system has inflicted on these economies. Without it, Region B's economy grows rapidly.

The real economy may not be able to grow as rapidly as in the model. Even so, the fixed exchange rate system needs to be considered as a viable option. China uses the system and it is growing rapidly. Europe and the United States of America also prospered when they were using the system.

The system does not have an integrated system for managing credit growth. Even so, it is a system that could overcome all the barriers that are hindering the attainment of economic stability and prosperity in the EMU.

5.4 Region A, Floating; Region B, Managed Float

The managed float is a process whereby the exchange rate is allowed to float within specified limits. These may be in the form of a cap, floor or collar. For example, there may be a cap or limit on the exchange rate rising more than 2 per cent relative to the average exchange rate over the past year. Alternatively, there may be a floor of say 3 per cent relative to the average exchange rate over the past two years. A collar could take the form of a limit of 1 per cent over or under the average for the last year.

The central bank would manage the float. It would buy foreign currency in exchange for domestic currency when the exchange rate met its upper limit. If the exchange rate met its lower limit, it would sell foreign exchange and buy domestic currency. This is likely to be a profitable activity for the central bank.

To assess this approach in the model, the exchange rate of Region B was allowed to rise, or fall, 1 per cent in each cycle. It was not linked to the exchange rate of Region A. The outcome was that after an initial depreciation, the exchange rate appreciated at its maximum rate of increase, as shown in Figure 48.
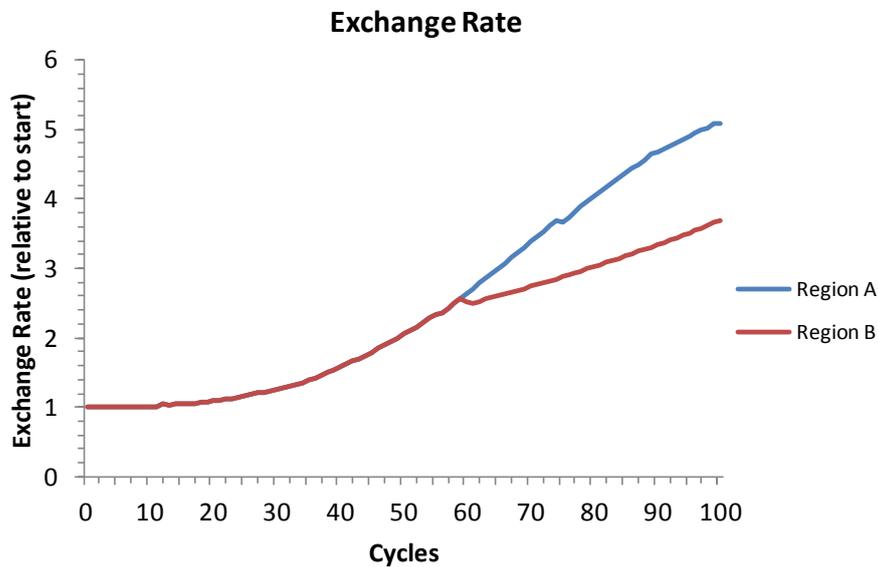
Exchange Rate

Figure 48. Exchange rates with Region B managed

The effect upon GDP is shown in Figure 49. The managed float for Region B provided it with a lower exchange rate than it would have had it stayed with the EMU. That exchange rate allowed it to raise exports and reduce imports, thereby raising GDP.

GDP
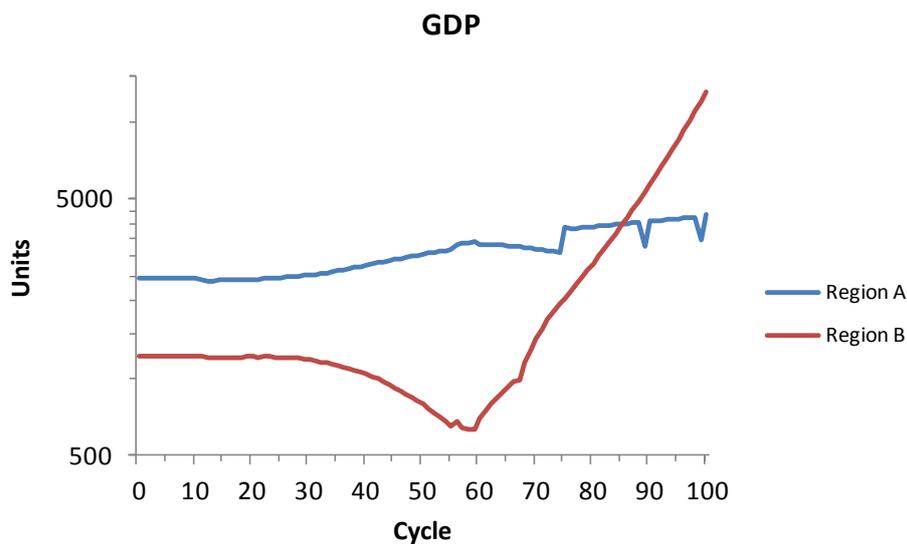
Figure 49. GDP with managed exchange rate for Region B

As for the fixed exchange rate linked to the exchange rate of Region A, the main source of funds to stimulate growth came from the growth of bank credit. Figure 50 reveals that

after an initial and small net gain in foreign income in the 65th to 66th cycle, Region B continued to lose income from trade until the 92nd cycle, when it started to generate some additional income from trade.

Region B: Net Foreign Income
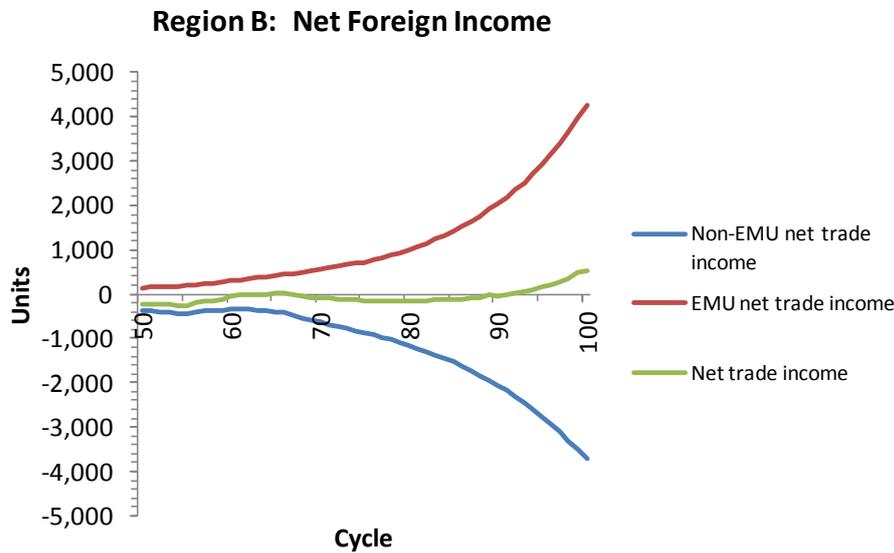
Figure 50. Region B, Net foreign income with a managed exchange rate

Region B's main source of economic stimulus for most of the following cycles came from the growth of credit, as shown in Figure 51.   Therefore, its net foreign debt continued to increase for most the following cycles.
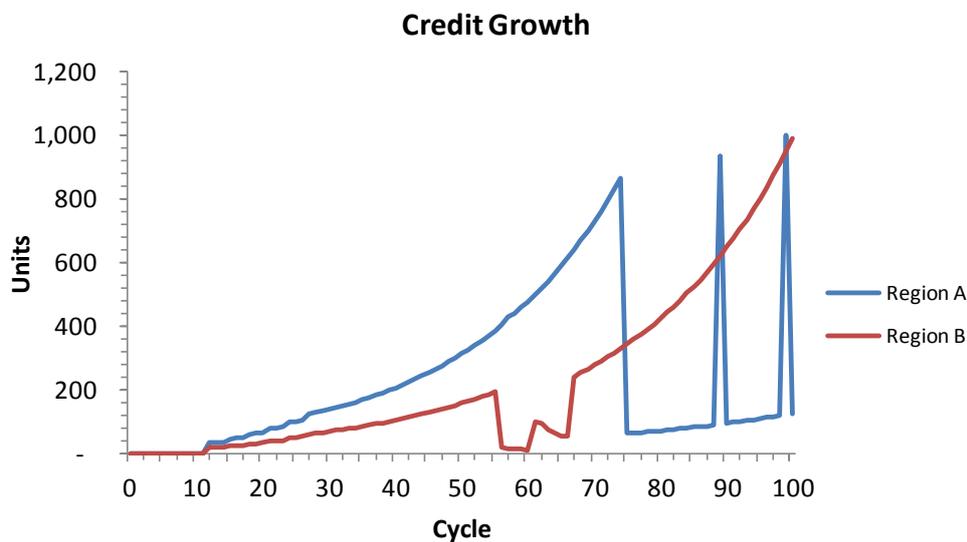
Credit Growth

Figure 51. Credit growth with a managed exchange rate in Region B

Net foreign assets/debt
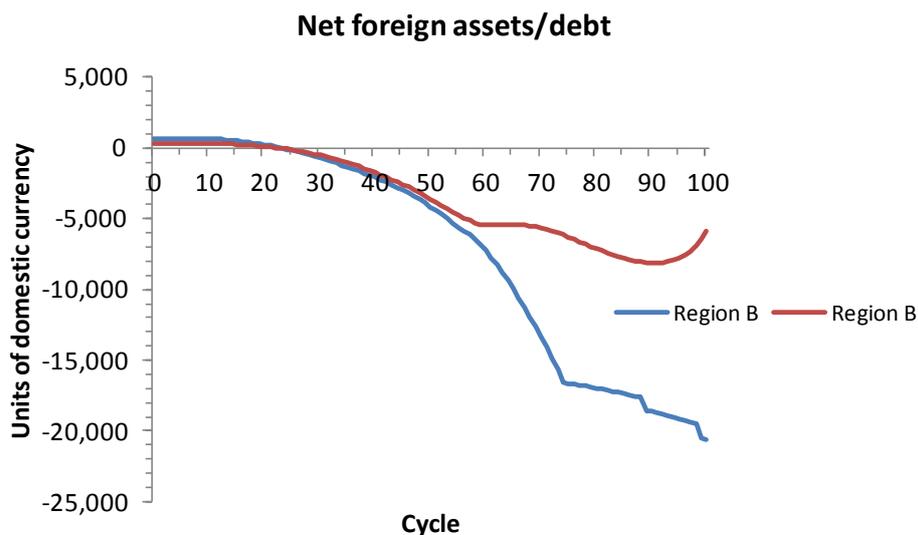
Figure 52. Net foreign assets/debt with a managed exchange rate in Region B

The managed exchange floating exchange rate enabled Region B to be more prosperous than it otherwise would have been. Also, it enabled its debts to become manageable. Therefore, it may be a solution for those economies experiencing economic difficulties within the EMU. However, it does not contribute to the prosperity of the remaining EMU members.

5.5   Region A, Floating; Region B, Optimum Exchange Rate System

The optimum exchange rate system[4] is an integrated monetary system that uses market incentives to manage both the exchange rate and the growth of bank credit so as to provide prosperity and economic stability. It can be incentivized to achieve a range of economic objectives that the government may choose. For example, it can be used to target employment levels, economic growth and price stability.

The first part of the system manages the growth of bank credit. To consider this, we will initially assume that the exchange rate is fixed. To avoid the "burgling thy brother" problem, the growth of bank credit needs be managed to prevent excessive lending that would cause the economy to buy more than it had produced, or lend more than had been saved. This system may allow foreign capital inflow to generate additional expenditure. However, that is not seen as a problem and the market can manage those flows using interest rates, which are determined in the market, also.

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[4] See "An introduction to the optimum exchange rate system" by Leigh Harkness available at:
www.buoyanteconomies.com/PAPER3.pdf. The guided exchange rate system behaves in a similar manner. Details of that system may be found at: www.buoyanteconomies.com/Guided_exchange_rate_system.htm

The proposed approach to managing the growth of bank credit is to link it to the growth of foreign reserves. The reserves could be denominated in terms of a currency, a basket of currencies, or in terms of gold. For example, banks may be authorized to lend, say, 20,000 Euros for every additional ounce of gold (or foreign exchange equivalent) that they held. In that way, if a bank's lending were excessive, it would deplete the bank's foreign reserves and that would automatically constrain it from further lending.

The reserves could be held fully, or in part, with the central bank. The growth in foreign reserves means net foreign reserves. Banks may directly borrow foreign currency but such loans would not enable them to raise their net foreign reserves and increase their lending.

This system allows banks to settle inter-bank transfers through a special settlement account which is denominated in foreign currency. In that way, if a bank were to lend excessively, it would suffer a reduction in foreign reserves through the special settlement account and that would constrain it from further lending.

This approach also means that some money will be created from the growth of foreign reserves. Therefore, domestic debt would not be the only source of additional money in the economy. Based upon the experience of the USA between 1986 and 1996, this approach should be sufficient to remove the "burden thy brother" barrier to economic stability and prosperity. Any growth in bank credit managed in this manner would be sustainable. It means that bank credit may grow only while the net foreign assets of the banking system were growing.

The second part of the system manages the exchange rate to achieve other objectives. For example, let us assume that the government wishes to attain full employment, with unemployment under 2 per cent. Also, it wishes to maintain inflation at below 3 per cent.

To provide incentives for the market to attain these objectives, it could advise the banks that they may lend 20,000 Euros for every additional ounce of gold (or foreign exchange equivalent) that they held while unemployment was equal to or less than 2 per cent, and while inflation was less than 3 per cent. But for every 1 per cent that unemployment exceeds 2 per cent and inflation exceeds 3 per cent, the amount that banks may lend for every additional ounce of gold (or foreign exchange equivalent) in their foreign reserve account would be reduced by 2,000 Euros.

Therefore, if unemployment was at 6 per cent and inflation 4 per cent, the banks would be allowed to lend 10,000 Euros for each ounce of gold (or foreign exchange equivalent) held in their foreign reserve account.

Banks earn profits by lending money: not from holding foreign reserves. Therefore, to maximize their profits relative to their foreign reserves, they would drive the exchange rate to a level that maximizes employment and minimizes inflation. Also, they would be likely to take discretionary measures to direct lending towards activities that created employment.

Furthermore, they would be interested in managing the rate of change of credit and the exchange rate so as to minimize inflation.

In this environment, interest rates would be determined by the market, not by the central bank. If the economy needs to increase its lending for investment to provide employment, it might raise interest rates to attract foreign capital and allow the banks to increase lending. If there were excessive lending capacity, interest rates may fall, discouraging foreign capital inflow and encouraging capital outflow.

If the government decided to lower the rate of inflation, it could lower the target rate or raise the penalties for exceeding the desired maximum.

Note that when the USA moved from a fixed exchange rate to a floating exchange rate system, the rate of inflation increased as shown in Figure 53. It is likely that if a country moves away from the floating exchange rate system, the rate of inflation would decline.

It is possible that a country could experience a deflationary boom in the same way that countries experienced an inflationary recession when they moved to the floating exchange rate system. The rate of inflation is not directly proportional to the growth of the money supply.
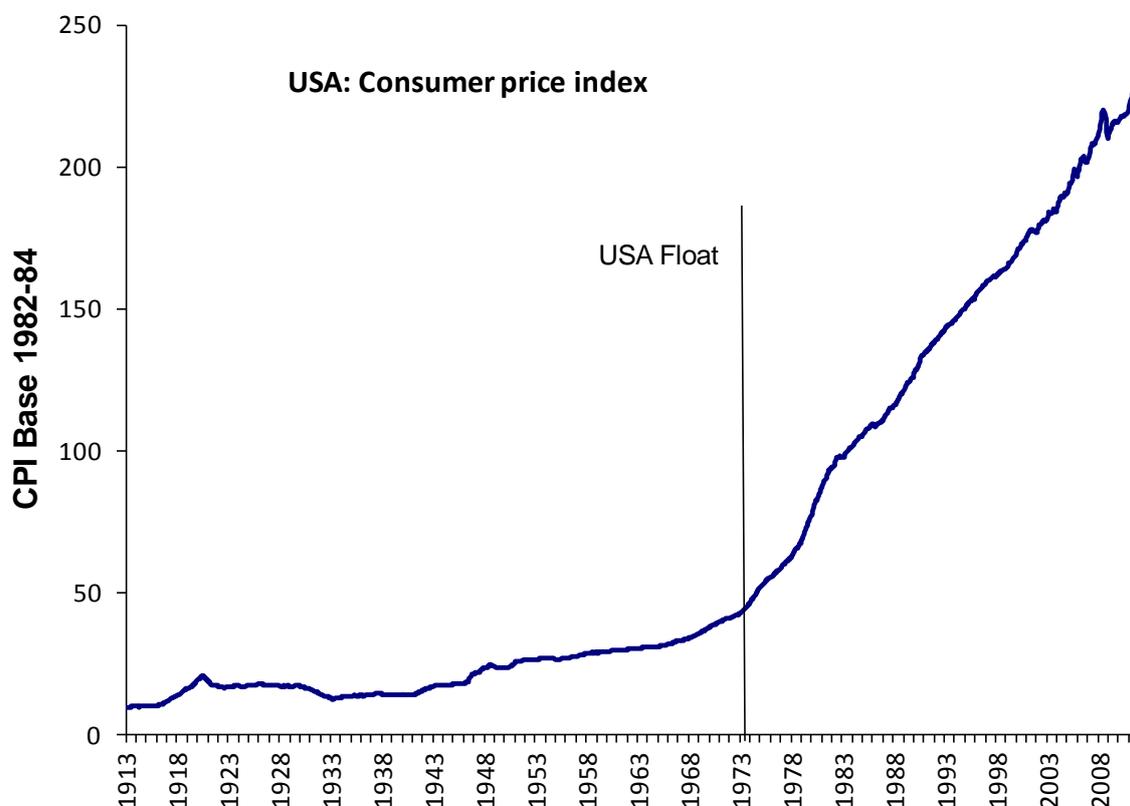
Figure 53. USA: Consumer price index

Figure 54 reveals the effect on GDP of Region B adopting the optimum exchange rate and Region A remaining on the floating exchange rate. Region B prospers immediately and continues to prosper. Region A continues as has been observed above. Initially, its economy remains stable. However, after the household sector reaches its debt ceiling, the subsequent depreciation of its currency enables it to grow slowly. Region B exceeds the GDP of Region A from the 82nd cycle.
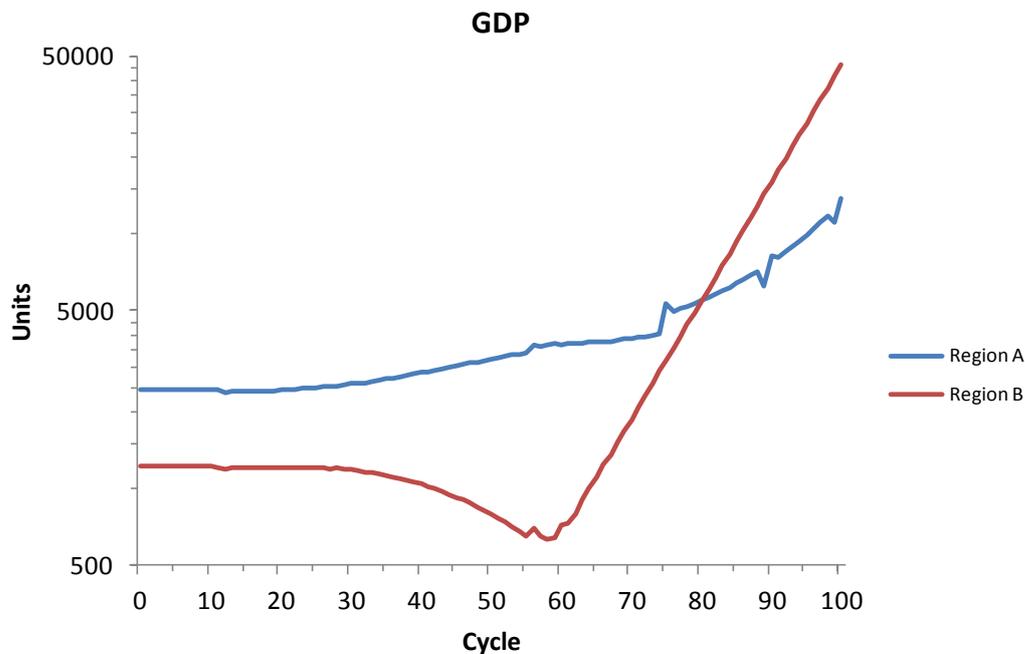
Figure 54. GDP: Region A, floating; Region B, optimum exchange rate

In this case, the optimum exchange rate system was targeted to keep inflation under 3 per cent, allow credit to grow at 5 times the amount of foreign reserves and to achieve a target minimum growth rate of 8 per cent. The exchange rates of Region A and Region B are presented in Figure 55.
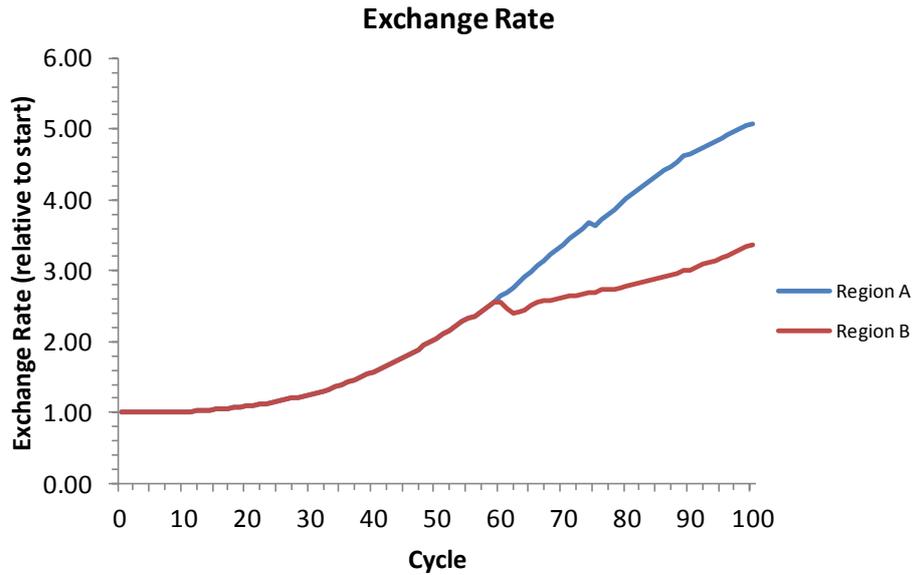
Exchange Rate

Figure 55. Exchange rates: Region A, floating; Region B, optimum

Region B benefitted from an initial depreciation under the optimum exchange rate system. However, when that initial stimulus was no longer required, the exchange rate system appreciated the exchange rate to cap the rate of growth. The model was structured to cap the growth rate at 1 per cent above the target rate. The average rate of growth from the 59th to the 100th cycle was 8.7 per cent per cycle.

During the period when it shared its exchange rate with Region A, Region B experienced a loss of income from trade. The revenue earned from net exports to Region A did not compensate it for the loss of income on net imports on its non-EMU trade. After separation and with the optimum exchange rate system, exports to Region A more than compensated for its net expenditure on imports from non-EMU members as shown in Figure 56. This contributed significantly to economic growth in Region B.
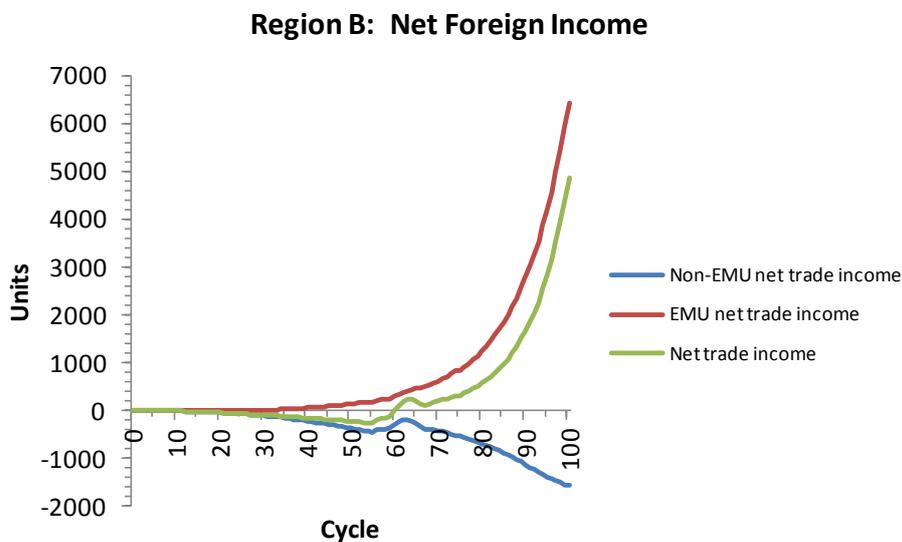
Region B: Net Foreign Income

We can see from the detail shown in Figure 57 that the optimum exchange rate system brought about an immediate change in the net foreign income of Region B, with imports falling below exports and other net foreign income (including interest paid on foreign debt) for the first time.

Region B: Exports and Imports
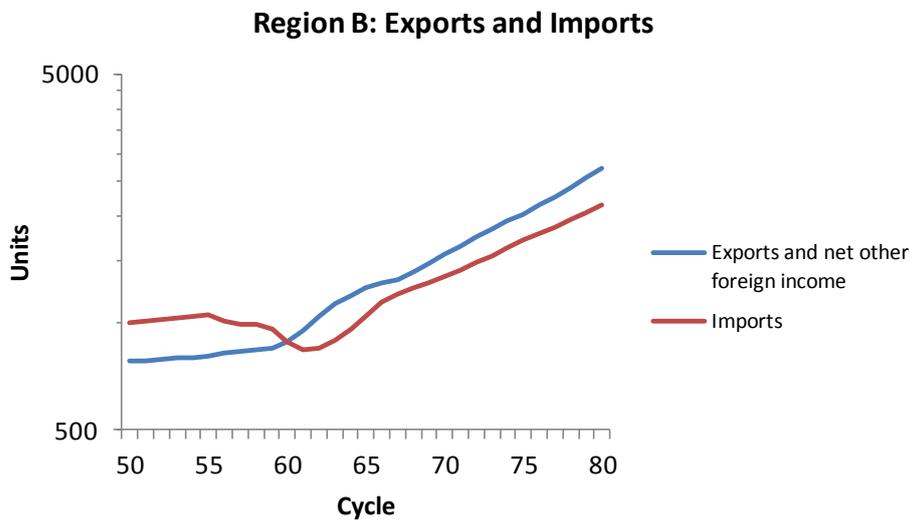
Figure 57. Region B: Exports and imports with optimum exchange rate system
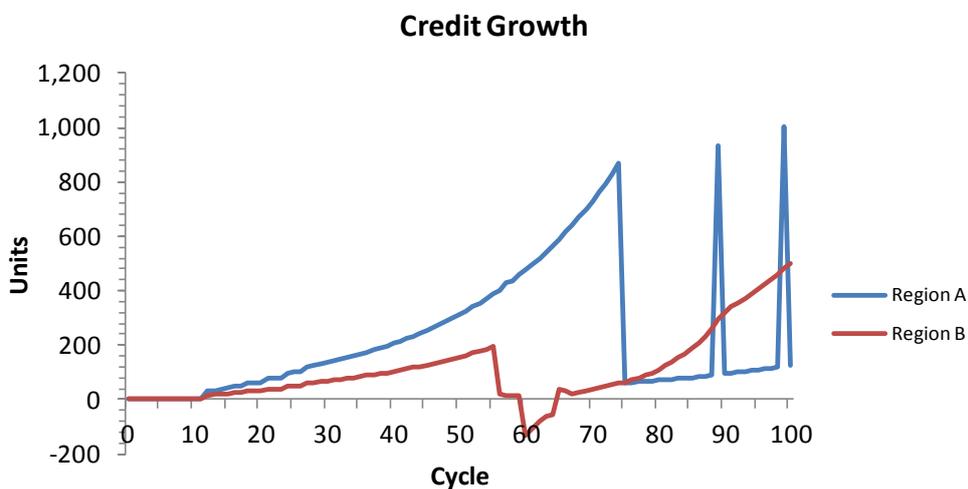
Credit Growth

Figure 58. Credit growth with optimum exchange rate system

The optimum exchange rate system generated additional trade revenue by not only adjusting the exchange rate, but also by managing the growth of bank credit. For the first four cycles after the introduction of the optimum exchange rate system, the growth of bank

credit was less than principal loan repayments. It was only in the 64th cycle that loans were greater than principal loan repayments.
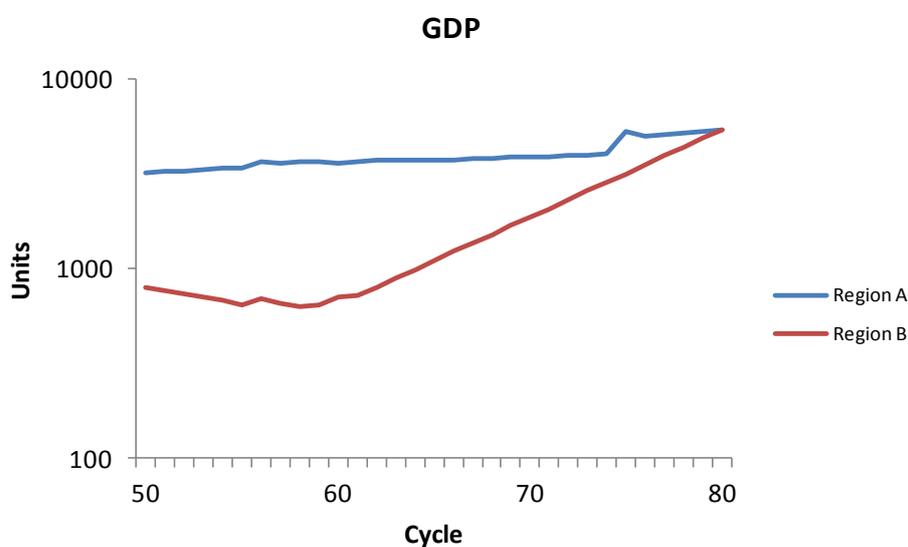
GDP

Despite the reduction in bank credit, the optimum exchange rate system immediately turned the economy around from declining GDP to a rising GDP as shown in Figure 59.

The optimum exchange rate system is capable of providing economic stability and prosperity to Region B. Region A, which was kept on the floating exchange rate system, did not benefit from the removal of Region B from the EMU.

5.6   Region A, Optimum; Region B, Optimum

The removal of a country from the EMU and leaving the remaining members of the EMU on the floating exchange rate system did not improve the prosperity of those remaining members. Yet, any reconfiguration of the EMU should ensure that all members prosper. Therefore, it was decided to asses the effect of reconfiguring the Euro so that the remaining members of the EMU also use the optimum exchange rate system. Therefore, the model was run to assess the impact on both Region A and Region B, both adopting the optimum exchange rate system with two separate currencies.

To test this option, the same objectives were applied to both Region A and B as was applied in the previous option, considered above.

Both Region A and Region B prospered after adopting the optimum exchange rate system in cycle 60, as shown in Figure 60. The model allows the optimum exchange rate system a one percent margin above the growth target before it responds to cap economic growth, if it is not inflationary. In this example, Region A was able to grow at an average 8.9 per cent per

cycle. This compares to 3 per cent under the floating exchange rate system. Region B grew at an average 8.1 per cent per cycle.
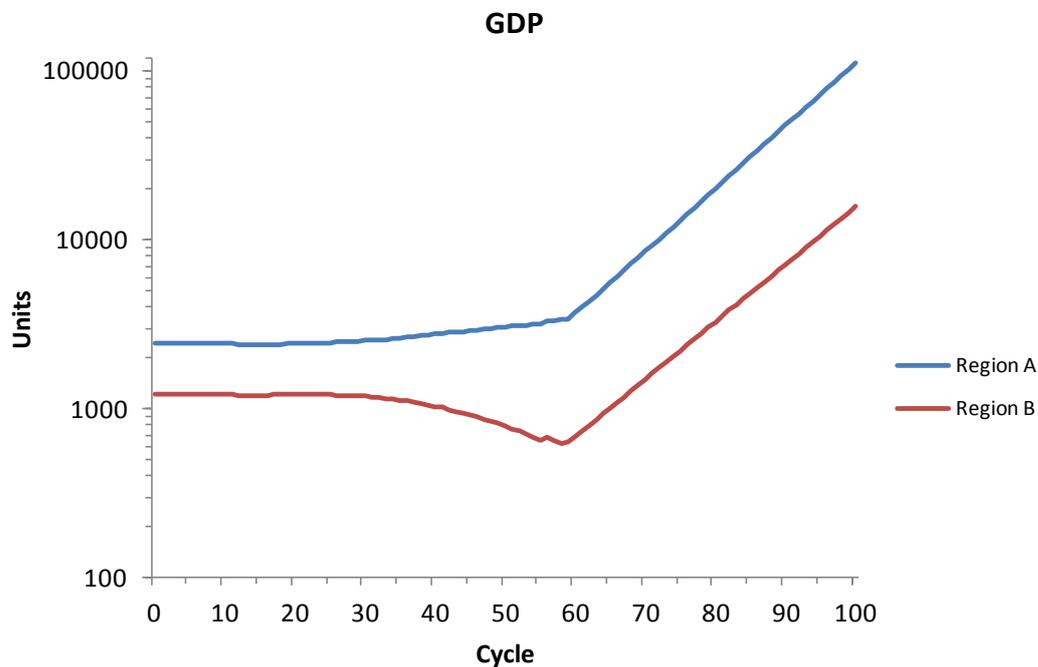
Figure 60. GDP with optimum exchange rate system for Region A and Region B

Region A depreciated its exchange rate by a total of 1.2 per cent over the first 2 cycles. Region B depreciated its exchange rate by 9.9 per cent over the first 8 cycles, before stabilizing and then depreciating slowly again, as shown in Figure 61. Region A started to appreciate its exchange rate from the 65th cycle. This reflects the setting in the model that the exports of the secondary sector in Region A grow at 9.5 per cent. Therefore, the exchange rate has to appreciate slightly to slow the rate of growth. It is worth noting that the exchange rate of Region B is higher in this example, now that Region A is also prospering. In the previous example, Region A was on the floating exchange rate system and was not contributing significantly to the rate of economic growth of Region B.
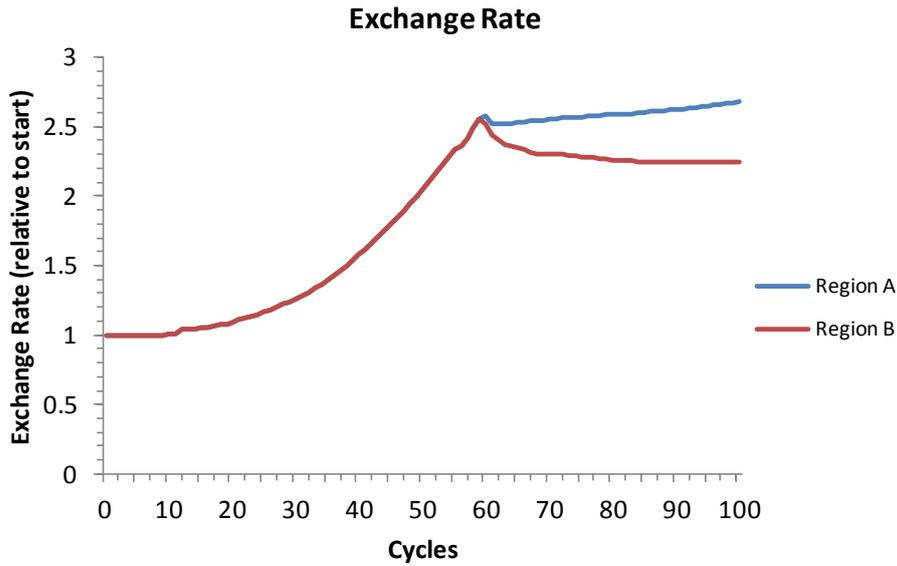
Exchange Rate

Figure 61. Exchange rate under optimum exchange rate systems in Region A and Region B

Although both regions resume credit growth, debt is no longer a burden to either region as shown in Figure 62.
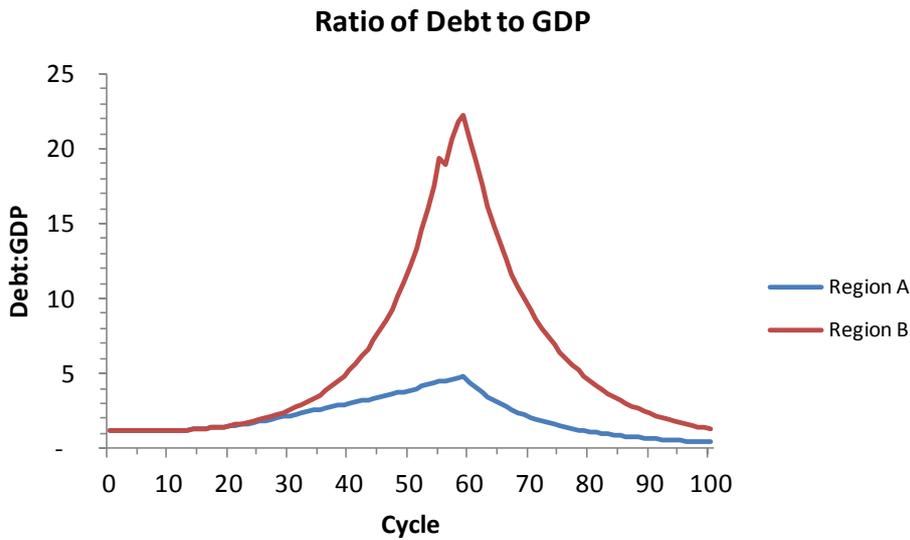
Ratio of Debt to GDP

Figure 62. Ratio of Debt to GDP before and after optimum exchange rates

We can conclude that if the EMU and countries leaving the EMU adopt the optimum exchange rate system, they would both attain a sustainable foundation for economic prosperity. The new monetary system not only manages the exchange rate but that also the growth of bank credit, so as to avoid the growth of foreign debt. It eliminates the barriers to economic growth.

5.7   Regions A and B, Unified Optimum Exchange Rate System

In the previous option, Region A and Region B operated under separate optimum exchange rate systems. The question arises as to whether it is necessary for Region A and Region B to operate separately or whether they would be more prosperous under a single Euro using the optimum exchange rate system.

To test this option, the same objectives were set in the model as in the examples considered above, except that both regions would share the same exchange rate.
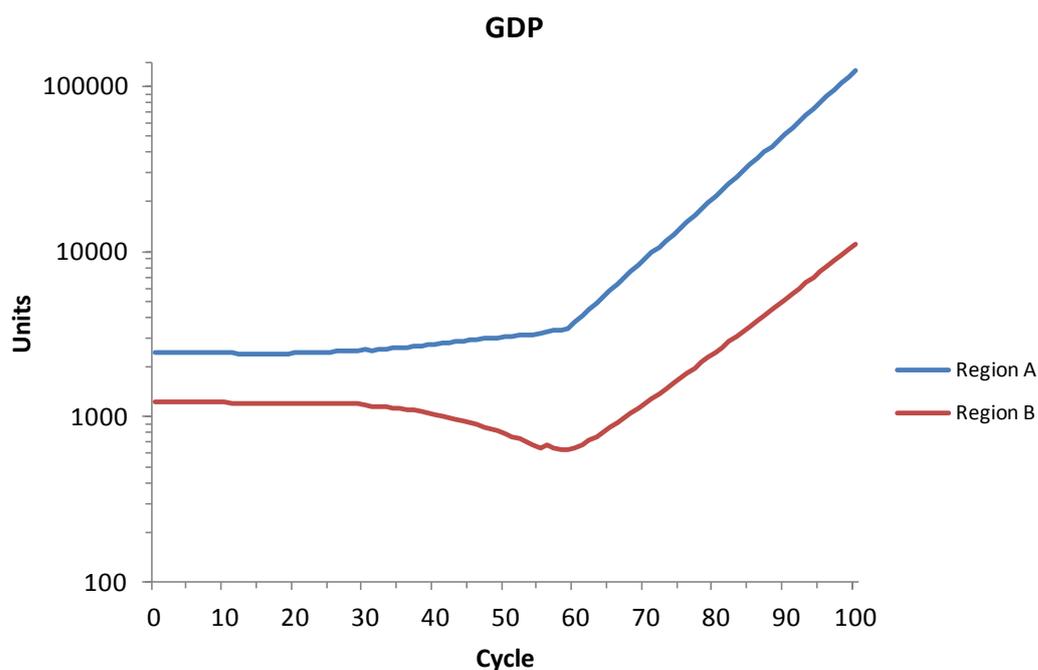
Figure 63. GDP with a unified optimum exchange rate system

The turn-around in gross domestic product after the optimum exchange rate was adopted in cycle 60 is clearly evident in Figure 63. GDP in Region A grew at 9.2 per cent; faster than under the separate option. In Region B, GDP grew at 7.2 per cent.   The average rate of economic growth for the EMU was 8.9 per cent.

The effect of retaining a unified monetary system can be best seen in the effect upon the exchange rate shown in Figure 64. The relative larger size of Region A means that the unified exchange rate is not as sensitive to the requirements of the smaller and poorer economy, Region B.

The unified floating exchange rate system enabled both Region A and Region B to reduce their debt burden, as shown in Figure 65.
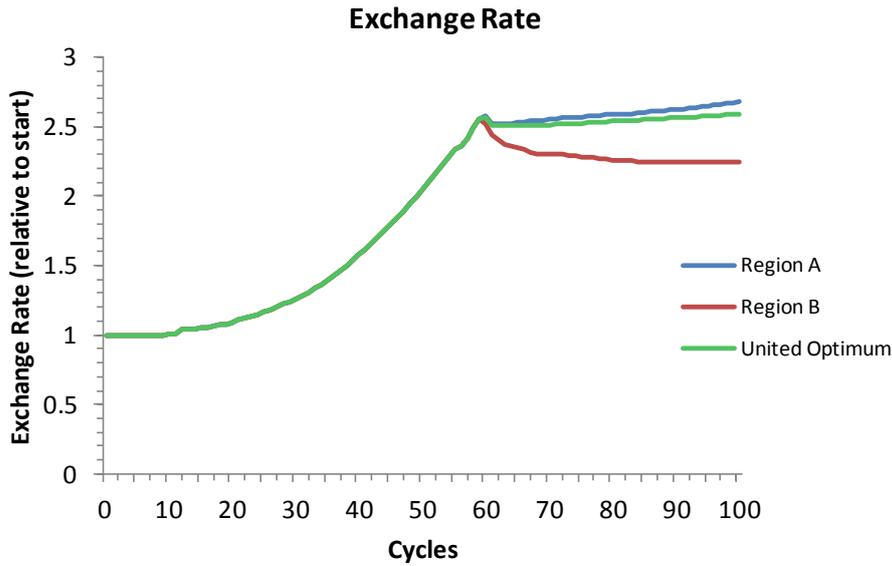
Exchange Rate

Figure 64. Exchange rates under the optimum exchange rate system
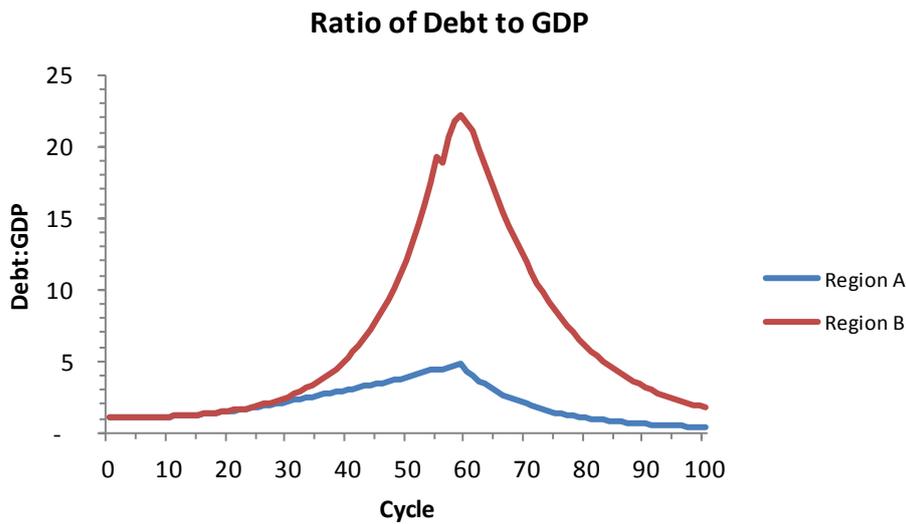
Ratio of Debt to GDP

Figure 65. Ratio of debt to GDP with a unified floating exchange rate system

Region A prospered from the rapid growth in net foreign income, generated by increased exports with the rest of the world as shown in Figure 66. Region B also prospered from trade. However it continued to have a trade deficit with the rest of the world. Its net foreign income came from inter-regional trade within the EMU from Region A, as shown in Figure 67.

Region A: Net Foreign Income
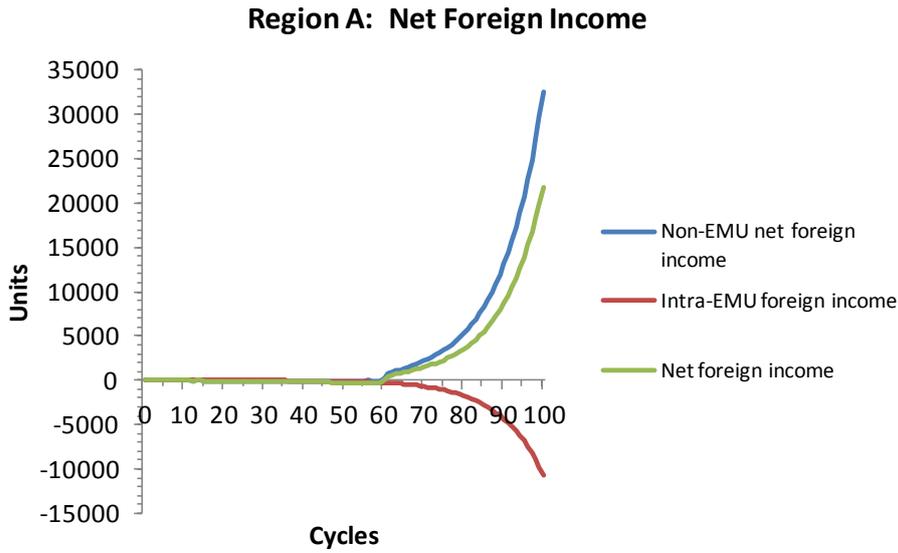
Figure 66. Region A: Net foreign income under the unified optimum exchange rate system

Region B: Net Foreign Income
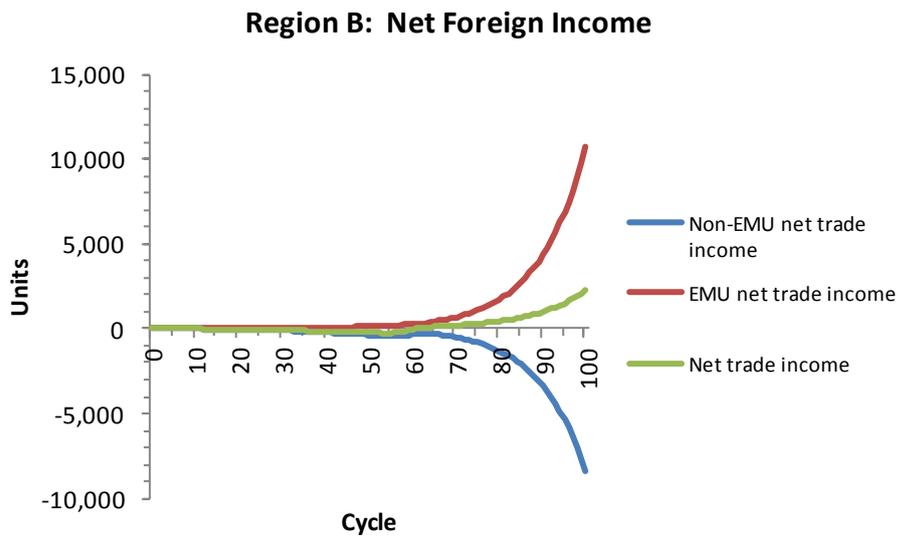
Figure 67. Region B: Net foreign income under the unified optimum exchange rate system

6 The Optimum Monetary Reconfiguration

6.1 The best strategy

The diagnosis chapter of this paper identified that the EMU suffers from a form of "economic anorexia" that is starving the member states of income. That disease puts three significant barriers between the EMU and its desire to achieve economic stability and prosperity. These are the:

- "beggar thy brother";
- "burden thy brother"; and
- "burgle thy brother" barriers.

Only the first barrier is related to the exchange rate. The second and third relate to the management of the currency, and particularly bank credit. Of the alternative optional solutions considered, only the optimum exchange rate system provided an integrated system that managed both the exchange rate and the growth of bank credit. It was recognized, also, that any shift away from the floating exchange rate system would provide some relief from the disease.

The fixed exchange rate has already proven itself to be a sound foundation for economic growth and prosperity. As was acknowledged above, China, which is the most rapidly growing large economy in the world, continues to use the fixed exchange rate system. That system has continued to provide a sound basis for China's economic growth and prosperity.

The issue arises as to whether the fixed exchange rate system would provide a sound foundation for the future growth and prosperity of the EMU. The fixed exchange rate system did break down and lead to instability when bank lending was deregulated.

Even if bank credit were well managed, there may be times when financial markets might speculate against the central bank, particularly if there were expectations that the exchange rate may appreciate or depreciate. Such speculation has caused considerable instability in financial markets and economies in the past. For that reason alone, central banks may be unwilling to return to fixed exchange rates. Therefore, there are reservations about the fixed exchange rate system as a stable foundation for an economy.

A managed float is not a coherent monetary system. It is a compromise, attempting to soften the effect of a system that has devastated economies around the world.   To appreciate the benefit of that system, we can compare it to being half dead: it's a far better option than being fully dead.

A managed float may be attractive to banks, as it may allow them to lend without restriction. However, it has been the deregulation of bank lending that started the chain of events that led to the current crisis. It caused the problem and it needs to be appropriately managed. Therefore, a managed float is not a solution.

The optimum exchange rate system manages both the growth of bank credit and the exchange rate. To determine the exchange rate, the system relies upon the financial market to continue to act in its own best interest.

Under the optimum exchange rate system, there are no opportunities for the financial market to speculate against the central bank, unless the central bank chooses to enter the market. The central bank may try to influence the exchange rate, but it does not determine the market exchange rate.

Factions within the financial market may speculate against the remainder of the financial market. However, that does no harm to the market. The market relies upon it. The speculators that most readily determine the most appropriate monetary settings to achieve the government's objectives will be the ones that the system rewards.

The optimum exchange rate allows banks to lend only if there are surplus foreign funds saved (foreign reserves). Therefore, there are no "burgle thy brother" barriers to economic stability. The banks are permitted to lend only those savings that the economy has entrusted to them. In the process of attracting those savings into their accounts, banks are likely to compete with each other for deposits.

The optimum exchange rate system removes the "burden thy brother" barrier because debt does not grow faster than GDP. Money is created from the growth of foreign reserves, as well as from debt. Domestic debt is no longer the only source of all new money. Also, the system promotes economic growth. Therefore, it provides increased capacity to repay debts.

The growth of foreign reserves does not place a burden on foreign economies. Any secure financial asset can be used as instruments for holding foreign reserves. They can be considered as loans to the foreign country. Holding foreign reserves does not require money to be withdrawn from that economy. Economies usually look favourably upon their securities being held as foreign reserves by other economies.

There continues to be the possibility that some countries within the EMU may experience a "beggar thy brother" barrier if they remain within the EMU. The example modelled revealed that all economies are likely to prosper under the optimum exchange rate system. However, the model also revealed that that some economies prospered above the target rate and some prospered below that rate. Those countries that need to grow more rapidly to provide employment for their large unemployed workforces may be more prosperous if they separated their monetary system from the EMU and adopted their own optimum exchange rate system, at least until they had attained full employment.

The optimum exchange rate system overcomes the "economic anorexia" and removes the monetary barriers that are preventing the EMU from attaining economic stability and

prosperity for all its members. Therefore, the optimum exchange rate system is the recommended exchange rate system to save the EMU.

6.2   The entity treated

The member states that have prospered most from the current monetary system of the EMU may be the most reluctant to change the monetary system. However, unless they do change, they are unlikely to continue to prosper under the floating exchange rate system. Instead they are likely to suffer falling rates of economic growth and rising levels of debt.

Also, as considered above, if the whole EMU adopts the optimum exchange rate system, the whole EMU would prosper. If the EMU were to adopt the optimum exchange rate system, the marginal benefits of member countries leaving and adopting an alternative currency would be reduced. For some, the benefits may be insufficient to warrant the pain of withdrawing from the Union. Therefore, adopting the optimum exchange rate system is likely to assist the preservation of the membership of the EMU.

It is not possible for all members of the EMU to prosper unless the whole EMU reconfigures its monetary system. If the EMU does not engage in monetary reconfiguration, and some of the poorer and indebted member states in the EMU were to leave the EMU, the subsequent reduction in the economic growth and prosperity of the remaining members may prompt the EMU to reconfigure its monetary system. If not, it may cause the remaining members to leave the EMU.

Some countries and sectors may be hostile to a monetary reconfiguration. Bankers within those economies that may oppose the change are likely to be the most hostile to the change. They are likely to be hesitant about moving to a system in which the rules governing their lending activities are changed, requiring them to act more responsibly.

Also, some central banks may be hesitant to change. They may see their role is to protect the profitability of the banks. They may equate bank profitability with bank stability and consider any constraint on bank lending as a restriction on bank profitability. However, the recent crisis experienced in Europe has revealed that bank profitability does not ensure the stability of the banking system.

The first step towards saving the EMU and returning to economic prosperity is for the EMU to adopt the optimum exchange rate system. That would eliminate the monetary crisis currently plaguing Europe. Once stability has returned, those countries that continue to have high unemployment may choose to leave the EMU to raise their prosperity by establishing their own currencies using the optimum exchange rate system.

7 Managing the Process to the Optimum Exchange Rate System

The process of changing from the floating exchange rate system to the optimum exchange rate will take time. It cannot happen instantaneously. There are institutional arrangements in the government and the banking system that must be established to facilitate the new system. Even so, the process of treating the "economic anorexia" can start immediately.

7.1 First Step – feed the economy

The first step in the process is for the European Central Bank (ECB) to cap the exchange rate of the Euro. No announcement is necessary. The European Commission can advise the ECB to enter the foreign exchange market and start buying foreign exchange. This should not create a shock to the market.

Early on in the process, the European Commission should advise the ECB of the desired policy. This would consist of two parts. The first would be to advise the ECB of the minimum exchange rate at which it may trade. For example, the Commission may advise the ECB not to sell Euros for less than US$1.25.

The second part is to advise the ECB of the market strategy for determining the price it should offer. For example, the European Commission may advise the ECB to offer to buy up foreign exchange at the lowest price reached in the past month. Also, if the exchange rate were to fall significantly below that level, the ECB could be instructed to prevent the exchange rate rising more than one per cent from any subsequent low, provided that it did not go below the floor price. For example, if the lowest exchange rate of the Euro in the last month was US$1.30, then the ECB should offer to buy foreign exchange at that rate. If the market price of the Euro should fall to US$1.28, then the ECB should lower its standing offer to US$1.2928. If the market price were to fall below to US$1.23, then the ECB's offer should fall to the floor price of US$1.25 per Euro. Another approach may be to advise the ECB about how much foreign currency it should buy. This would concurrently inject money and income into the European economy.

7.2 Second Step – stop the burgling

The next part of the process should occur as soon as possible after the ECB has entered the foreign exchange market, or at the same time. This second step is to advise banks that they are not allowed to undertake any further lending[5] until they have advised the ECB of the total amount of their outstanding loans, including bank guarantees of securities or debt as at the date of the announcement. The banks are also to advise the ECB of the total amount

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[5] This rule applies to central banks and to bank loans to governments. Governments may continue to borrow by issuing securities. Banks would class government securities as another form of lending and would be allowed to purchase them only if they had capacity within their lending license. While government securities may be a secure investment for banks from a prudential perspective, from an economic perspective, loans to the government have the same effect as loans to any other entity.

of each type of debt. If the banks have branches in more than one member state of the EMU, they would be required to advise the EMU of the amounts of debt attributable the branches in each member state.

Also, banks are to advise the ECB on the total amount of foreign assets and foreign debt held by each bank, including deposits of foreign entities with the bank. Again, if these foreign assets and foreign debt can be attributed to branches in member states, then the details of the amount attributed to each member state should be provided.

The ECB should notify banks that any loans issued after the date of the announcement and before the banks have advised the ECB of their outstanding loans would not be enforceable. That announcement should be made after the banks have closed business for the day, possibly on a Friday evening, to minimize the amount of loans that are back dated and to minimize any panic in the market. Alternatively, the announcement could be made after the close of business on a day that coincides with a regular reporting time for the banks.

Some economists may consider that this policy would be inflationary. However, that is not the case. It is likely to be deflationary. As we saw in Figure 53, inflation in the USA increased when the country floated its exchange rate. The float was associated, also, with a recession, the "oil crisis" that started before oil prices increased in October 1973. When Europe comes out of the float, it is likely to experience the reverse effect: a deflationary boom.

In a country with floating exchange rates, the inflation rate tends to be equal to the rate of growth of bank credit (or currency) relative to the growth of nominal GDP. Figure 68 shows the CPI for the USA compared to ratio of the growth of bank credit relative to the growth of nominal GDP for the USA. It shows that over the last 16 years, there has been a close relationship. A similar relationship is evident in New Zealand as shown in Figure 69. In this case, the ratio of the growth of the M3R money supply relative to the growth of nominal GDP was used. The quarterly ratios in New Zealand were averaged over a year to remove the cyclical changes.

USA: CPI and CPI calculated from the growth of bank credit

Legend:
- Official CPI
- Modelled CPI
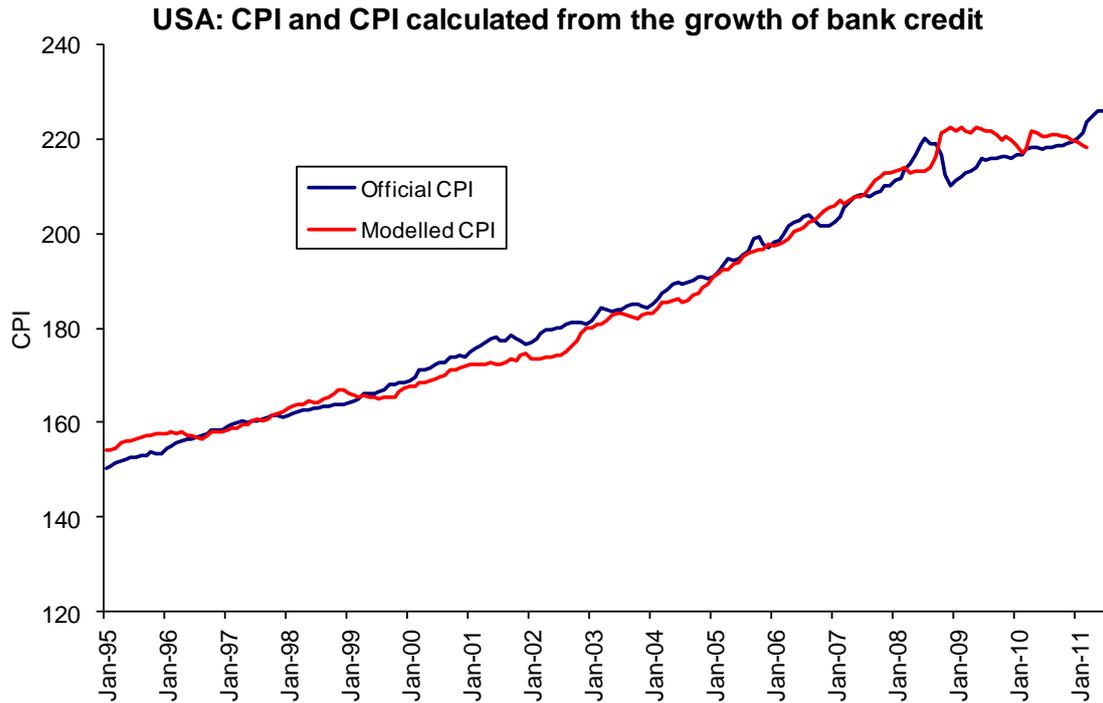
Figure 68. USA: CPI compared to the ratio of credit growth over the growth of nominal GDP

New Zealand: CPI and modelled CPI

Legend:
- Official CPI
- Modelled CPI
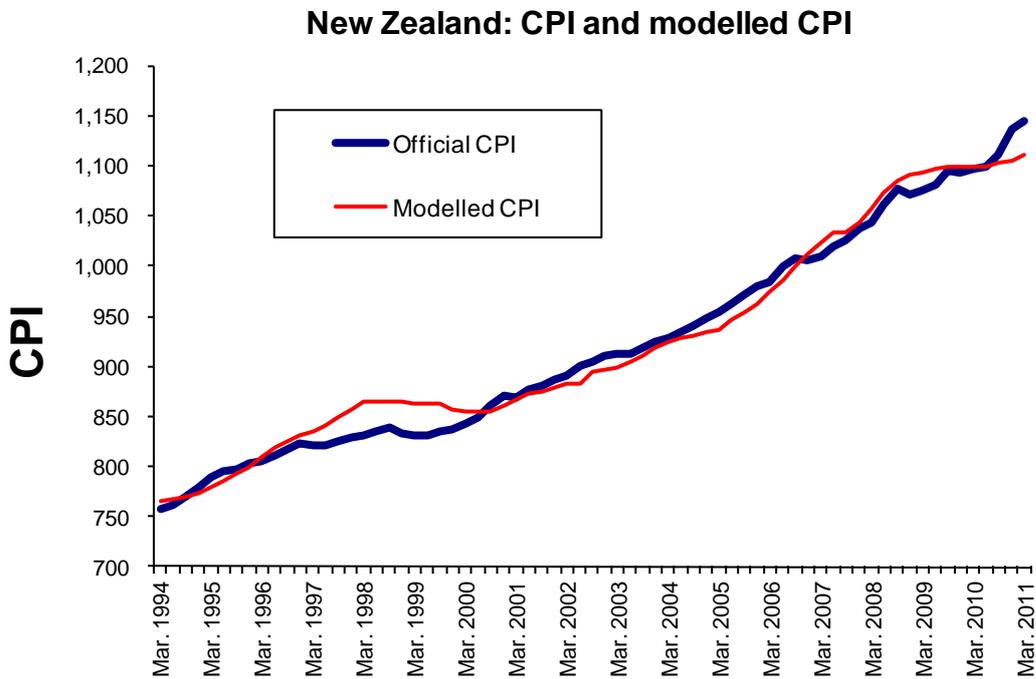
Figure 69. New Zealand: CPI compared to the average ratio of growth of M3R money supply to growth of nominal GDP

This relationship between inflation, monetary growth and GDP exists only while the exchange rate is floated.

The proposal for the ECB to enter the foreign exchange market and purchase foreign exchange would inject new money into the economy. It would raise GDP, also.

It would raise export incomes and shift demand from imports to products produced within the EMU. At the same time, the cessation of the growth of bank credit would reduce monetary growth sourced from bank lending. Taken together, the reduction of excess demand from bank credit and the increased production should reduce the inflationary pressure on prices.

Without the demand created by the growth of bank finance, real estate prices can be expected to stabilize. They may fall in some regions. However, manufacturing industry should prosper because domestic and foreign demand for its output should rise in response to the depreciated Euro (the result of ECB intervention).

The monetary reconfiguration is intended to change relative prices. The objective is to shift demand from foreign products to European products. This would raise the demand for European labour and other resources. It can be expected to raise incomes and wages. It would raise production and create employment. It would feed the anorexic economy that has been starved of demand. It would not add to the burden of debt: it will enable people and industries to repay their debt.

7.3 Third Step – establish a sustainable credit system

When the banks have completed the second step, they are to be advised that they would be licensed to maintain the total amount of lending declared in their report to the ECB, provided that they maintained their net foreign reserves. Therefore, if existing borrowers repaid part of the principal of their loans, then the banks may lend up to the amount that had been repaid (provided that they maintained their net foreign reserves). They would not be permitted to transfer their capacity to lend between off balance sheet liabilities such as bank guarantees. If they were to reduce their total guarantees, they may issue new guarantees so as to retain the total amount of guarantees outstanding. Care needs to be taken that banks do not reduce off-balance sheet liabilities to increase loans that appear on their balance sheet.

Also, banks would be advised that they may now convert foreign exchange into Euros, without having to exchange the funds on the foreign exchange market. They may hold those foreign assets in their own account or they may deposit them with the ECB.

Also, banks may meet foreign exchange payments from their own resources as well as from the foreign exchange market. They would be required to declare publicly the exchange rate at which they buy and sell foreign exchange.

The ECB would establish a special settlement account for each bank. This account would be recorded in units of a basket of currencies, on a similar basis to Special Drawing Rights (SDRs) with the IMF. We can assume for the purposes of establishing the new monetary

system, that SDRs are the unit of account for special settlement accounts with the ECB.   The European Commission may wish to determine an alternative basket of currencies at a later date. The Commission would be free to revise the mix of currencies in the basket, and their relative weights, at any time.

Banks may request settlement of inter-bank transfers in foreign exchange through their special settlement account. It is expected that most banks would regularly settle any outstanding balances in their inter-bank transfers through their special settlement account.

Banks would be advised that they may increase the total amount of their lending if they increase the total amount of their net foreign financial assets (foreign reserves). Those net foreign reserves are calculated as their total foreign financial assets less their total foreign financial liabilities. These records should be denominated in SDRs as well as Euros. They would include the funds in their special settlement account with the ECB. For the purpose of determining whether there has been an increase or decrease in their net foreign reserves, the SDR denominated records would be used.   This avoids the situation where a change in the value of the domestic currency affects banks capacity to lend.

Banks would increase their net foreign reserves when they converted foreign exchange into Euro deposits.   They would reduce their net foreign reserves when they converted Euro deposits into foreign exchange using funds from their own reserves.

Banks would need to make a request to the ECB to increase their lending license. The ECB may grant an increase in a bank's lending license up to the equivalent of 10 Euros for every 1 SDR increase in the bank's net foreign reserves. In granting an increase, the ECB would require the bank to transfer into a loan reserve account with the ECB, an amount equivalent to 1 SDR for every 10 Euros increase in the bank's lending capacity. The loan reserve account would be kept in SDR units. The same procedure would apply to licenses to increase off balance sheet liabilities such as bank guarantees.

It would be a condition of the bank's licence to lend that it may lend the additional amount authorized, only if it maintained its net foreign reserves. That is, the net foreign reserves originally reported plus the funds held in the loan reserve account. In calculating their net foreign reserves, banks are to include the funds held in the loan reserve account and their special settlement account with the ECB.

If the bank were to immediately lend the amount authorized, this may cause imports to rise. That could deplete the bank's foreign reserves. If that were to happen, the bank would not be able to lend again until it had replenished its net foreign reserves.

Also, when banks lend, the borrower would usually transfers the funds borrowed to the account of the vendor of the property purchased with the borrowed funds. That is likely to be another bank. When the vendor's bank settles with the borrower's bank, the vendor's bank is likely to draw on the borrower's bank's special settlement account. Therefore, the

lending bank must ensure that it has sufficient funds in its special settlement account, when it lends money.

In addition, if a bank wishes to purchase Euro currency (notes and coins) from the ECB, the ECB would settle those purchases with funds from the bank's special settlement account. When banks return notes and coins to the ECB, they will be credited with a deposit in their special settlement account.

Within this framework, banks would only be able to increase their lending as their foreign exchange position improves. They would no longer be able to "burgle thy brother" and raise the net foreign debt of member states of the EMU.

The intervention of the ECB in the foreign exchange market together with the additional funds created by the foreign exchange activities of the banks would stimulate the European economy. It would raise export revenues and stimulate demand for domestic products. The growth in domestic incomes would raise tax revenues for governments.

7.4 Fourth Step – a competitive exchange rate

Once the credit system had been established, it would be possible to establish the incentive mechanism that would drive the exchange rate to achieve economic objectives such as full employment with low inflation. The European Commission would need to determine the objectives and the incentives.

The objectives proposed are to reduce unemployment from the current level of around 10 per cent to less than 3 per cent over six years. Also, during this process, inflation is to be kept below 3 per cent per annum.

To achieve these objectives the banks would be advised that they may continue to lend 10 Euros for each additional 1 SDR increase in their net foreign reserves, only while:

- unemployment was less than 8 per cent; and
- inflation was less than 3 per cent.

For every 1 per cent (or part thereof) that unemployment exceeded 8 per cent or inflation exceeded 3 per cent, the amount they may lend would be reduced by 1 Euro.

Therefore, if unemployment were 10 per cent and inflation 4 per cent, the ECB may only increase the banks' licenses to lend by 7 Euros for each additional 1 SDR increase in bank net foreign reserves.

The banks would also be advised that each year, the unemployment target would be reduced by 1 per cent. Hence, six years after the new rules were implemented, banks would need to bring unemployment down to 3 per cent if they are to maximise their lending capacity relative to the growth in their net foreign reserves.

Once this policy was put in place and understood, the ECB would be able to withdraw from intervening in the foreign exchange market.

This series of events was tested in the computer model. In the 60th cycle, the exchange rate was depreciated 2 per cent and capped. All new bank lending was stopped, although banks could lend what was repaid. In the 61st to 62nd the optimum exchange rate credit control system was initiated but without the exchange rate system. In the 63rd cycle, the optimum exchange rate was allowed to operate with the 3 per cent inflation constraint and a target of 10 per cent for economic growth. This was expected to provide the level of economic growth necessary to reduce unemployment. At the 75th cycle, the target rate of economic growth was reduced to 6 per cent.

Employment levels were not built into the model. Economic growth targets were used instead to simulate the required growth to attain the full employment target. The initial target growth rate of 10 per cent was applied to simulate the effect of reducing unemployment to the target rate of 3 per cent. Full employment was assumed to be achieved by the 74th cycle, after which the target rate of economic growth was reduced to 6 per cent per cycle; the rate assumed to maintain full employment with low inflation.

The effect on the exchange rate is shown in Figure 70. Initially, the exchange rate falls 2 per cent. When the market is free to set the exchange rate, the exchange rate depreciates to provide the level of economic growth needed to provide full employment. At cycle 75, when full employment is attained, the exchange rate slowly appreciates to reduce the rate of economic growth and sustain full employment with low inflation.
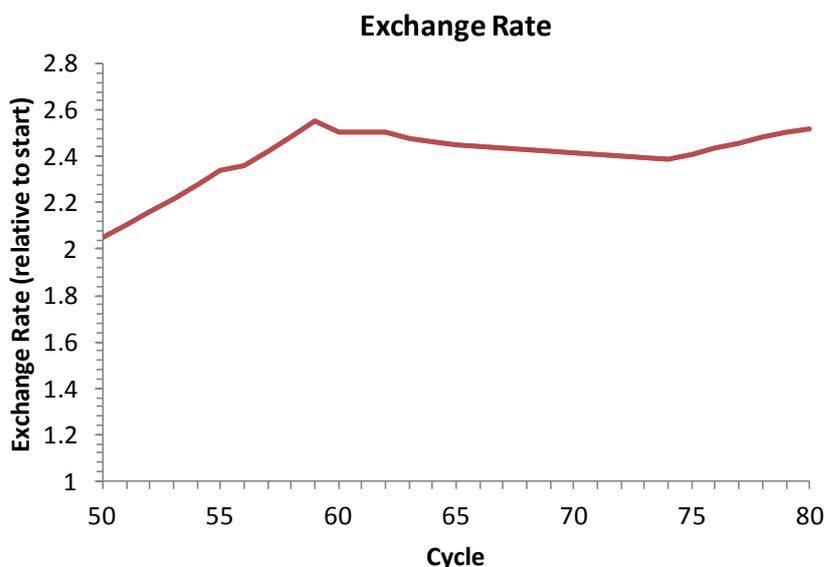
Figure 70. Exchange rate following implementation of the proposed economic process

The initial devaluation and cessation of credit growth raises GDP by 15 per cent in Region A. This rate of growth falls to 8 per cent in the 61st and 62nd cycle, and the steadies at 10 per cent.

In Region B, the impact is not as great because it relies more on inter-regional trade rather than trade with the rest of the world. Its GDP increased 9 per cent in the 60th cycle followed by only 3 per cent in the 61st. However, after that, its growth rate rises progressively to 8.6 per cent. At the 75th cycle, the rate of growth in Region A falls back to just over 7 per cent while in Region B, the rate of growth falls back to about 5.5 per cent. The growth of GDP is evident in Figure 71.
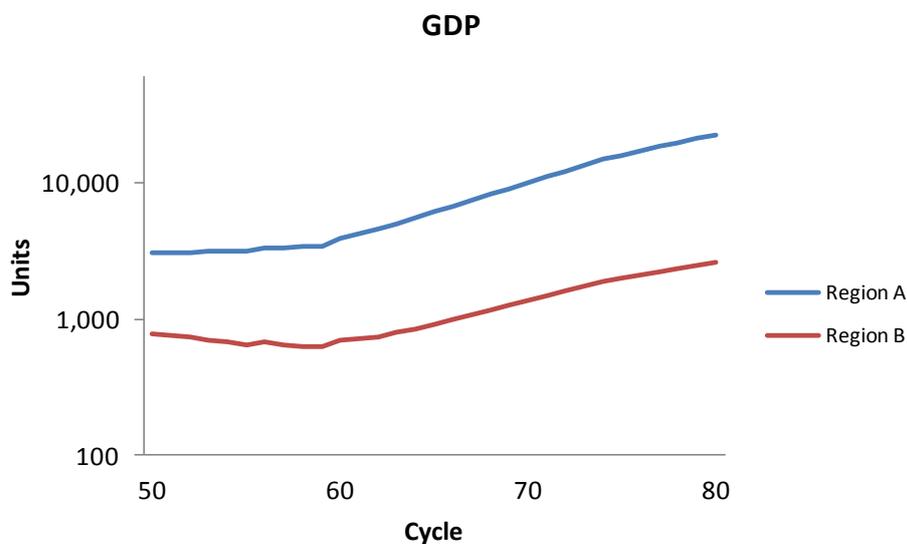
Figure 71. GDP in Regions showing implementation of the proposed monetary process

The effect of these policies on exports and imports are small, yet they are sufficient to raise export revenues above import payments. This enables the economy to start reducing the burden of foreign debt. Also, it stimulates the economy. The effect on trade in Region A is shown in Figure 72.
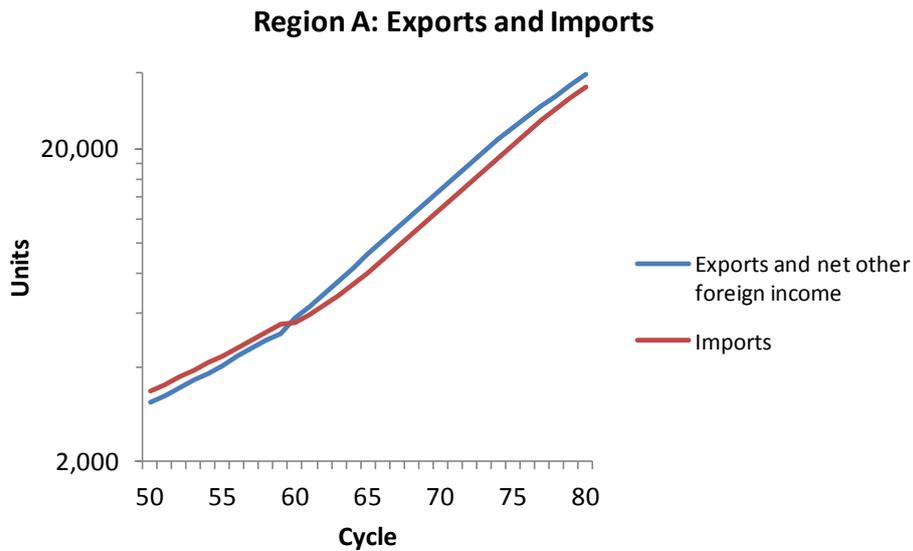
Region A: Exports and Imports

Figure 72. Region A: Exports and imports showing effect of the proposed monetary process

In Region B, imports had been falling with the falling level of income. Implementing the proposed monetary process boosted exports and stabilized the fall in imports. Once GDP in Region B started to grow again, imports rose. However, after the reconfiguration of the monetary system, the export revenues exceeded the import payments, as shown in Figure 73.
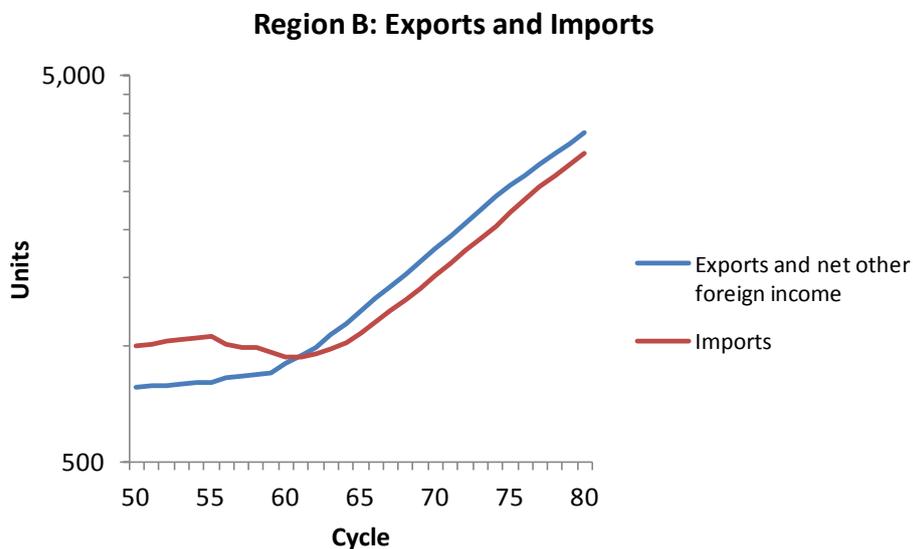
Region B: Exports and Imports

Figure 73. Region B: Exports and imports showing effect of the proposed monetary process

The effect of the proposed monetary policies on the growth of bank credit is quite significant for Region A, as shown in Figure 74. The sudden constraint on this very profitable activity is likely to cause considerable opposition in those parts of the EMU where bank lending continues to be growing. However, the current rate of growth of bank lending is unsustainable and the constraint is applied only until the new credit system is put in place.

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Once the monetary system has been reconfigured, bank lending can proceed at a sustainable rate.
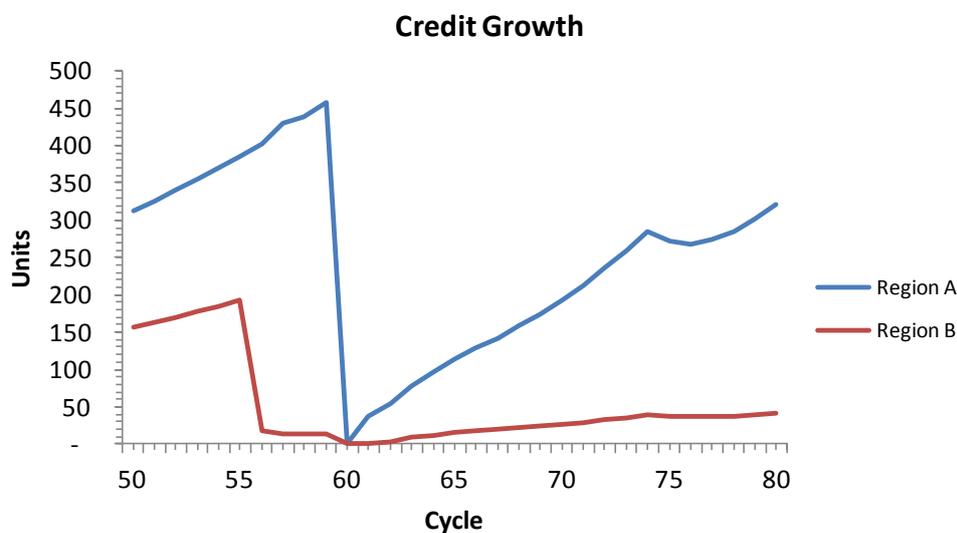
Credit Growth

Figure 74. Credit growth showing effect of the proposed monetary process

In Region B, the constraint on bank lending was of little significance as bank lending was already low. Once the new monetary reconfiguration had been put in place, the rate of credit growth increased and soon exceeded the amount of credit growth before the reconfiguration.

It is worth noting, in Figure 74, that when the target rate of economic growth is reduced from 10 to 6 per cent, the reduced stimulus from international trade also reduces the rate of credit growth.

The proposed monetary reconfiguration reduces the burden of debt on both Region A and Region B. Its effect is most profound on Region B, which has the significantly higher debt burden, as shown in Figure 75.
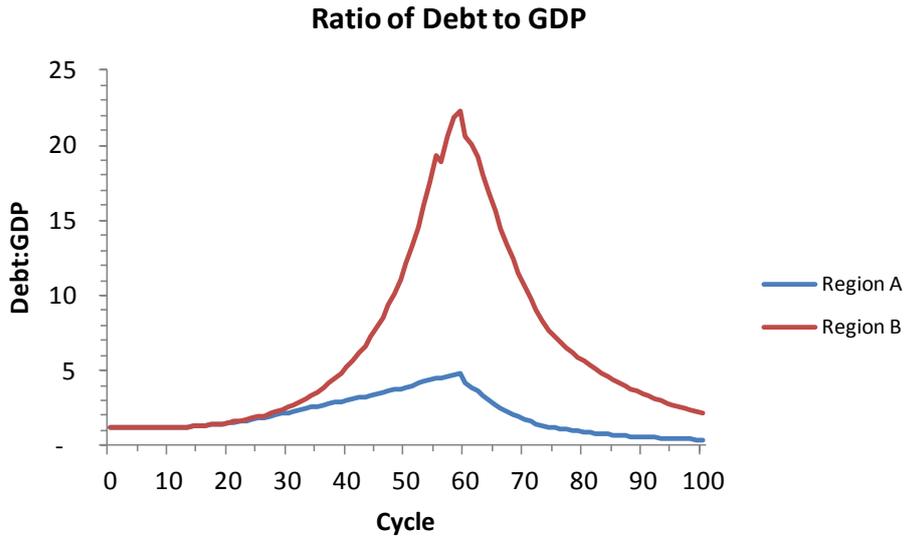
Ratio of Debt to GDP

The proposed monetary reconfiguration deals immediately with the "economic anorexia". The income and money generated by the rise in net foreign income more than makes up for the reduction in the growth of bank credit. As evident in Figure 76, this effect is particularly strong in Region A. Revenue from trade with non-Euro nations rises dramatically, raising the net foreign income of the Region.

Region A: Net Foreign Income

In Region B, the effect is not as dramatic as its main source of foreign income is from within the EMU. The economic growth in the Region A raises the demand for products from

Region B. Also, the lower exchange rate initially reduces Region B's net imports from the rest of the world. Together, these effects raise the net foreign income for Region B, as shown in Figure 77

Region B: Net Foreign Income
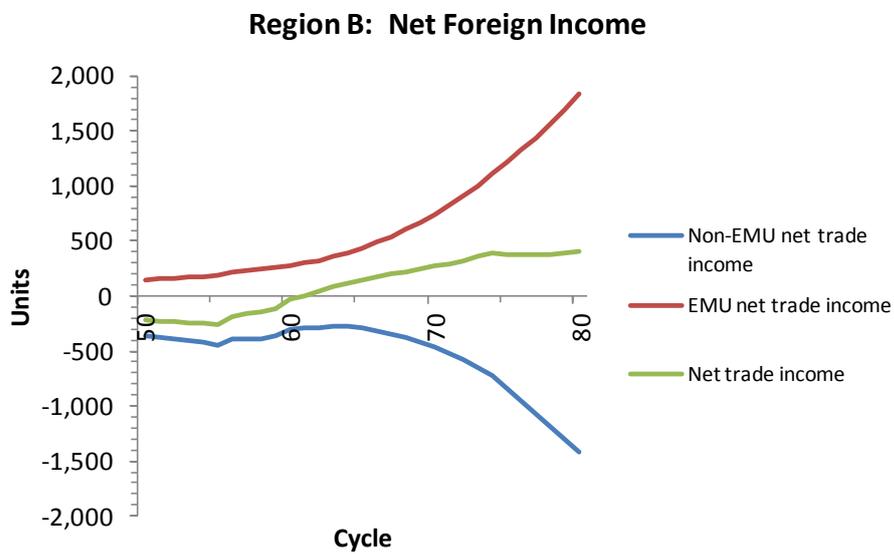
Figure 77. Region B: Net foreign income overcoming "economic anorexia"

The arrangements proposed so far, would establish the optimum exchange rate system. Once established, the system should be further developed.

8   Implications of Monetary Reconfiguration

The monetary reconfiguration quickly provides stability to the European Monetary Union. It will also prevent the implementation of costly misinformed policies that are likely to create poverty and exacerbate the monetary crisis in Europe.

8.1   Institutional Implications

Possibly one of the most obvious institutional deficiencies that the problems of Europe have highlighted is the inadequate management of monetary policy. It needs to be made clear that the short term interests of the banks are very different to the interests of the wider economy.   What is good for the banks is not good for the rest of the economy. The monetary system should serve the interests of the whole economy, not just the banks.

For that reason, the European Commission needs to distinguish between the management of the monetary system (the currency) and the oversight of the banks and financial markets. Economists are aware that the high exchange rates have been making businesses uncompetitive, leading to their collapse. However, there has been no institution responsible for that failure. These failing industries were often derided as being inefficient and unproductive. Yet no level of efficiency or productivity could save them from the flawed monetary system that was destroying them.

The European Central Bank has responsibility mainly for price stability. Article 3 of the Treaty of European Union provides that the Union shall work to attain "full employment" and "balance economic growth" through its internal market. While the ECB acknowledges that these provisions exist for the market, it has limited its role to maintaining price stability.

As we have seen, monetary policy has implication for far more than price stability. Yet there does not seem to be an institution within the Union responsible for monetary policy that is also responsible for full employment, economic growth and the debt burden.

 Therefore, one of the first matters that must be settled within the European Commission is "who is responsible for monetary policy when it affects employment, economic growth and the growth of foreign and domestic debt?"

I would suggest that a new institution is required, possibly a "Euro Currency Council" (ECC), that is independent of the European Central Bank. The ECC would be responsible broadly for monetary policy and the currency. It would be responsible for economic growth, employment and the level of domestic and foreign debt.

The ECC would set the employment (or growth) targets and inflation targets as well as the incentives that drive the optimum exchange rate system, if it were to adopt the optimum exchange rate system.

The ECB would continue to operate as it has done. It would manage the banks and provide an interbank settlement service. Part of its operations will involve facilitating the operation of the optimum exchange rate system (if it were adopted) and implementing the policies of the ECC.

8.2   The European Monetary Alliance

It would be desirable for the future economic stability of the banking system in Europe that the loan reserve account established for the purposes of the optimum exchange rate be split into a number of tranches. Each tranche could hold one sixth of each bank's loan reserve balances. These tranches would comprise:

- Tranche A1, a foreign reserve account held by each bank. If banks required additional foreign exchange to meet customer requirements, or to top up their special settlement account, they could draw on these funds. However, if these funds were to fall below the required level stipulated in their lending license, the bank would not be authorised to increase its total level of lending. It would be restricted to lending the equivalent of funds that had been repaid on existing loans. It would not need to notify the ECB, or their regional central bank, that these funds were being drawn upon, provided that its lending activities did not increase the total amount of its lending while the A1 Tranche was deficient.

- Tranche A2, also a foreign reserve account held by each bank. It may be used in the same way as the first tranche. However, if a bank was to draw upon these reverse, the bank would need to notify their regional central bank. This may be the ECB if the bank does not deal with a regional central bank. Any bank that draws upon its Tranche A2 reserves must cease all lending activities. It would not be authorised to engage in any lending activities, including off-balance sheet activities such as providing guarantees while its A2 Tranche was deficient. The regional central bank may request information and provide advice at this stage.

- Tranche B1 would be held by the regional central bank, or the ECB, if the bank did not have a regional central bank. Tranche B1 reserves would be available to the bank at the discretion of the regional central bank. The ECB would be able to place conditions on the use of the funds drawn.   The bank would not be authorised to engage in any lending activities of any for, while its B1 Tranche was deficient.

- Tranche B2 reserves would be held by the regional central bank (or the ECB). If a bank's Tranche B1 reserves were depleted, the central bank may appoint an administrator to manage the bank. The central bank may make available to the administrator the Tranche B2 reserves. If these were inadequate, the central bank could make available to the administrator the Tranche B2 reserves of the other banks held with that central bank. The central bank may apply terms and conditions to the use of these funds.

- Tranche C1 reserves would be held by the ECB. If the Tranche B2 reserves of the central bank were insufficient to meet the requirements of the bank, or banks, in

difficulties, then the central bank could turn to the ECB for assistance from all the Tranche C1 reserves held with the ECB. The ECB may place terms and conditions on how those funds were to be used.

- Tranche C2 reserves could be held with the ECB also. The combined sum of the Tranche C2 reserves of all banks would be available to finance the closure of the bank or banks. The ECB would be able to take full control of the situation.   The ECB may place terms and conditions on the use of the funds drawn.

This structure would form the basis of a European monetary alliance (EMA), should member states of the EMU wish to withdraw from the Union. The withdrawing members would transfer their Tranche C reserves (held with the ECB) to the new EMA. The EMU would also transfer all its Tranche C reserves to the EMA. The ECB would continue to retain the Tranche B reserves that were previously held with it.

The EMA would enable former member states of the EMU to continue to enjoy the benefits of the combined security of the European community through the EMA. Also, it would expand the resources available to contribute to the stability of the EMU to include those of the broader European Community.

Any prospective members of the EMU would be required to join the EMA before they could enter the EMU. That would ensure that their monetary system was already stable and their financial institutions were familiar with the form of monetary regulation applying to the banking system in the EMU.

Members of the European Community would be able to join the EMA without joining the EMU. That would improve the economic stability of the Community without requiring all members to participate in a single currency.

The EMA would be administered separately from the EMU, although it would be likely to maintain close ties. All member countries of the EMA would be represented on its governing body. It would have its own executive which would monitor the monetary activities of members to ensure that they were consistent with the monetary requirements of the EMA. Any member that adopted policies contrary to the requirements of the EMA for monetary stability could be expelled from the Alliance.

8.3   Interest rates

The ECB would no longer use interest rates as an instrument of monetary policy. Interest rates would be set in the market. If interest rates were high, they would attract foreign capital. The additional foreign reserves would increase the capacity of the banks to lend. If the lending capacity exceeded the borrowing requirement at that rate of interest, interest rates would fall, thereby reducing the capital inflow and reducing the capacity of banks to lend.

It would be up to the banks to decide whether they raise foreign reserves by raising interest rates to attract foreign capital to lend or lower exchange rates to increase export revenues and lower imports. The option of raising interest rates would raise lending capacity without significantly affecting economic growth and employment. However, it may have implications for inflation. The option of lowering the exchange rate would provide increased employment and economic growth. That may raise the lending ratio, enabling banks to increase their lending relative to their foreign reserve holdings. Also, it may have inflationary implications.

9 Managing the Process of Separating from the EMU

If a member state wishes to leave the EMU they should not do so until the EMU has reconfigured its monetary system and brought economic stability to the Union. The following is a procedure for a country to leave the EMU, assuming that the EMU has already reconfigured its monetary system to provide monetary stability.

The process of leaving the EMU should not be rushed. The following procedure is intended to minimize the stresses placed upon the economies involved and provide the soundest foundation for their future growth and prosperity.

9.1 Step one – avoid panic

Once the decision is made to leave the EMU, it should be made public. The time frame for the transition should be announced at the same time. The announcement should not cause any panic. Rather, sufficient notice should have been given of the imminent decision that the outcome is anticipated and publicly welcomed.

9.2 Step 2 – introduce new currency

The transition should occur over several years. In the first six months, the new currency should be issued at the same value as the Euro. It should be circulated and be used interchangeably with the Euro. However, all withdrawals of cash from financial institutions are to be denominated in the new currency, unless the customer explicitly asks for Euros.

In the second six months, all bank accounts should be recorded in the new currency and all loans issued in the economy would be denominated in that currency. All wages would be paid in the new currency. Also, all withdrawals of cash from bank accounts would be denominated in the domestic currency. Banks would be able to charge a commission on the sale of Euros, as they do for other foreign currencies.

Prices displayed in shops would be denominated in the new currency. They may also display prices in Euros. During the first year of the transition, people would be free to move their funds to Euro accounts or to move Euro accounts to the new currency. Also, they would have the opportunity to transfer any loans with a financial institution in another member state to a financial institution in state that is withdrawing from the EMU. Alternatively, they may refinance their loans in terms of the new currency.

Bank credit would be managed in the same way as the Euro. However, all banks who wish to continue to trade in the member states that are leaving the EMU must establish their Tranche B loan reserves with the central banks of the respective member states that are leaving.

Long term securities issued in Euros would remain in Euros. However, institutions in the economies leaving the EMU that had issued securities in Euros would be able to issue new securities in the new currency and use the funds raised to hold appropriate Euro denominated financial assets to hedge their Euro denominated debts.

During the first 12 months of the transition, people, businesses and government would be able to rearrange their finances in preparation for the time when the exchange rate of the new currency would be different to the Euro.

Step 3 – gradual exchange rate movement

In the second year of the transition, the exchange rate between the new currency and the Euro would be allowed to separate. However, initially the currency would be allowed to be traded within a narrow band, 1 per cent above or below the Euro. That collar would be expanded by 0.1 per cent each month until it reached 2 per cent. When the collar reached 2 per cent, it would be raised 0.25 per cent each month until the collar reached 4 per cent. From 4 per cent, the collar would be raised by 0.5 per cent each month until it was no longer binding. Within 2 years, the collar would have expanded to 6.5 per cent around the Euro. To minimize distortions at the end of each month, the central bank could adjust the collar daily.

To assess the impact of this policy on the economy, the model was run assuming that the initial movement in the exchange rate of Region B commenced at the 70th cycle. The target rate of economic growth for Region B was kept at 10 per cent and that rate was allowed to continue up to the 80th cycle. At the 80th cycle, the target rate of economic growth was lowered to 6 per cent, the same rate as in Region A.

Constrains were placed on the movement of the exchange rate. However, they were found not to be binding.

The rate of export growth in Region B had been set at 3.5 per cent for Region B (see section 2.1). Region A had been growing at 10 per cent up to the 74th cycle. That target growth rate was reduced to 6 per cent in the 75th cycle.

The optimum exchange rate system had to continuously devalue the currency of Region B to achieve the target rate of economic growth of 10 per cent. However, once full employment had been attained and the target rate of growth was reduced to 6 per cent, the exchange rate for Region B started to appreciate slightly as shown in Figure 78.
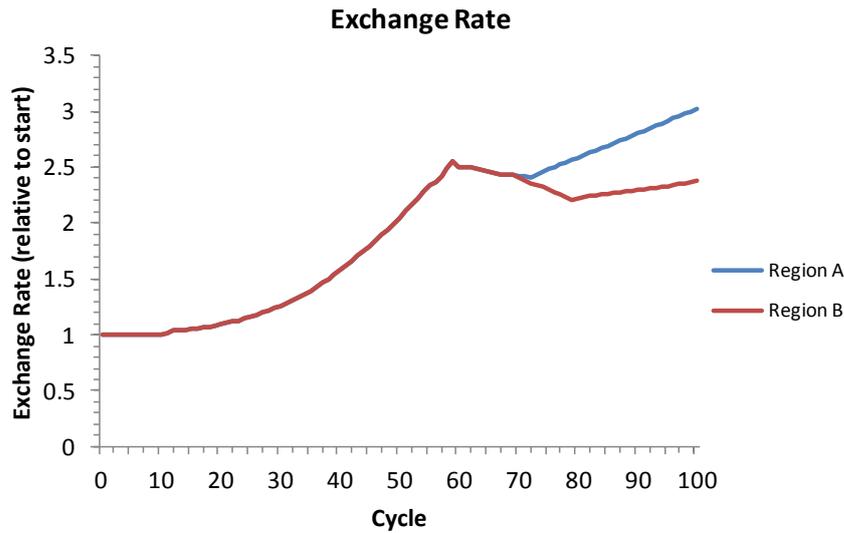
Figure 78. Exchange rates during reconfiguration and separation

The exchange rate of Region A continued to depreciate while it retained the target growth rate of 10 per cent. When Region A achieved full employment and reduced its target growth rate to 6 per cent, the subsequent appreciation of the exchange rate of Region A reduced the rate of depreciation of the currency in Region B.

The rate of economic growth in Region B increases from around 8 per cent to 10 per cent once it is separated from the Union. This is despite the fact that the target rate of growth was 10 per cent in both cases. Region A was receiving a larger share of the benefit of the exchange rate deprecation when the two regions were united. Once Region B separated, the rate of economic growth in Region A declined slightly, as the rate of growth in Region A did not need to compensate for the lower rate of economic growth in Region B. The rates of economic grow are evident as changes in the slopes of the lines in Figure 79.
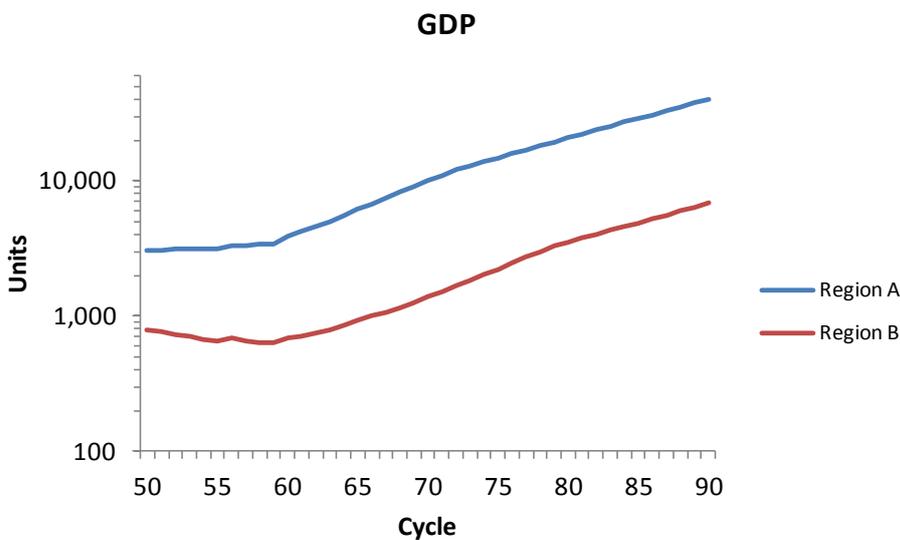
Figure 79. GDP during reconfiguration and separation

The main stimulus to Region B from its separation from the unified monetary system came from the growth of income from trade, as shown in Figure 80. The increase in the rate of growth of net foreign income is evident between cycle 70 and cycle 80. When, at cycle 80, the target rate of economic growth is reduced to 6 per cent, it reduced the rate of growth of net foreign income.

Region B: Net Foreign Income
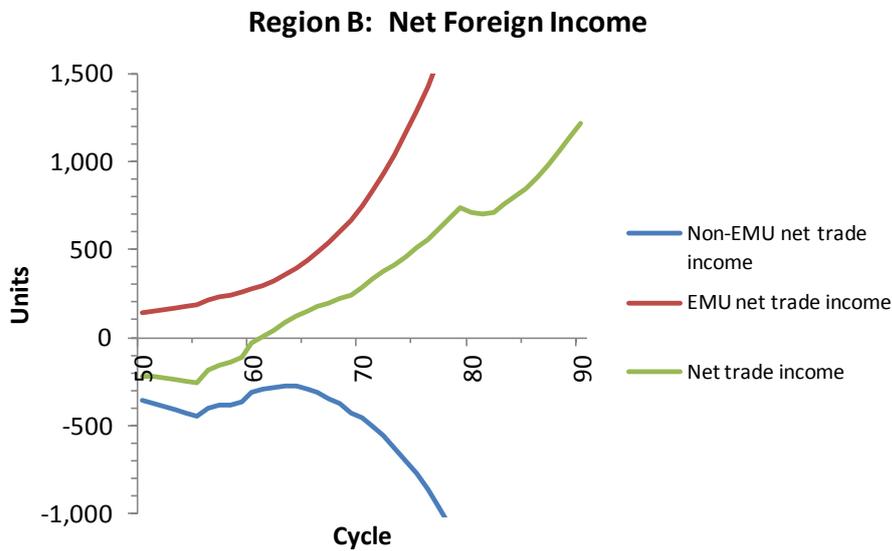
Figure 80. Region B: Net foreign income during reconfiguration and separation

The income from trade affects the ability of banks to create credit, as shown in Figure 81.
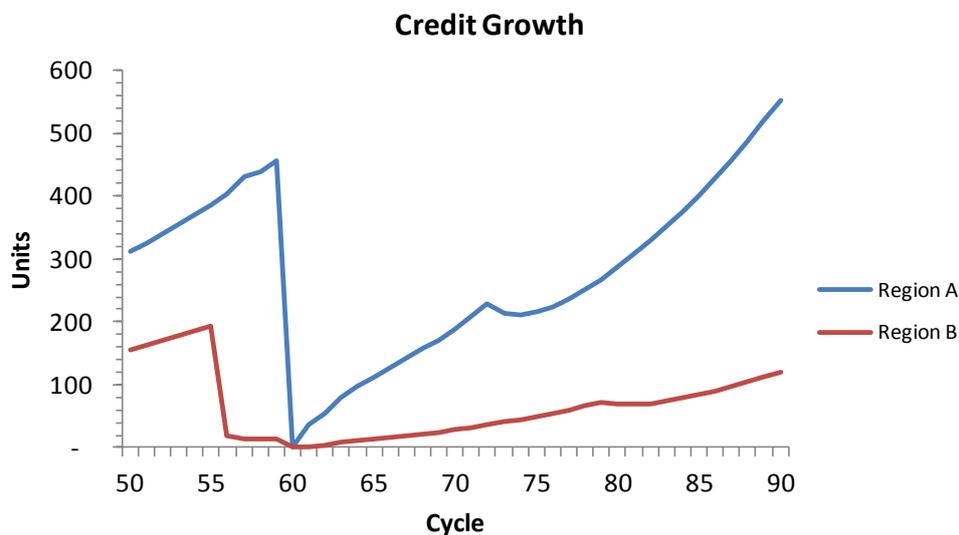
Credit Growth

Figure 81. Credit growth during reconfiguration and separation

Under the proposed scenario, the process of leaving the EMU should be no more daunting to a member state of the EMU than the process of joining the EMU. The establishment of

the European Monetary Alliance would provide member states that leave the EMU the additional security of the wider European community.

If the ECB does not participate in the European Monetary Alliance, then members of the EEC that were not members of the EMU could establish their own alliance to provide additional security. Member states that withdrew from the ECB could then gain additional monetary security if they join the EMA.

The EMA provides banks and central banks with a staged approach for dealing with bank failures. The structure is designed to be self regulating. It builds secure financial assets into the balance sheet of the banking system. This does more than raise capital requirements. It provides financial assets to banks that can be called upon at any time to deal with minor crisis and thereby prevent them growing into major crisis.

10 Implications of Separating from the EMU

Any member state that chooses to leave the EMU would be doing so to improve the foundation of its economy for its future growth and prosperity. Therefore, the implications can be expected to be positive for the economy, its people and its government.

10.1 Employment

The proposed monetary reconfiguration should be based on the optimum exchange rate system which lends itself to the attainment of full employment. The system uses the exchange rate to stimulate the economy, directing domestic demand to domestic products and making exports more competitive in the international market.

Also, the banking system is provided with incentives to raise employment. Therefore, it is likely to use the resources it has available to it to favour investments that provide employment, particularly in locations with higher levels of unemployment.

The floating exchange rate system acts against the attainment of full employment. Any movement away from the constraints of that system would provide additional employment. The advantage of the optimum exchange rate system is that it can optimise the level of employment.

10.2 Sovereign debt

Governments earn tax revenue from their tax payers. If tax payers are under-employed or unemployed, then the government's revenue base is reduced. Also, when there are high levels of under-employment and unemployment, government social security payments are higher.

The first step in reducing the level of sovereign debt is to raise the incomes of the tax payers. Governments have a direct financial interest in the economic welfare of their tax payers. Therefore, governments should make the economic welfare of their tax payers their first priority.

The proposed monetary reconfiguration would raise the incomes of tax payers. This will in turn raise the tax revenue of governments and enable them to finance their expenditure commitments, including servicing their debts.

Governments may need to revise their tax system. However, that should not be a priority during the economy's resuscitation process. The best time to review tax system would be when the economy had achieved full employment. Taxes should be structured so that the revenue collected during times of full employment is sufficient to meet all government expenditure commitments without resorting to additional borrowing.

The issue of whether to hold debt in Euros or in the member state's new currency is a matter of choice for the government. Euro denominated debt may have lower interest

rates. However, they carry an exchange rate risk for the government. Governments will need to assess the risks and determine the strategy that minimizes their costs.

10.3 Private savings

Residents of member states will have time to determine where they hold their private savings during the first twelve months of the transition. If they wish to hold Euros, there would be no restriction on them holding Euro accounts either within the withdrawing economy or in another country. Even when the currency has separated and trades at a different exchange rate to the Euro, residents would be able to hold Euro accounts.

The decision as to whether a resident holds Euros or the new currency will not significantly affect the growth of bank credit. The growth of bank credit would be determined by the growth in foreign reserves.

If residents chose to hold their private savings in Euros, and then after separation, decide to repatriate those funds, they would contribute to the growth of foreign reserves and enable banks in that state to increase their lending. Also, the transfer would reduce the lending capacity of banks in the Euro economy.

Under the optimum exchange rate system, banks would be more likely to compete with each other for deposits. This is because deposits have an effect upon the balances of the special settlement account of the banks and on their capacity to lend. Banks, therefore, are likely to offer higher interest rates on deposits than they have in the past.

10.4 Domestic mortgages

People and banks would have twelve months to decide whether they would hold their mortgages in Euros or in the new domestic currency. Most would be likely to allow their mortgages to shift to the new currency. That would remove any exchange rate risk between the currency in which they are paid and the currency with which they are to pay their debts. However, banks may offer lower interest rates for loans in Euros. It would be up to people to decide on the option that suits them.

10.5 Implications for international contracts denominated in Euros

There are unlikely to be any significant problems related to contracts denominated in Euros. They may remain in Euros or be renegotiated in terms of the new currency. There may be risks to suppliers if the exchange rate of the member state that leaves the EMU appreciates relative to the EMU. However, that is unlikely. Any entity that feared exchange rate losses would be able to hedge their contracts or take other measures to hedge their risks.

The transitional process allows time for all parties to enter contracts and take measures to reduce and avoid their risks. Also, there are buffers built into the process designed to minimise risks and prevent any exchange rate shocks.

10.6 Stability of the banking system

The optimum exchange rate system is designed to enhance the stability of the banking system. It is based upon a system that has been tested and found to be stable over many years.

A monetary alliance would enhance that stability. The main advantage of participating in the alliance is that it would provide a visible form of security to the banking system. Also, it has a staged response to deal with problems in the banking system as they arise.

There exists the possibility that banks in the states that withdraw from the EMU would be left holding assets denominated in the new currency and liabilities denominated in Euros. To minimise exchange rate risks, banks would be able to adjust the interest rates on their assets and liabilities in order to compensate for the future exchange rate differences. These interest rate differentials should not only provide compensation but also assist to reduce the exchange rate risks that banks may face. The different interest rates would encourage people to move their deposits with financial institutions to the new currency.

Once the new currency is in place, the growth of new deposits and loans denominated in the new currency would quickly swamp the effect of any loss caused from exchange rate differentials.

11 A Post Reform Eurozone

11.1 Reflection

The European Monetary Union is currently collapsing. The member states and the European Central Bank appear not to understand what is causing that collapse. Therefore, they do not have a reasoned solution. Like a drowning man, they are clutching at anything that may give them some form of temporary support.

To explain the problems of the EMU, the author has created a computer model to replicate them. The model has been used to illustrate how the interactions of the current monetary policies of the EMU have caused its problems.

Using the same model, a number of alternative solutions were tested. From these the policy that provided the soundest foundation for the future growth and prosperity of the current membership of the EMU was selected.

The policy changes proposed have been modelled in the same model that was used to illustrate the problem. The only changes to the model were those that reflect the policies proposed. The model was able to illustrate how the policy changes altered the behaviour of the economy to bring about a stable foundation for economic growth and prosperity.

11.2 The future of the Euro

The Euro, after only a relatively short period of time as a common currency, has proven inadequate to deal with the economic requirements of its different member states. Moving from the floating exchange rate system to the optimum exchange rate system would improve the stability and viability of the Euro currency. However, that may not be sufficient to ensure that all current member states of the EMU will continue to use the Euro as their domestic currency.

In the worse case, the Euro is may have a future mainly as a common currency used for trade across Europe. The Euro has a particular advantage for trade as it enables all parties to a contract to deal in a single currency with a known value relative to their own currency. The Euro and the US dollar have been used for negotiating international contracts around the world. The Euro is likely to become more widely used an international currency if it is able to move out of its present crisis.

The Euro is likely to continue to be used by travellers and tourists as a convenient medium of exchange when travelling around countries in Europe. It is likely to be accepted in most European countries as a second currency alongside the domestic currency. The optimum exchange rate system provides much more stable exchange rates than the floating exchange rate system. Therefore, there would be little risk to businesses associated with holding Euros. Also people know the value of the Euro relative to their own currency. These factors combine to make the Euro an attractive international currency. Also, given that the

exchange rate risk would be low, transaction costs associated with buying and selling Euros should be very small.

If the Euro moves to the optimum exchange rate system, it would increase the stability of the monetary system and the prosperity of the member countries. In such an environment, it is likely to retain its current membership and attract new members.

11.3 Conclusion

The failing economies within the Euro are the victims of a flawed monetary system. No amount of fiscal constraint can solve a fundamental monetary problem. The fiscal constrain only exacerbates the economic problems of Europe. They are not a solution.

Saving the Euro requires the co-operation of all member counties and major economic institutions. It requires a reconfiguration of the monetary system in such a way to provide a sound monetary foundation for the member economies to prosper.

The model

The heart of the model is a matrix in which money from each sector on the vertical axis is spent and earned as income of each sector in the horizontal axis. The sectors are as follows:

Region A
Household
Primary
Secondary
Finance and Business services
Other Tertiary
Government
Region B
Household
Primary
Secondary
Finance and Business services
Other Tertiary
Government

All the expenditure of each sector is allocated to each sector, or to imports. The money available to be spent comprises:
- the income of the sector in the previous cycle;
- less interest paid on bank debt;
- less repayments of principal on bank debt;
- less interest on bonds;
- plus expenditure in that sector financed from bank credit;
- plus the proceeds of bond sales;
- plus foreign income comprising export income and interest income less interest paid on bonds.

The bonds in the model are assumed to be purchased only by foreign investors and all interest paid on bonds is paid to foreign investors. The sale and purchase of bonds internally, within an economy, are assumed be internal transfers and to have no bearing on the macroeconomic issues being considered in this model. Therefore, they are not included in the model.

The model first deals with the international sector and then allocates the remaining funds to the domestic economy, based upon the past expenditure patterns of each sector.

If there are any tax changes, those changes are made to the expenditure patterns first before the domestic expenditure is allocated to the domestic sectors.

For example, if taxes are raised 10 per cent for a sector, then in the cycle in which tax was raised, the tax revenue from that sector in the previous period is raised 10 per cent. This does not affect the tax revenue in the previous period which is already fixed by this stage of the model's progression. It only affects the matrix of expenditure which determines the relativities in the subsequent year.

When the available funds in the current cycle are allocated, the increased taxes are put into effect when domestic expenditure is allocated according to the revised expenditure pattern for the previous period.

When using the floating exchange rate system, the exchange rate is adjusted to ensure that the revenue from:
- exports; plus
- foreign interest; plus
- net foreign capital inflow; less
- foreign interest payments,

is equal to the payments for imports. In this way international financial transactions do not affect the domestic money supply.

The model can handle up to 180 cycles, although only 100 were required to illustrate the issues raised in the paper.

In the first cycle, the two regions are assumed to be in an economic and monetary union with floating exchange rates. It is possible to vary most policy settings and to restart the model from any cycle. Thus it is possible to create an economic problem and then test alternative options for dealing with that problem.

A cycle represents the time that it takes for all the money in the economy to be spent once. In the model a cycle is a process that takes all the money recorded as the expenditure of each sector and allocates it either on imports or to the domestic sectors. Once these funds have been allocated, the outcomes are saved to record that cycle and the model moves on to the next cycle. A cycle can be considered equivalent to a period of time such as quarter or a year in an economy.

Exchange rates

The exchange rate affects exports and imports. A 10 per cent increase in the exchange rate means that export revenues are reduced 10 per cent and expenditure on imports increase 10 per cent.

The model allows the operator to select from a range of exchange rate options.

EXCHANGE RATE SYSTEMS							
	Stage 1		Stage 2		Stage 3		Stage 4
Start from Cycle	1		60		80		90
Region A	Floating	▼	Floating	▼	Optimum	▼	Optimum
Region B	Floating	▼	Managed Float	▼	Optimum	▼	Optimum
Relationship	United	▼	Separate	▼	United	▼	Separate
							Selection Confirme

These options may be applied as a single "united" currency or a "separate" currency for each region. The range of exchange rate systems is as follows:

Region A	Region B
Floating	Floating
Fixed Tied to B	Fixed Tied to A
Fixed Tied Outside	Fixed Tied Outside
Managed Float	Managed Float
Optimum	Optimum

The choice of system determines how the exchange rate may be set.

If a fixed exchange rate system is selected, it is possible to set the constraints applying to that system. For example, if the exchange rate of Region A were to be tied to that of Region B, then it would be necessary to define the exchange rate of A as a percentage of the exchange rate of Region B.

If the exchange rate was to fixed, and tied to currencies outside of the EMU, then it is necessary to determine at the time of adopting that system whether the exchange rate were to be devalued or re-valued.

FIXED EXCHANGE RATE SYSTEM		Stage 2	Stage 3	Stage 4
Region A	If Fixed tied to B	60	-	-
Percentage A of B		80%	90%	120%
	Fixed tied to Outside	-	-	-
Revaluation/(Devaluation)		-20%	10%	5%

If the exchange rate were to be managed, then there is a range of management options from which to make a selection. Also, it is necessary to determine the parameters to be applied.

MANAGED FLOAT SYSTEM			
Region A			
Form of control	Stage 2	Stage 3	Stage 4
Region A Cap relative to last period ▼	-	-	-
Cap relative to B	1%	2%	4%
Floor relative to B	1%	2%	4%
Constraint relative to B	1%	2%	4%
Cap relative to last period	-2%	4%	7%
Floor relative to last period	2%	5%	8%
Constraint relative to last period	1%	6%	9%

If the optimum exchange rate system is required, then it is necessary to set the target rate of growth, the maximum inflation rate, the amount that exchange rates may vary in a cycle and the amount of credit that may provided relative to each unit of foreign reserves.

OPTIMUM EXCHANGE RATE SYSTEM			
From Period	-	80	90
Optimum Exchange Rate Objectives			
	Stage 2	Stage 3	Stage 4
Region A			
Target growth rate in a period	10%	10%	10%
Maximum Inflation rate per period	3.0%	3.0%	3.0%
Max change in exchange rate in period	0.0%	1.0%	3.0%
Credit per unit of foreign reserves	10	10	10

Other Options

It is also possible to adjust the term of loans. This affects the amount of loan repayments for each sector.

AVERAGE TERM OF LOANS	Alternative term of loans from cycle 80	
	INITIAL AVERAGE TERM OF LOANS	ALTERNATIVE AVERAGE TERM OF LOANS
When a sector's debt reaches their ceiling, they stop borrowing.		
Region A	Periods	**No of Cycles**
Household	80	100
Primary	60	80
Secondary	20	50
Finance and Business services	10	30
Other Tertiary	8	20
Government	100	50

The model allocates the proceeds of loans. For example, the household sector below allocates 85 per cent of its borrowed funds to the Tertiary sector, representing loans for home construction.

	ALTERNATE USE OF CREDIT			Initial credit allocation shown in Assumptions		
	from cycle	80				
	Loans spent on Household sector	Loans spent on Primary sector	Loans spent on Secondary sector	Loans spent on Finance & Business services	Remaining alloncted to Tertiary	Loans spent on Government.
Region A	% of loans	% of loans	% of loans	% of loans	% of loans	% of loans
Household	0.0%	0.0%	10.0%	0.0%	85.0%	5.0%
Primary	0.0%	10.0%	50.0%	10.0%	25.0%	5.0%
Secondary	8.0%	10.0%	40.0%	20.0%	12.0%	10.0%
Finance and Busine	10.0%	0.0%	25.0%	5.0%	45.0%	15.0%
Other Tertiary	20.0%	0.0%	20.0%	20.0%	30.0%	10.0%
Government	65.0%	2.5%	10.0%	10.0%	12.5%	

The growth in credit for each sector may be determined for each sector. However, the optimum exchange rate system modifies these rates according to the available funds.

GROWTH RATE FOR CREDIT (relative to existing debt)	CONSECUTIVE			
		Step 1	Step 2	Step 3	Step 4
Stops at 181	From Period	55	60	61	63
Region A					
Household		4.5%	0.0%	6.0%	6.5%
Primary		3.5%	0.0%	6.0%	6.5%
Secondary		3.5%	0.0%	6.0%	6.5%
Finance and Business services		3.5%	0.0%	6.0%	6.5%
Other Tertiary		3.5%	0.0%	6.0%	6.5%
Government		4.5%	0.0%	6.0%	6.5%

There is provision within the model to change the debt servicing ceiling. This determines whether sectors can borrow. When the debt servicing costs reach their maximum, the sector stops borrowing.

DEBT CEILING	
When principal loan repayments plus interestest reaches the debt	
(Ceiling applies to interest only for government.) Step 1	
Stops at 181 From Period	1
Region A	
Household	30%
Primary	20%
Secondary	20%
Finance and Business services	70%
Other Tertiary	20%
Government (interest only)	20%

Taxes may also be adjusted for each sector by setting the increase in taxes relative to the amount that the sector was previously paying in taxes.

TAX CHANGES			
TAX CHANGES			CONSECUTIVE
Enter the % change relative the amount of tax previously collected. The revenue c			
		Step 1	Step 2
Stops at 181	**From Period**	59	90
Region A			
Household		10%	20%
Primary		10%	10%
Secondary		10%	10%
Finance and Business services		10%	10%
Other Tertiary		10%	10%

The model also provides for fiscal expenditure policy to be modified. There is a choice of five policy options, shown below.

EXPENDITURE POLICY

Region A

Initial Policy

Government expenditure equals tax revenue ▼

From Period 2

Government expenditure is not allowed to fall below initial level in real terms ▼

Government expenditure equals tax revenue
Government expenditure is not allowed to fall
Government expenditure not allowed to fall in real terms
Government expenditure is not allowed to fall below initial level
Government expenditure is not allowed to fall below initial level in real terms

The rate of export growth for each sector can also be determined. These rate of growth are applied to the exports in the previous period to determine the level of exports before any exchange rate adjustment are made.

EXPORT GROWTH			CONSECUTIVE	
		Step 1	Step 2	Step 3
Must be consecutive				
Stops at 181	**From Period**	10	15	20
Region A				
Household		0.0%	0.5%	0.6%
Primary		1.0%	1.5%	2.0%
Secondary		1.0%	1.5%	3.5%
Finance and Business services		1.0%	1.5%	2.0%
Other Tertiary		1.0%	1.5%	2.0%
Government				0.0%

The model allows different interest rates to be applied to each sector and the rates to be varied in different periods or cycles.

INTEREST RATES		Step 1	Step 2	
Region A			10	30
Household	1.5%	3.0%	4.0%
Primary	1.5%	2.5%	3.5%
Secondary	2.5%	2.5%	3.5%
Finance and Business services	2.0%	2.5%	3.5%
Other Tertiary	3.0%	2.5%	3.5%
Government	1.0%	2.0%	3.0%

There are options to vary interest rates on foreign assets and foreign debt.

INTEREST RATES ON FOREIGN DEBT		Step 1	Step 2	
Region A			10	30
Earned on Assets	2.0%	2.0%	3.5%
Paid on A Euro Bonds	2.5%	2.5%	3.0%

The model allows the proportion of a sector's borrowing requirement that may be obtained from the bond market to be set and varied.

If Available % of credit financed with bonds		Step 1	Step 2	
Region A	Initial		2	90
Household	0.0%	0%	0%
Primary	0.0%	0%	0%
Secondary	75.0%	75%	85%
Finance and Business services			
Other Tertiary	60.0%	60%	70%
Government	100.0%	100%	100%

The model runs one cycle at a time, applying the parameters that apply to that cycle. It is possible also, to restart calculations from any cycle for which data has been calculated.

Start from Cycle No.	Start fromSpecified Cycle	Resume	Start from the Beginning	Stop at Cycle No.
69				180

The model starts from a stable equilibrium position with net exports of 1,200 units and income from domestic sources of 8,800 units.

	Foreign interest receipts/ payments	Change in Exports	Previous Exports	Total Exports last period dollars	(Exports plus foreign interest)/e	Income from domestic sources
Region A						
Household	0	0.0	0	0	0	1,759
Primary	0	0.0	233	233	233	633
Secondary	0	0.0	500	500	500	1,049
Finance and Business services	13	0.0	0	0	13	594
Other Tertiary	0	0.0	53	53	53	1,102
Government	0	0.0	0	0	0	729
Region B	**13**	**0**	**787**	**787**	**800**	**5,867**
Household	0	0	0	0	0	880
Primary	0	0	117	117	117	317
Secondary	0	0	250	250	250	524
Finance and Business services	7	0	0	0	7	297
Other Tertiary	0	0	27	27	27	551
Government	0	0	0	0	0	365
	7	**0**	**393**	**393**	**400**	**2,933**
	20	**0**	**1,180**	**1,180**	**1,200**	**8,800**

Initially, there is no change in credit outstanding as new loans equal loan repayments. Payments of interest by the other sectors contribute to the income of the Finance and Business services sector.

	Additional Credit Bank	Total Bank Credit	Credit financed expend-iture	Repay-ments of pricipal of debt	Interest Paid on band debt	Interest Earned by banks	Expend-iture including K
Region A							
Household	0	18	14	-18	-22		1,733
Primary	0	2	3	-2	-1		867
Secondary	0	27	25	-27	-14		1,533
Finance and Business services	0	8	16	-8	-2	53	667
Other Tertiary	0	47	37	-47	-11		1,133
Government	0	3	10	-3	-3		733
Region B	**0**	**105**	**105**	**-105**	**-53**	**53**	**6,667**
Household	0	9	7	-9	-11		867
Primary	0	1	1	-1	-1		433
Secondary	0	14	13	-14	-7		767
Finance and Business services	0	4	8	-4	-1	26	333
Other Tertiary	0	24	19	-24	-6		567
Government	0	1	5	-1	-1		367
	0	**52**	**52**	**-52**	**-26**	**26**	**3,333**
	0	**157**	**157**	**-157**	**-79**	**79**	**10,000**

The expenditure of each sector of each region is allocated and to the other sectors including the sectors in the other region.

REGION A INCOME

	House-hold	Primary	Second-ary	Finance/ Business services	Other Tertiary	Govern-ment
	1,759	633	1,049	594	1,102	729
Region A						
Household	67	13	170	222	627	419
Primary	273	209	145	17	13	71
Secondary	352	310	305	85	10	134
Finance and Business services	240	3	94	81	113	27
Other Tertiary	501	31	185	116	122	48
Government	326	3	45	60	190	31
Region B						
Household		1	19	6	16	
Primary		23	16	0	0	
Secondary		34	34	2	0	
Finance and Business services		0	10	2	3	
Other Tertiary		3	21	3	3	
Government		0	5	2	5	

REGION B INCOME

	House-hold	Primary	Second-ary	Finance/ Business services	Other Tertiary	Govern-ment
	880	317	524	297	551	365
Region A						
Household		1	19	6	16	
Primary		23	16	0	0	
Secondary		34	34	2	0	
Finance and Business services		0	10	2	3	
Other Tertiary		3	21	3	3	
Government		0	5	2	5	
Region B						
Household	33	6	76	108	305	210
Primary	136	93	64	8	6	35
Secondary	176	138	136	41	5	67
Finance and Business services	120	1	42	39	55	13
Other Tertiary	251	14	82	56	59	24
Government	163	1	20	29	93	15

Also, expenditure is allocated to imports. In the initial stable equilibrium situation, the expenditure on imports is equal to the income from exports and net interest receipts.

	Imports
	1,200
Region A	
Household	173
Primary	100
Secondary	267
Finance and Business service	93
Other Tertiary	100
Government	67
Region B	
Household	87
Primary	50
Secondary	133
Finance and Business service	47
Other Tertiary	50
Government	33

A shift to economic prosperity or poverty requires disequilibrium in the economy. Once changes are made to the model, it causes disequilibrium in the model. By monitoring that process, we can use the model to determine whether the change generates prosperity or poverty to the modelled economy.

The bond market is used only while the floating exchange rate system is in operation. It is not required for other exchange rate systems.