

A model of a currency union with endogenous money and saving-investment imbalances

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Abstract

The economic crisis in the euro zone proves that neither the creators of the euro nor today's policy-makers fully understand the functioning of a currency union. Explanations of the macroeconomic relations inside a currency union are therefore in demand. Traditional textbook models, like the IS/LM/BP or the IS/MR/PC model respectively, either are found lacking on the monetary or the real side or both. It is now clear that macroeconomic imbalances should be part of a model. The one developed in the following has been created with the purpose of filling this gap and allowing instructors to analyze the macroeconomics of a currency union with the help of a simple model which features endogenous money and saving-investment imbalances.

Keywords: endogenous money, saving-investment imbalances, EMU

JEL classification: E12, F41

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1 Introduction

The introduction of the euro has been the biggest experiment in monetary economics in recent European history. Being largely a political project led by Jacques Delors, academic economists have been commenting from the sidelines since the foundations were laid in the late 1980s.¹ The theory of optimum currency areas started by Mundell (1961) was revisited by academia and applied to Western Europe. American and European economists soon were in disagreement over the proposed currency union, with the Americans declaring that it would not work and the Europeans strongly believing that it would.² The project was pushed ahead nevertheless, creating the European Monetary Union (EMU). Exchange rates were fixed in 1999 and three years later the euro was put into circulation. Not all countries entered the EMU. Some EU members, having established a broad political consensus, preferred to not join the euro.³

Three institutions were created to support the EMU. The Maastricht criteria were drafted to determine eligibility for the euro. For those that were admitted to the euro, the main institution is the European Central Bank (ECB). It sets an interest rate for the whole currency union in order to achieve its target of an inflation rate of below, but close to, 2 percent over the medium term. This range is the ECB's interpretation of price stability and not hardwired into its legal foundations. The ECB might follow secondary goals as long as price stability is not compromised. Next to the ECB the Stability and Growth Pact (SGP) was established to ensure that governments would not free-ride by moving budgets into deficit in expectation of future bail-outs. The so-called 3/60 rule was established to ensure that government deficits would neither surpass three percent of GDP per year nor that total government debt would rise above sixty percent of GDP. The rules were changed in 2005. Two additional reforms were enacted in the middle of the economic crisis: the Euro Plus Pact (2011) and the European Fiscal Compact (2012). Both tightened the regulation of sovereign debt.

It was clear what was being regulated – the inflation rate and public sector debt – and it was also clear what was not: private sector debt and the balance of pay-

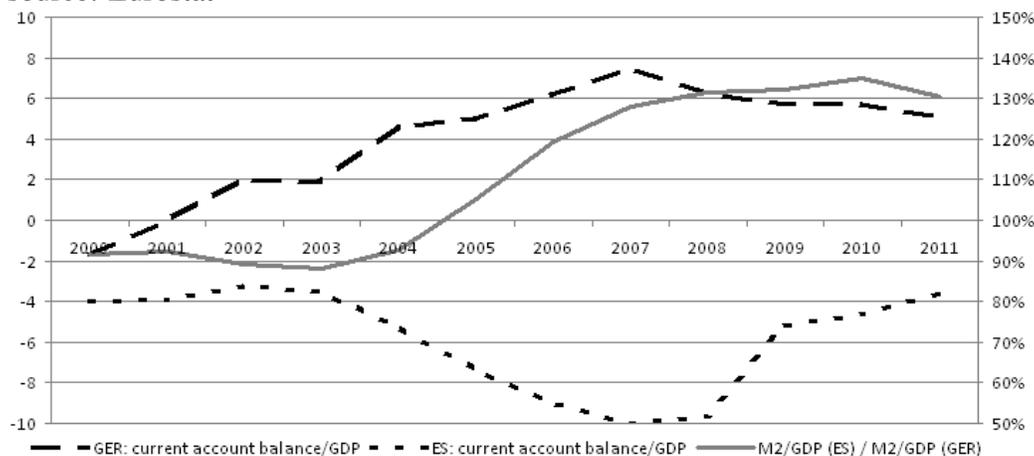
¹The basic framework is developed in EC (1989), nicknamed the Delors Report.

²See Jonung and Drea (2009) for a perhaps premature summary.

³See British economists Godley (1992) and Walters (1990) on the prospects of euro membership for Great Britain.

ments. Banking sector regulations were not harmonized on a European level. This meant that private sector debt could expand in one part of EMU while it contracted in another, just as before the introduction of the euro. Since countries were in different phases of the business cycle, lending increased strongly in some and stagnated in others. As a consequence, those countries that were in the middle of a boom saw wages and prices increase more than those that were in a slump. If national price levels evolved in different directions, intra-euro zone current account imbalances were to be expected. Since the ECB exclusively aims at stable inflation in the whole currency union, this situation would be allowed to persist. It was also assumed that asymmetric shocks are unlikely, and that market adjustment would correct these shocks if they happened. Markets would also regulate themselves so that intra-EMU capital flows would not create unsustainable balance of payments positions by themselves.⁴

Figure 1: Spanish and German current account to GDP ratios (dotted, left scale) and the ratio of German to Spanish domestic loans to GDP (grey, right scale), source: Eurostat



Right from the start of the EMU domestic credit expanded rather quickly in some countries while it was stable in others. The European Commission (2009, p.26) examined the resulting current account imbalances. It is worthwhile to present a full quote:

⁴See Patterson and Amati (1998) for an optimistic evaluation on how shocks can be dealt with by market adjustment(s).

According to conventional wisdom, external factors such as price competitiveness are seen as major drivers of current accounts. However, a large part of the divergence in the current account in the euro area since the late 1990s can be traced back to domestic demand. There have been considerable and persistent differences in domestic demand across Member States since the launch of the euro. Stronger relative demand pressure in a Member State will tend to fuel import demand and depress the current account.

Figure 1 shows the development of the macroeconomic imbalances in Spain and Germany, which are exemplary of the euro zone developments. Germany (dashed line, left hand axis) started with a negative current account in 2000 which turned first positive and then very positive over time until the crisis hit in 2008. In Spain (dotted line, left hand axis), the current account was negative from the start and declined until the crisis broke out. The ratio of the monetary aggregate domestic loans to GDP in Germany divided by that of Spain is depicted by the grey line (right hand axis).⁵ Germany's ratio of domestic loans to GDP used to be significantly higher than Spain's, and only around 2004 the Spanish domestic loans to GDP ratio started to increase. This coincides with the decline of the current account. Today, the Spanish ratio is still much higher than Germany's.⁶

As it stands, there is no macroeconomic model for a currency union that features macroeconomic imbalances. While there is an extensive literature on optimum currency areas, it is mostly eclectic and to this day has not produced a model of how the macroeconomy of members of a currency union works. Existing models, like the textbook IS/LM model, its open economy extension (Mundell-Fleming model) and DSGE models in the spirit of Woodford (2003) fall short for different reasons explained in some detail later. The world economy has changed a lot in the last decades, and these changes are not yet reflected in the standard models. The following model incorporates some recent advances in understanding the workings of a modern monetary economy in the context of a currency union. What I believe these advances to be I will lay out in the next section, at the end

⁵There are no more collections of national data on monetary aggregates by Eurostat. My data series is domestic credit as collected by the World Bank.

⁶Domestic loans in Spain would be much lower had the ECB not started accepting mortgage-backed assets in their liquidity provision operations from early on. Non-performing loans would have been written off by now.

of which I discuss how these issues are neglected in the Mundell-Fleming model and the DSGE models.

2 Literature

A macroeconomic model of a currency union must be able to explain what drives the economies of its members. As the European Commission (2009) itself has emphasized, macroeconomic imbalances play a major role. If that is the case, then stocks of debt matter. This means that money cannot be treated as a veil. Money – or credit – then must be modeled explicitly. The inter-regional as well as the inter-sectoral distribution of debt as well as the level of gross debt do influence the economy. In other words, money is not neutral.

This was recognized about eight decades ago by John Maynard Keynes, who looked for a theory which would deal 'with an economy in which money plays a role of its own and effects motives and decisions' (1933, 408). In the *General Theory of Employment, Interest and Money* (1936) money stocks are introduced into the flow framework. Current investment depends on the marginal efficiency of capital, which is influenced by expectations about future earnings, and 'the reward for parting with liquidity' as described by Keynes (1936, 167), expressed through the interest rate. In the IS/LM model, it is the downward movement of the investment schedule that leads to an equilibrium with underemployment, as savings adjust to investment through changes in income. However, the model is not without flaws regarding the situation of stocks and flows.⁷

Keynesian theory was extended by Hyman Minsky, who looked more explicitly at the monetary system. According to Minsky (1982, 6), aggregate demand is equal to income plus the change in debt. What is meant here is the change in endogenous money where an increase in lending is not set off one to one instantly by an increase in savings. If everything works out, the increase in lending will lead to higher incomes that will create an increase in savings later on. Debt and demand are intertwined as parts of demand – consumption, investment, government spending and net exports – are financed by an increase in indebtedness of

⁷While monetary supply certainly is a stock, monetary demand is derived from the flow of savings.

the respective sector. This complicates economic analysis as additional flows of income are derived from changes in stocks of debt to form aggregated demand. Stock-flow consistent models are able to handle this complication, at the price of additional complexity.⁸ Having established that stocks of debt matter for the economy, the next question is how.

Lavoie (1985, 67-68) states:

[L]oans make deposits. Banks do not wait for the appropriate amount of liquid resources to exist to provide new loans to the public (mainly firms). Credits are created *ex nihilo*. The recipient of the purchasing power is the initial recipient of the loan. When the bank makes a new loan, the borrower is being immediately credited with a deposit, the amount of which is exactly equal to the amount of the loan. Hence, the increase in the supply of money is a consequence of increased loan expenditure, not a cause of it. The loan is the causal factor.

Given optimistic expectations, firms will be willing to switch from internal financing (equity) to external financing (debt). Minsky (1982, 24) divides external finance into three types. The most healthy of these is hedge finance, when an investor borrows today in order to repay the loan plus interest in the future. The next step is speculative finance, when an investor can only repay the interest on his loan but not the principal. Beyond that, Ponzi finance describes investors that can repay neither interest nor principal. The last two types are dependent on financial markets to roll over their existing loans from time to time. As firms forget the lessons of the past, more and more firms might shift towards the two risky classes of external finance, as a result of which financial fragility increases.

Richard Koo (2003) coined the term *balance sheet recession* to describe the change of behavior in the private sector when balance sheets start to look more and more fragile. As investors turn towards a more pessimistic view of less growth and higher interest rates, they change from profit-maximizing to debt-minimizing behavior. This has an influence on asset prices as firms start repaying their external debt by selling those assets, often being forced to. The fall in loans causes a fall

⁸See Godley and Lavoie (2007) and van Treeck (2009) among others.

in asset prices, as in the early 1990s in Japan and in 2008-09 in both the US and Europe.⁹ Cash flows no longer finance investment but reduce the total amount of debt, as loans are repaid and balance sheets shrink. Meanwhile, the real economy is in trouble because first investment and then consumption fall. The dynamics of this process are well-known.

Fisher (1933) describes the process of debt deflation in times of financial distress. Written in the aftermath of the Great Crash of 1929 and in the middle of the Great Depression, Fisher shows that the repayment of debt by private firms sets into motion a deflationary process which might not come to a halt on its own. Policy intervention might be necessary to stabilize prices and stop the downward spiral.¹⁰

Another very important issue concerns the origin and form of money. Whereas in the IS/LM model the central bank exogenously sets the monetary supply, most central banks today set the interest rate. The monetary aggregate is then completely determined by the demand for loans, as in Hein and Stockhammer (2011, 115). Given the interest rate, banks can borrow as much as they like given they are eligible for lending. Hence loans supply is determined wholly by loan demand. It is therefore the expectations of investors in the real economy and those of speculators that in normal times determine the monetary aggregate, and not the central bank.¹¹ This constitutes a large difference. In a currency union, it is quite impossible that the monetary aggregate of each and every member is controlled by the single central bank.¹²

Last but not least, national accounts are needed to make visible the evolution of the economy, both of real and financial variables. The balance of payments highlights the international transactions, which are added to the existing stocks. It is important to look at both stocks and flows.

Most of the building blocks above are not part of existing models. The IS/LM/BP model assumes exogenous money, which is controlled by the central bank. Furthermore, interest parity is assumed to hold, which does not allow for persistent capital market mistakes. In the case of fixed exchange rates, monetary expansion

⁹Only government intervention - TARP, QE, LTRO, etc. - stopped the decline in asset prices.

¹⁰A variation on this theme include Bernanke and Blinder (1988).

¹¹The central bank can influence the monetary aggregate through policies like quantitative easing, buying illiquid debt with liquid funds.

¹²It would mean that intra-currency area capital flows are restricted and that this restriction is enforced. Controlling a monetary aggregate has proved to be a difficult task by itself in the past.

puts the exchange rate under pressure to depreciate. The central bank would have to intervene by buying foreign assets with domestic money, thus stabilizing the currency but reversing the monetary expansion. In a currency union, this works out quite differently.

Modern neo-classical models like the DSGE models based on Woodford (2003) do not model credit realistically. Neither the distribution nor the level of debt play a role. Inter-temporal coordination failures on the capital markets, as seen for instance in the US, Ireland and Spain in the last 5 years, are ruled out by definition. Declaring investment to be equal to savings at all times blocks the view on macroeconomic imbalances just as the neglect of the external sector.¹³ Also, the use of the interest rate as the major mechanism to establish equilibrium is not realistic in a currency union with economies that face the same interest rate but nevertheless are at different points of the business cycle.

In the following, the above insights are incorporated into one single framework. The goal is to show how changes in endogenous money and sectoral debt can drive the economy of currency union members. It is during times where credit constraints become binding that the economy experiences stress. The task of the economist is to explain what has happened and why things went wrong.

3 The IS/MY model

The following model presents a view of an economy which is part of a currency union. The central bank controls the interest rate, which is the same for all members. Since these face the same central bank interest rate the development of the monetary aggregate is more interesting. It is defined as the sum of all loans created in an economy. The creation of loans takes place when banks that are willing and able to finance find borrowers – households or firms – that are willing and able to lend.¹⁴ Loan demand comes from government, consumers, entrepreneurs but

¹³See Mazzocchi et al. (2009) for a more complete critique.

¹⁴The creation of loans by banks is not regulated by the central bank in the sense that the latter always supplies the necessary reserves – given that they are demanded by creditworthy institutions – at the interest rate it has set.

also from speculators.¹⁵ Consumers borrow in the form of residential real estate mortgages, home equity loans, student loans and the like.¹⁶

The main economic problem in any economy is establishing the equality of supply and demand at a level that maximizes social welfare. In the words of Axel Leijonhufvud (1981, 104):

[T]he central issue in macroeconomic theory is – once again – the extent to which the economy, or at least its market sectors, may properly be regarded as a self-regulating system. In what respects does it, or does it not, behave in such fashion? How well, or badly, do its "automatic" mechanisms perform?

In the following model, demand is connected to the financial side of the economy through changes in net debt. It is assumed that insufficient demand is a major problem.¹⁷ However, the model can also be set into a full employment mode. Therefore, it is a general theory of the economy rather than a special case. In the following it is assumed that the price level is fixed exogenously.

Aggregate demand consists of domestic demand to which exports are added to and imports subtracted from.¹⁸

$$AD = C + I + G + (EX - IM) \quad (1)$$

Consumption includes an autonomous part that does not depend on income and a part that directly depends on it. The propensity to consume lies between zero and one.

¹⁵The way governments in the EMU are financed by banks is specific to the construction of the monetary system. Most other industrial economies have chosen a different system whereby sovereign debt is a risk-less asset as a consequence of setting up the central bank as a lender of last resort.

¹⁶Whether these constitute investment or consumption is a matter of debate.

¹⁷The textbook view that most firms are resource-constrained has been proven wrong on both empirical and theoretical terms as documented by Keen (2011, ch. 4).

¹⁸Assuming a balanced government budget, the following equation is equivalent to stating that aggregate demand equals domestic demand plus the change in indebtedness of the private sector.

$$C = c_0 + c * Y, 0 < c < 1 \quad (2)$$

Investment is exogenous, since it depends on expectations about future levels of demand and conditions in the financial markets which are not modeled.¹⁹

$$I = \bar{I} \quad (3)$$

Imports depend directly on income, with the marginal propensity to import being positive and below one.²⁰

$$IM = im * Y, 0 < m < 1 \quad (4)$$

Exports depend on the foreign marginal propensity to import m^* and the income AD^* of the rest of the world.

$$EX = m^* * AD^* \quad (5)$$

Given these real variables, private savings S_p are defined as investment plus net exports plus government deficit. This equation follows from the balance of payments. A balanced current account and a balanced government budget would leave private savings equal to investment. Private savings increase when net exports rise, the budget deficit increases or investment rises.²¹

$$S_p = I + (EX - IM) + (G - T) \quad (6)$$

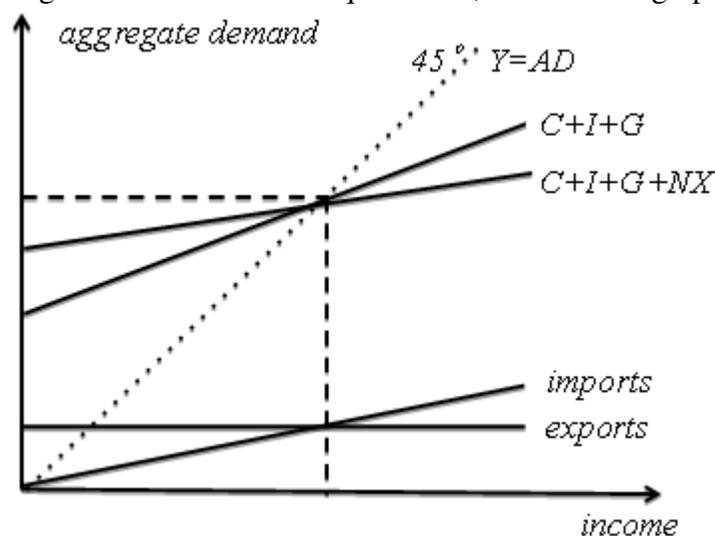
¹⁹However, some indication about investment can be derived by looking at the real interest rate, aggregate demand and the state of the stocks of debt in the model.

²⁰Note that this is a critical assumption. Imports depend on relative incomes of domestic and foreign, not on relative price levels. The income effect dominates the substitution effect. This connects to the Keynes-Ohlin debate on the transfer problem.

²¹The two terms are in brackets to highlight that they are net exports and the government budget surplus or deficit.

Figure 2 shows the above equations in graphical form.²² On the 45 degree line income, which is shown on the horizontal axis, is equal to aggregate demand, which is shown on the vertical axis. Domestic demand ($C + I + G$) is upward-sloping because more income will lead to more consumption. More consumption leads to more income, which leads to more consumption, etc.²³ The slope is less than 45 degrees because a part of the rise of income falls on savings.²⁴ Therefore, imports are rising with income while exports are not. Adding net exports to domestic demand gives us the aggregate demand curve AD .

Figure 2: Goods market equilibrium, source: own graph



Having established the relations of the real economy, the focus now shifts to the financial underpinnings of the economy. Net indebtedness can play a major role in the economy. Expenditure is influenced by changes in indebtedness as credit constraints of households, private firms and the government are relaxed or tightened. Equation 7, which is an identity, describes the changes in net indebtedness of the sectors of the economy.

²²The starting equilibrium resembles an unlikely state with a balanced current account and a balance government budget. It has been chosen in order to highlight the rise of savings-investment imbalances.

²³This is the result of the Keynesian multiplier in equation 2.

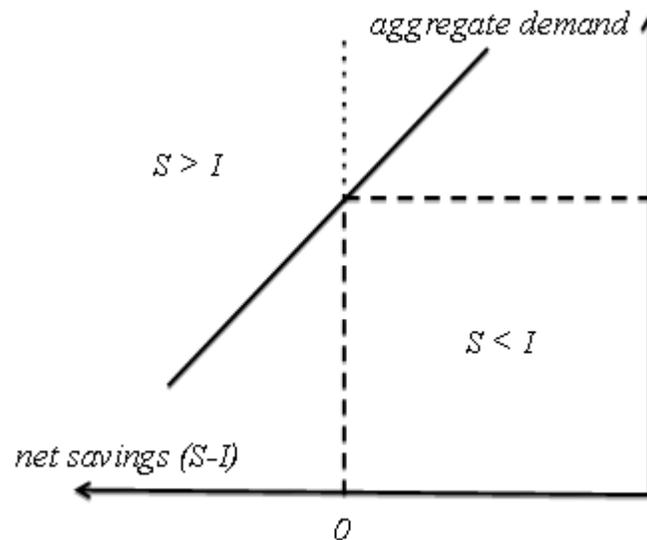
²⁴A higher income is not spend in full, as part of it is used to increase private savings.

$$(S - I) + (T - G) = (EX - IM) \quad (7)$$

Connecting the real with the financial side and assuming the government budget to be balanced net imports ($IM > EX$) coincide with an increase in foreign indebtedness ($S < I$), while net exports ($EX > IM$) coincide with a decrease in foreign indebtedness ($S > I$). Alternatively, holdings of foreign assets might be reduced to finance net imports or foreign assets are accumulated when the current account is positive. Given the demand and net import schedules a change in private debt ($S - I$) is related to the current account ($EX - IM$).²⁵ This can be seen in figure 3.

There is one level of demand at which the current account is balanced. At this level, savings must be equal to investment. This situation is shown by the dotted lines. If demand would move higher, fueled by an increase in credit, imports would increase over exports and to make this happen savings must be lower than investment.²⁶ In the opposite case savings would rise over investment, generating an increase in private sector wealth.

Figure 3: The Saving/Investment relation (S-I), source: own graph

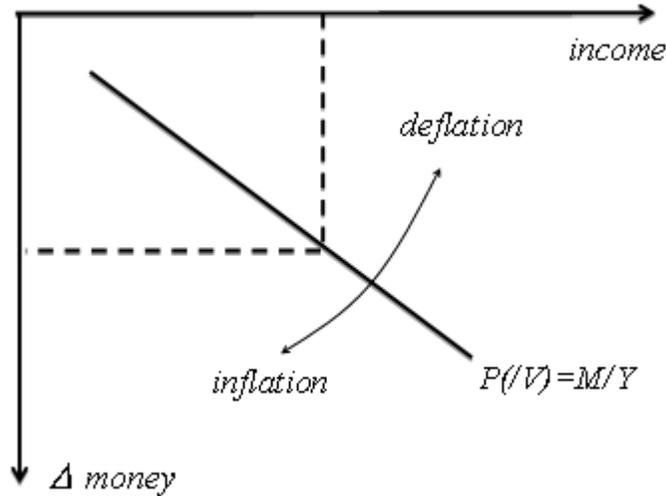


²⁵See equation 7.

²⁶It is very likely that both savings and investment are now higher.

The model describes savings-investment imbalances as the ultimate result of changes in the amount of credit in the economy. The causality runs through the goods market where an increase in the amount of loans increases aggregate demand and hence income. This increase is partly spend on imports, which drives the current account down. The figure that is showing this ultimate link is figure 4.

Figure 4: The Money/Income relation (M/Y), source: own graph



An increase in loan demand increases aggregate demand and therefore income. The change in loans influences income, which is shown in figure 4. Given that prices are fixed, a fall (rise) in the demand for loans will lead to a fall (rise) in income. This reasoning is close to that of the quantity equation, although backwards. It is the change in the amount of loans that drives income, given some price level:

$$Y = \frac{M * V}{P}, 0 < m < 1 \quad (8)$$

Assuming that the price level and the velocity of money (or credit) are fixed, the amount of loans M and income Y move in tandem. They are positively correlated. The MY line in figure 4 shows that correlation.²⁷ However, that correlation may break down at one point as the price level cannot remain constant under all

²⁷Hence the name IS/MY model.

conditions. Under full employment or conditions where bottlenecks exist in either labour or input markets it is quite likely that a debt-financed increase in demand will lead to an increase in the general price level as firms are bidding up certain prices. As a result, the MY line would turn downwards (upwards) in the case of inflation (deflation). This has a feedback on the level of exports that are connected to each level of income. On the other hand, changes in the wage level can drive price level. The evolution of unit labour costs thus can shift the price level in Figure 4, and by this change the relationship between changes in loans and changes in income.

Combinations of some price level movement and some increase in incomes are possible by shifting the MY line around. The model therefore can take account of an economy's specific conditions regarding the scarcity of factors of production or the changes in unit labour costs. In the extreme, a fixed price level implies some Keynesian kind of underemployment situation whereas a very flexible price level implies an economy in or near full employment.

4 Equilibria and business cycles

Putting the parts together, two impulses can drive the economy. During a boom the increase in loans provides a boost to aggregate demand, which increases incomes. Optimistic expectations about the real economy have created an euphoria. The economic expansion is mirrored in the expansion of balance sheets of the private sector. Investment is funded more and more by the creation of additional endogenous money. The resulting increase in aggregate demand – either via households increasing their consumption or firms increasing their investments or both – increases total income, which then leads to a subsequent rise in savings.

The private sector increases external debt as it perceives a rise of existing wealth or a rise in the schedule of marginal efficiency of capital, which – depending on accounting rules – can leave them with more collateral. This additional collateral might be exchanged for new funds if the central bank is willing to accept it.

Eventually, speculative and Ponzi financing become more widespread. Following Minsky's (1975, 1982, 1986, 1992) classification, firms using speculative finance can repay interest but not principal and those using Ponzi finance can repay nei-

ther. The rise in indebtedness increases the demand for liquidity as more interest payments must be made, which at some point translates into higher interest rates. When financial distress becomes large enough, companies start repaying external debt. At that point private savings will be higher than investment, which is the result of the cash flow being diverted towards repayment of maturing loans. As a result, the monetary aggregate shrinks.²⁸ Firms have changed their mode from profit-maximizing to debt-minimizing.

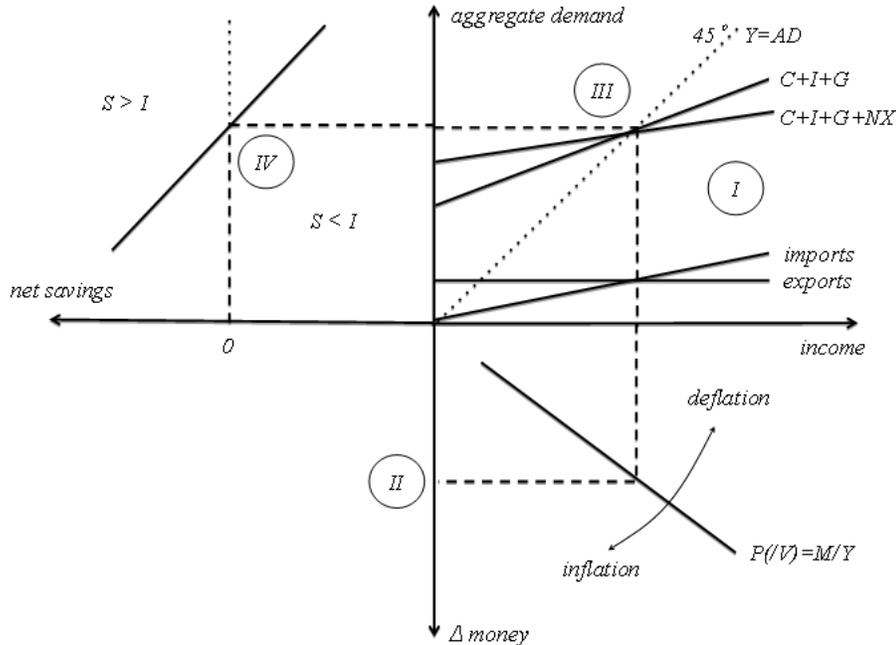
Figure 5 shows how the parts fit together. In this scenario, the distribution of debt is no problem and the economy is driven by the real side. Expectations drive the demand for loans by entrepreneurs and speculators (I), who are subsequently supplied with funds by the banking sector (II). The banking sector will supply those funds given that the regulation on the supply of loans is not a constraint and debtors have acceptable levels of collateral. The creation of endogenous money which finances additional investment and/or consumption adds to total income. In the real economy, income is equal to demand. In equilibrium the current account happens to be exactly balanced, as imports match exports. This is mapped into the northwestern sector where private savings are equal to investment (IV). It is a result of the BoP accounting identity from equation 7 in conjunction with the assumption of a balanced government budget.

Figure 6 shows the situation of an economy driven by debt problems.²⁹ Here, the private sector is assumed to be in a position of de-leveraging. Levels of (foreign) debt are judged to be too high, and therefore private savings S_p are increased over investment I (I). This increase in private savings means that d , and must be falling, which then triggers a multiplier process of falling income (II). As a result, aggregate demand falls, which pulls down actual output. Note that according to equation 7 an increase in government spending could have helped to bring about fall of private sector debt, without the negative effect on output. A fall in income depresses imports, in this case so much so that the current account turns from balanced to positive (III). As firms are repaying loans, the amount of money in the economy falls.

²⁸See Appendix A for an exposition of balance sheets.

²⁹This is a theme prominently developed by Richard Koo (2009).

Figure 5: The IS/MY model, driven by the real side, source: own graph



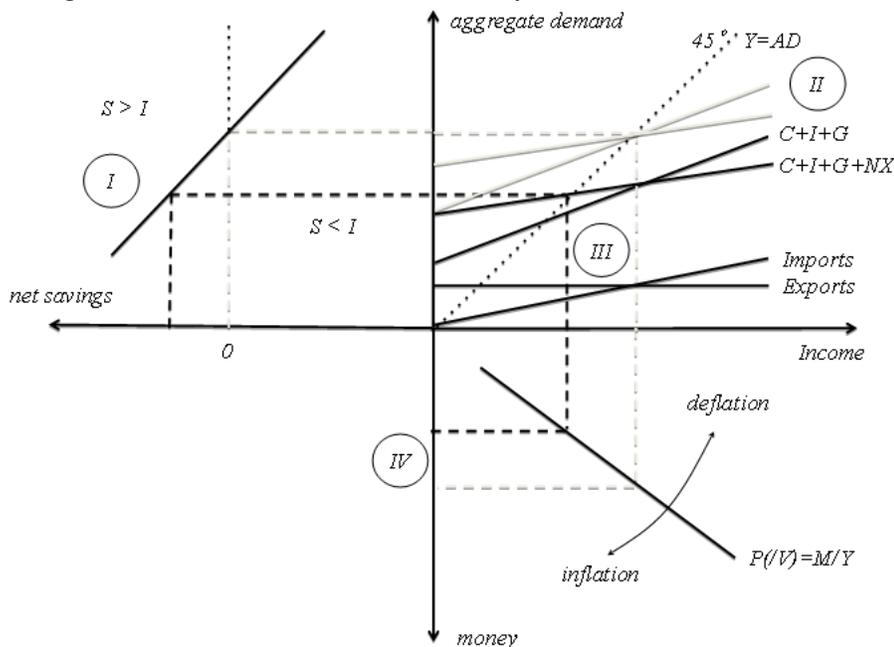
5 Economic policy

Business cycles are part of every capitalist economy. In good times, demand is stronger than supply, whereas in bad times demand is weaker than supply. The market should establish that supply and demand are in equilibrium, but nobody can be sure this works automatically all the time. There are policy tools that allow expanding or contracting both domestic and or foreign demand.

However, the economies in a currency union have given up the conventional instruments of economic policy that most sovereign nations can employ. There is no longer a nominal exchange rate. Also, a single market should in theory equalize prices of tradable goods and perhaps – via movement of labour and capital – even prices of non-tradable goods. The price level depends partly on wage setting, which can be influenced through policy. Monetary policy is not available because it is now run at the supranational central bank. Last but not least, use of fiscal policy might be restricted.³⁰ Financing government deficits through the central bank

³⁰A case in point would be the Stability and Growth pact in the euro zone.

Figure 6: The IS/MY model, driven by the financial side, source: own graph



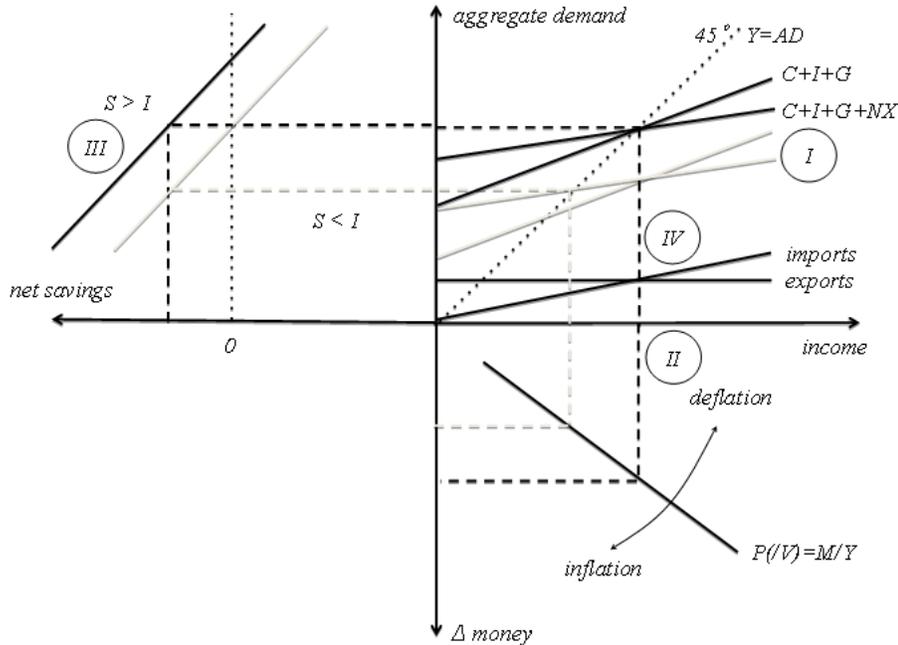
is not an available option. Macroeconomic adjustment – equalization of demand and supply on the goods market – rests on markets getting it right, because in case of problems there are not that many powerful instruments left.

A first route leads to an expansion of aggregate demand and, therefore, incomes through an expansion of the monetary aggregate. A rise in private sector indebtedness can finance consumption and/or investment, which are both part of aggregate demand. A part will leak to imports, but nevertheless a rise in private sector indebtedness will increase domestic demand. A second road to expand demand is to export more and as a matter of accounting to save more than invest.³¹ While wages are cut in order to become more competitive demand might be lacking. It can be propped up by deficit spending, which is the third strategy.

Figure 7 shows this last case. The rise in government spending (quadrant I) is financed by an increase in the monetary aggregate (II). The rise in government spending enables households to save more, so that the S-I line shifts outwards.

³¹The direction of causation is much debated, with some assuming that the capital account drives the current account while others assuming the opposite.

Figure 7: A rise in government spending, source: own graph

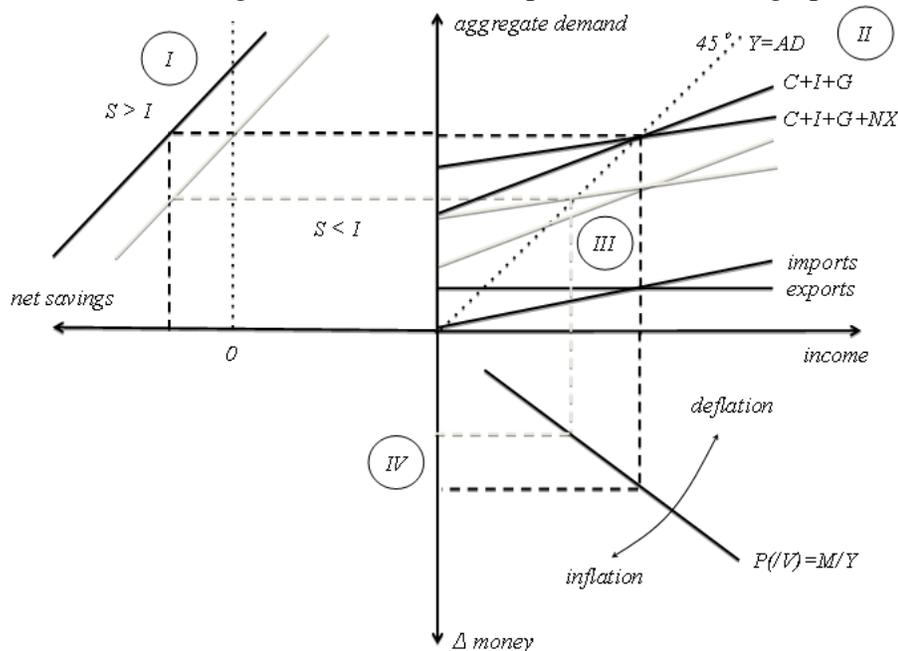


However, the rise in imports and demand means that the S-I imbalance is reduced.

Now for part (b) of this strategy. While demand is propped up by government spending, economic policies lower the wages and prices in the economy relative to its trade partners. This exogenous shift occurs in the south east sector (I) in Figure 8. Lower prices lead to a lower demand for loans, as aggregate demand is perceived to be weak (II). However, exports increase (III) because more money is lend abroad, financing exactly those exports and leading to an accumulation of foreign assets. Private savings are above investments (IV), but now the additional wealth is held in foreign assets instead of domestic government bonds.

Other countries rely on closing the demand gap with domestic demand – willingly or not. Figure 9 tells their story. As people in the real economy see an improved outlook (I), they demand more loans (II). As long as the economy is not at full employment, the price level will not react. Instead, income expands and so does demand (III). The rise in imports is financed by an increase in foreign debt, thus leaving private savings below the level of investment (IV).

Figure 8: A rise in net exports, source: own graph

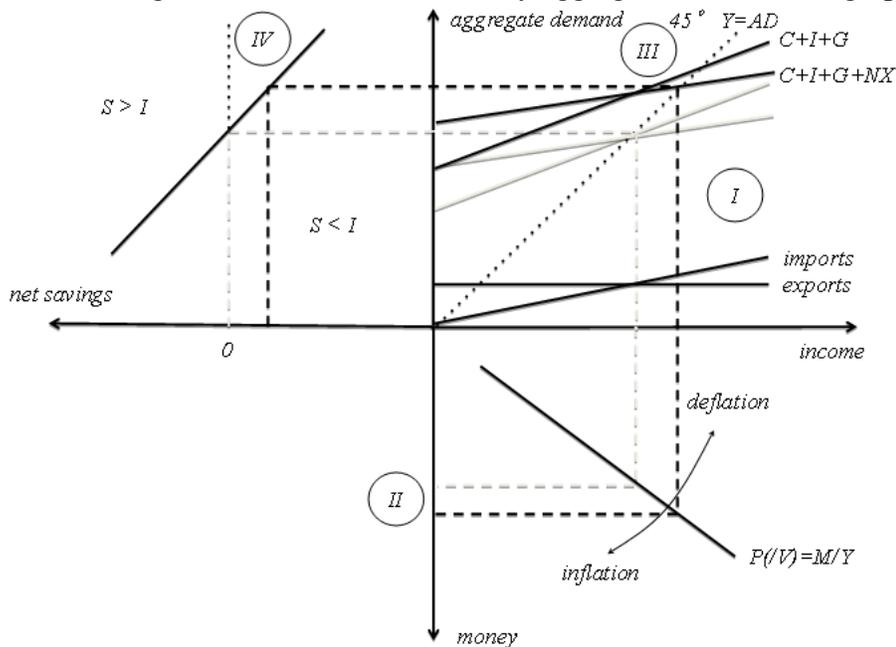


Comparing figures 8 and 9, it is clear that these two scenarios are not independent of each other. In the scenario with an increase in net exports, the private sector is net saving. As a consequence of double-entry bookkeeping, some other – domestic or foreign – sector must be net dissaving. This is how the figures must fit together. If one country decides to apply the net export strategy, then the other country will find it difficult to prevent the increase in net debt of its private sector. In theory, the public sector could be the counterparty as well. If that constellation is made impossible by fiscal institutions the increase in debt must take place in a foreign country.

6 Conclusion

The intention of the model developed above was to present a simple framework in which endogenous money drives saving-investment imbalances. The idea was to connect the monetary framework with the balance of payments and therefore be

Figure 9: A rise in the monetary aggregate, source: own graph



able to show how macroeconomic imbalances play themselves out in a currency union. Using the euro zone as an example, it was shown that the members had different options when they joined the currency union. The model highlights the importance of sectoral budget constraints and the distribution of debt.

The IS/MY model is a flow-only model, which does not include any stocks. However, the questions whether the existing values of flows that drive the debt position of the private, the public and the external sector are sustainable and under what conditions come up naturally. The discussion of the adjustment of stocks over any time frame leads hence to questions of the sustainability of government budgets, household and corporate sector debt as well as external debt.

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