

**KEYNES' SAVINGS PARADOX, FISHER'S DEBT DEFLATION
AND THE BANKING CRISIS**

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Abstract: The sharp fall in economic activity in the world is the result of an interaction between stock and flow deflation spirals. These deflationary spirals have the same origin, i.e. a collective movement of fear and risk aversion (animal spirits). These lead economic agents (savers, firms and banks) to take actions that create negative externalities making these actions self-defeating. Individuals (savers, firms, banks) are unable to internalize these externalities because collective action is costly. We use a simple IS-LM model to analyze the interactions between these different deflationary spirals. We find that it is the interaction between the flow and stock spirals that create an unstable economy. The banking crisis is at the center of this vicious downward spiral.

In order to solve the coordination failure implicit in the deflationary spirals, the government must take action. We describe the nature of the collective action by the government. Key is the resolution of the banking crisis, without which the economy cannot be stabilized.

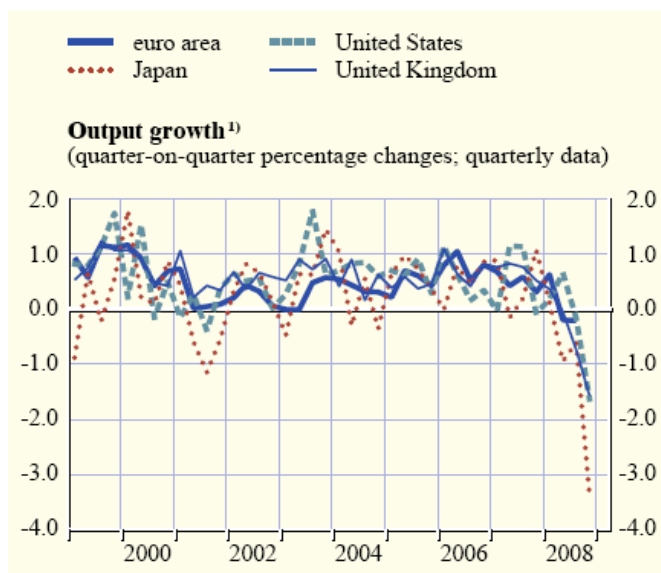
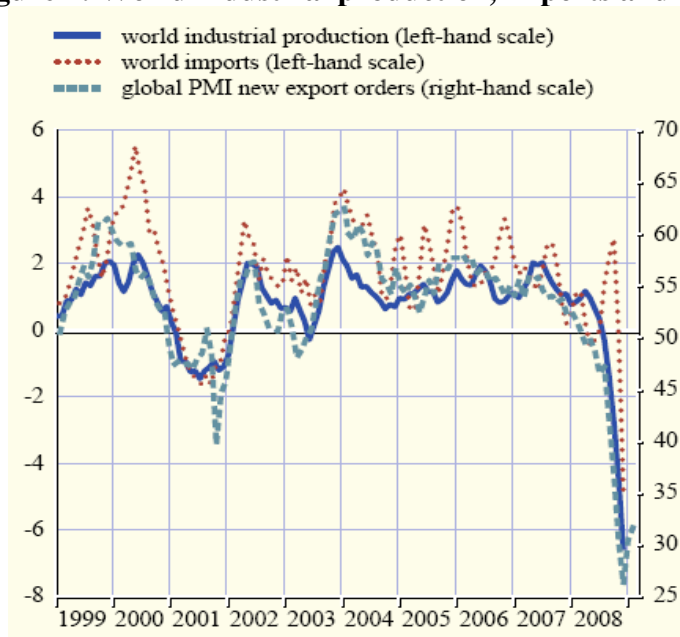
Modern macroeconomic models based on the paradigm of the rational (representative) agent who understands the complexities of the world, has become a misleading tool of analysis. The problems relating to coordination failures and movements of collective fears that are at the core of the present macroeconomic reality play no role in these models. It will not be surprising that these macroeconomic models have not informed us correctly about the nature of the economic crisis.

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1. Introduction

The world economy is experiencing a downward spiral in output and international trade that has not been seen since the Great Depression of the 1930s. The most striking feature of the downward spiral in economic activity is the speed at which it is occurring. We show this in figure 1. The acceleration in the downturn of industrial production, world trade and GDP since the end of 2008 is breathtaking.

Figure 1: World industrial production, imports and GDP-growth



Source: ECB, Monthly Bulletin, March 2009

How can such a rapid deceleration of economic activity be explained? In this paper we identify different deflationary spirals. These spirals feed on themselves and amplify each other. We argue that this interaction of different deflationary spirals is at the core of the sudden deceleration of world economic activity. We conclude with some ideas about how to stop these downward spirals.

2. Four deflationary spirals.

We identify four deflationary spirals. We will argue that they have similar structures arising from coordination failures which in turn are triggered by animal spirits. The four deflationary spirals are

- The Keynesian savings paradox
- Fisher's debt deflation
- The cost cutting deflation
- The bank credit deflation

Each of these deflationary spirals can be dealt with when they occur in isolation. They become lethal when they interact with each other.

2.1 Keynesian savings paradox.

When one individual desires to save more, and he is alone to do so, his decision to save more (consume less) will not affect aggregate output. He will succeed to save more, and once he has achieved his desired level of savings he stops trying to save more.

When the desire to save more is the result of a collective lack of confidence (animal spirits) the individual tries to build up savings when all the others do the same. As a result, output and income decline and the individual fails in his attempt to increase savings. He will try again, thereby intensifying the decline in output, and failing again to build-up savings. There is thus a coordination failure: if the individuals could be

convinced that their attempts to build up savings will not work when they all try to do it at the same time, they would stop trying, thereby stopping the downward spiral.

Somebody must organize the collective action. An individual agent will not do this because the cost of collective action exceeds his private gain.

2.2 Fisher's debt deflation:

When one individual tries to reduce his debt, and he is alone to do so, this attempt will generally succeed. The reason is that his sales of assets to reduce his debt will not be felt by the others, and therefore will not affect the solvency of others. The individual will succeed in reducing his debt.

When the desire to reduce debt is driven by a collective movement of distrust, the simultaneous action of individuals to reduce their debt is self-defeating. They all sell assets at the same time, thereby reducing the value of these assets. This leads to a deterioration of the solvency of everybody else, thereby forcing everybody to increase their attempts at reducing their debt by selling assets.

Here also there is a coordination failure. If individuals could be convinced that their attempts to reduce their debt will no work when they all try to do this at the same time, they would stop trying and the deflationary cycle would also stop. An individual, however, will have no incentive to organize such a collective action.

2.3 Cost cutting deflation

When one individual firm reduces its costs by reducing wages and firing workers in order to improve its profits, and this firm is alone to do so, it will generally succeed in improving its profits. The reason is that the cost cutting by an individual firm does not affect the other firms. The latter will not react by reducing their wages and firing their workers.

When cost cutting is inspired by a collective movement of fear about future profitability the simultaneous cost cutting will not restore profitability. The reason is

that the workers who earn lower wages and the unemployed workers who have less (or no) disposable income will reduce their consumption and thus the output of all firms. This reduces profits of all firms. They will then continue to cut costs leading to further reductions of output and profits.

There is again a coordination failure. If firms could be convinced that the collective cost cutting will not improve profits they would stop cutting their costs. But individual firms have no incentives to do this.

2.4 Bank credit deflation:

When one individual bank wants to reduce the riskiness of its loan portfolio it will cut back on loans and accumulate liquid assets. When the bank is alone to do so (and provided it is not too big), it will succeed in reducing the riskiness of its loan portfolio. The reason is that the strategy of the bank will not be felt by the other banks, which will not react. Once the bank has succeeded in reducing the riskiness of its loan portfolio it will stop calling back loans.

When banks are gripped by pessimism and extreme risk aversion the simultaneous reduction of bank loans by all banks will not reduce the risk of the banks' loan portfolio. There are two reasons for this. First, banks lend to each other. As a result when banks reduce their lending they reduce the funding of other banks. The latter will be induced to reduce their lending, and thus the funding of other banks. Second, when one bank cuts back its loans, firms get into trouble. Some of these firms buy goods and services from other firms. As a result, these other firms also get into trouble and fail to repay their debt to other banks. The latter will see that their loan portfolio has become riskier. They will in turn reduce credit thereby increasing the riskiness of the loan portfolio of other banks.

There is again a coordination failure. If banks could be convinced that the simultaneous loan cutting increases the risk of their loan portfolio they would stop cutting back on their loans and the negative spiral would stop. They have no individual incentives, however, to engage in collective action.

The four deflationary spirals that we described have the same structure. The action by one economic agent creates a negative externality that makes this action self-defeating. This spiral is triggered by a collective movement of fear, distrust or risk aversion (animal spirits). Individuals (savers, firms, banks) are unable to internalize these externalities because collective action is costly. There is thus a failure to coordinate individual actions to avoid a bad outcome.

It is important to stress that these market failures are triggered by animal spirits, i.e. waves of correlated beliefs (for a fascinating recent analysis see Akerlof and Shiller(2009)). When these beliefs are not correlated the market will work fine. To give an example: when an individual firm is alone to believe it will have a profit problem in the future it will cut costs. If other firms have no such beliefs, they will not cut their costs. This will allow the first firm to improve its profitability. The market system will work fine in coordinating the different (uncorrelated) beliefs of individual firms. When the beliefs are correlated, i.e. when animal spirits occur, the market will fail to coordinate individuals' actions towards a "good equilibrium"¹.

Cyclical movements in optimism and pessimism (animal spirits) have always existed. Why do these now lead to such a breakdown of coordination? We answer this question in the next section

3. Flow and stock deflations

The four deflationary spirals we identified, although similar in structure, are different in one particular dimension. Numbers one and three (savings paradox and cost deflation) can be called "flow deflations". They arise because consumers and firms want to change a flow (savings and profits). Numbers two and four involve the adjustment of stocks (the debt levels and the levels of credit). We call them "stock deflations". Problems arise when the flow and stock deflations interact with each other.

¹ Note that ultimately these market failures occur because of an information problem. Agents experience cognitive problems in understanding the world. As a result, they use limited information and tend to follow the lead of others. This will sometimes lead to correlated beliefs that are self-fulfilling and self-reinforcing.

In “normal” recessions such as the ones we have experienced in the postwar period prior to the present crisis, only the flow deflations were in operation. There had not been a preceding period of excessive debt accumulation and unsustainable levels of bank loans. As a result, households, firms and banks were not trying to adjust their balance sheets. The pessimism of households and firms was related to expected shortfalls in income and profits, and led to increased savings and cost cutting. In such an environment in which the stock levels were perceived to be right, there were sufficient automatic equilibrating mechanisms that prevented these two flow deflations from leading to an unstoppable downward spiral. The most important equilibrating mechanism occurred through the banking system.

When banks function normally they have a stabilizing force on the business cycle. The reason is that in a recession the central bank typically reduces the interest rate making it easier for banks to lend. In normal circumstances, when banks are not in the process of cleaning up their balance sheets, they will be willing to transmit this interest rate decline into a reduction of the loan rate. As a result, banks will engage in automatic “distress lending” to firms and households. Households will be less tempted to increase their savings. In addition, private investment by firms will be stimulated, i.e. firms will be willing to dissave, thereby mitigating the deflationary potential provoked by the savings paradox. (In section 5 we show this in the context of a simple IS-LM analysis).

The interest rate decline will also mitigate the cost cutting dynamics. This is so because it improves the profit outlook for firms, giving them lower incentives to go on cutting costs. Thus when the banking system functions normally, there are self-equilibrating mechanisms that prevent the flow deflations from degenerating into uncontrollable downward spirals.

The problem the world economy faces today is that flow and stock deflations interact and reinforce each other. The period prior to the crisis was one of excessive buildups of private debt and banks’ assets. The result of these excessive buildups of private debt and balance sheets is that the stock deflation processes described in the previous section operate with full force. As a result, the equilibrating mechanism that exists in normal recessions does not function. The lower interest rates engineered by central banks are not

transmitted by the banking sector into lower loan rates for consumers and firms. In addition, we now are confronted by the interaction of the flow and stock deflations. This interaction amplifies these deflationary processes. In section 5 we show such an interaction between the Keynesian savings paradox, Fisher's debt deflation and the banking crisis. This interaction can be described as follows. Because of excessive debt accumulation of the past, households desire to reduce their debt levels. Thus they all attempt to save more. As argued earlier, these attempts are self-defeating. As a result, households fail to save more, and thus fail to reduce their debt. This leads them to increase their attempts to save more. The fact that the banks do not pass on the lower deposit rates into lower loan rates makes things worse. There are no incentives for firms to increase their investments (no dissaving). Nothing stops the deflationary spiral.

The interaction goes further. The deteriorating conditions in the "real economy" feed back on the banking system. Banks' loan portfolios deteriorate further as a result of increasing default rates. Banks reduce their lending even further, etc.

4. Intermezzo: Why has modern macroeconomics become irrelevant?

Modern macroeconomics as embodied in Dynamic Stochastic General Equilibrium models (DSGE) is based on the paradigm of the utility maximizing individual agent who understands the full complexity of the world. Since all individuals understand the same "Truth", modern macroeconomics has taken the view that it suffices to model one "representative individual" to fully represent reality. Thus as a consumer the agent continuously maximizes an intertemporal utility function and is capable of computing the implications of exogenous shocks on his optimal consumption plan, taking full account of what these shocks will do to the plans of the producers. Similarly, producers compute the implications of these shocks on their present and future production plans taking into account how consumers react to these shocks. Thus in such a model coordination failures cannot arise. The representative agent fully internalizes the external effects of all his actions. When shocks occur there can be only one equilibrium to which the system will converge, and agents perfectly understand this.

In such a world, animal spirits, i.e. independent waves of optimism and pessimism cannot arise. The absence of animal spirits and of coordination failures makes sure that deflationary spirals as we have described them in the previous sections cannot occur in the world of the DSGE-models.

The macroeconomic upheavals that the world economy is experiencing cannot be denied even by DSGE-modelers. The way the latter treat these upheavals is to introduce them as exogenous shocks (see Smets and Wouters(2007), Woodford(2009)). Thus, the credit crisis that erupted in august 2007 is the result of an exogenous increase in risk aversion, and not the result of previous periods of euphoria that led to bubbles in asset markets and unsustainable debt levels. In the DSGE-world the crisis is the result of an event that could not be foreseen, like a meteor hit. This shock forces rational agents to adjust their consumption and production plans. Once they will have done this, we will be back in the best of all possible worlds.

It will not come as a surprise that models that are populated by rational agents who understand the full complexities of the world and who all agree on how to interpret these complexities, have not produced any useful insight allowing us to understand the nature of the present economic crisis. Yet vast amounts of intellectual energies are still being spent on the further refining of DSGE-models.

5. Keynesian savings paradox, Fisher debt deflation and banking crisis in a simple IS-LM framework

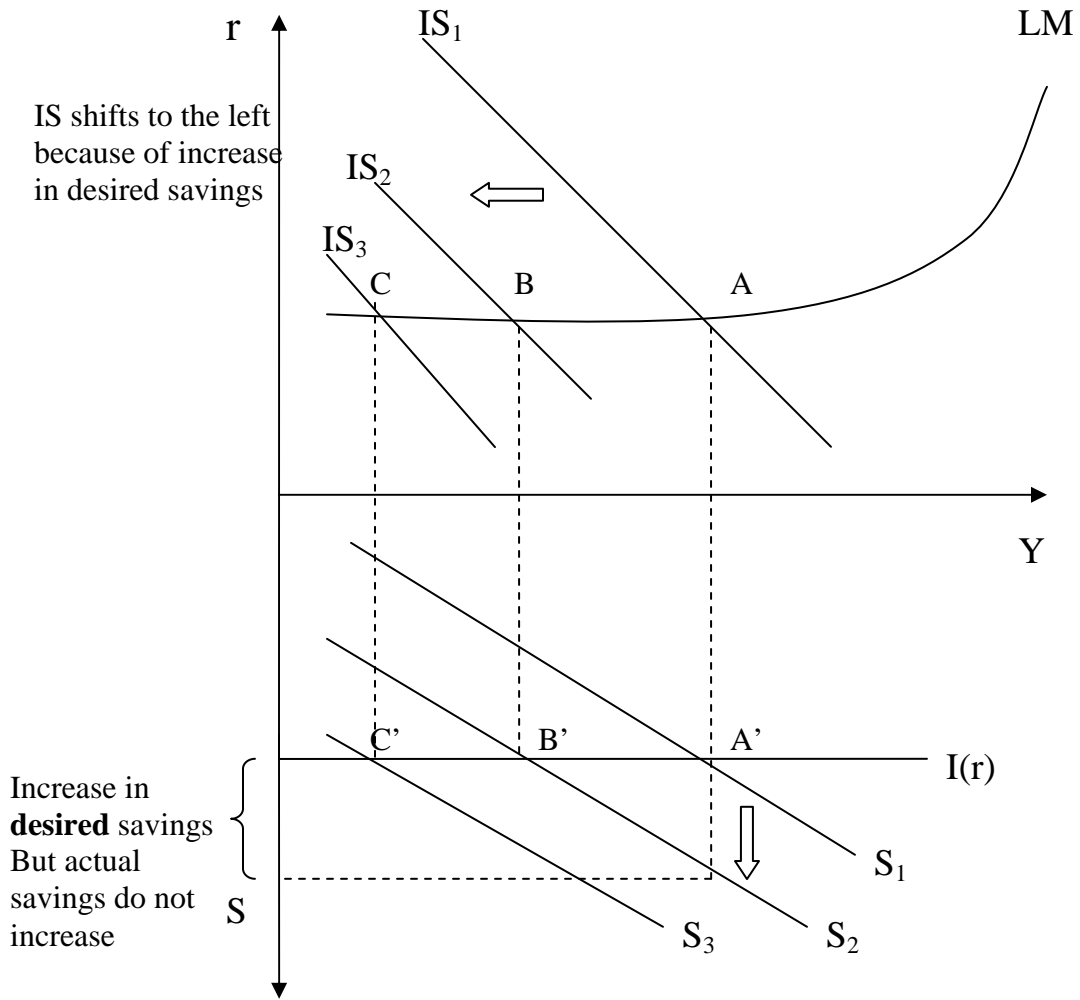
In this section we analyze more formally the interaction between three of the four deflation processes we have identified, i.e. the savings paradox, the debt deflation and the banking crisis.

The Keynesian savings paradox can be represented in the context of the traditional IS-LM model. We assume that the economy is in a liquidity trap. There are different versions of the liquidity trap. Here we assume the “modern” version, i.e. the commercial banks have unknown amounts of impaired assets on their balance sheets. As a result, they have stopped providing new lending and use the central bank’s liquidity injections as a means to reduce the riskiness of their assets. Thus, central bank liquidity is hoarded by the banks and does not lead to a lower interest rate for consumers and firms. The economy operates in the horizontal segment of the LM-curve.

Let us now assume that consumers desire to increase their savings (a flow deflation). This shifts the IS curve to the left from IS_1 to IS_2 in figure 1. In the lower part of figure 1 we also represent the balance between investment and savings. We assume that savings are a function of income. This relation is represented by the S-curve. Investment is a function of the interest rate and is represented by the $I(r)$ -line. The desire to save more leads to a shift of the S-line from S_1 to S_2 .

The Keynesian savings paradox can immediately be derived from Figure 1. The attempted increase in savings (the shift of the S-curve) fails to lead to more savings. The reason is that the ensuing decline in income (Y) lowers the volume of savings. Consumers have less income to save from. In the new equilibrium, B and B’, effective savings are exactly equal to the initial savings. Since this is a pure flow shock, we reach a new equilibrium in B and B’. Consumers stop attempting to save more. The new equilibrium is stable (although unpleasant since output has declined).

Figure 1: Interaction of flow and stock deflation with an impaired banking system



Things get more interesting (for economists at least, not for the people involved) if we allow for an interaction between this Keynesian flow analysis with the stock analysis of Irving Fisher (see Fisher(1933)). Suppose that the reason why consumers attempt to increase their savings is that they have accumulated too much debt in the past. They now want to reduce the level of their debt (a fixed number) by increasing their savings. What does this imply in the analysis of figure 1? As before we have a shift of the IS curve from IS_1 to IS_2 and a shift of the S-curve from S_1 to S_2 . In B and B' consumers find out that they have not been able to save more. As a result, they have also failed to lower their debt levels which have remained unchanged. They will therefore not stop their attempts

to save more since this is the only way they can bring down their debt. The S-curve shifts further downwards to S_3 and the IS-curve shifts further to the left to IS_3 . We obtain a new “equilibrium” in C and C’. It can, however, immediately be seen that this is not a sustainable equilibrium because in C’ consumers still have not been able to increase their savings, and thus their debt levels are still the same as in the initial point. Thus they will continue their attempts to increase savings that will continue to be self-defeating. We have a true deflationary spiral that does not stop. The economy is unstable.

From the preceding analysis we conclude that the interaction between the flow and stock deflations creates a very different dynamics than the simple Keynesian flow analysis. In the latter case the increase in savings leads to a decline in output, but the economy settles in a lower but stable output equilibrium. This is not the case when we allow for stock and flow interactions. In this case we obtain a true deflationary spiral (see also Minsky(1986).

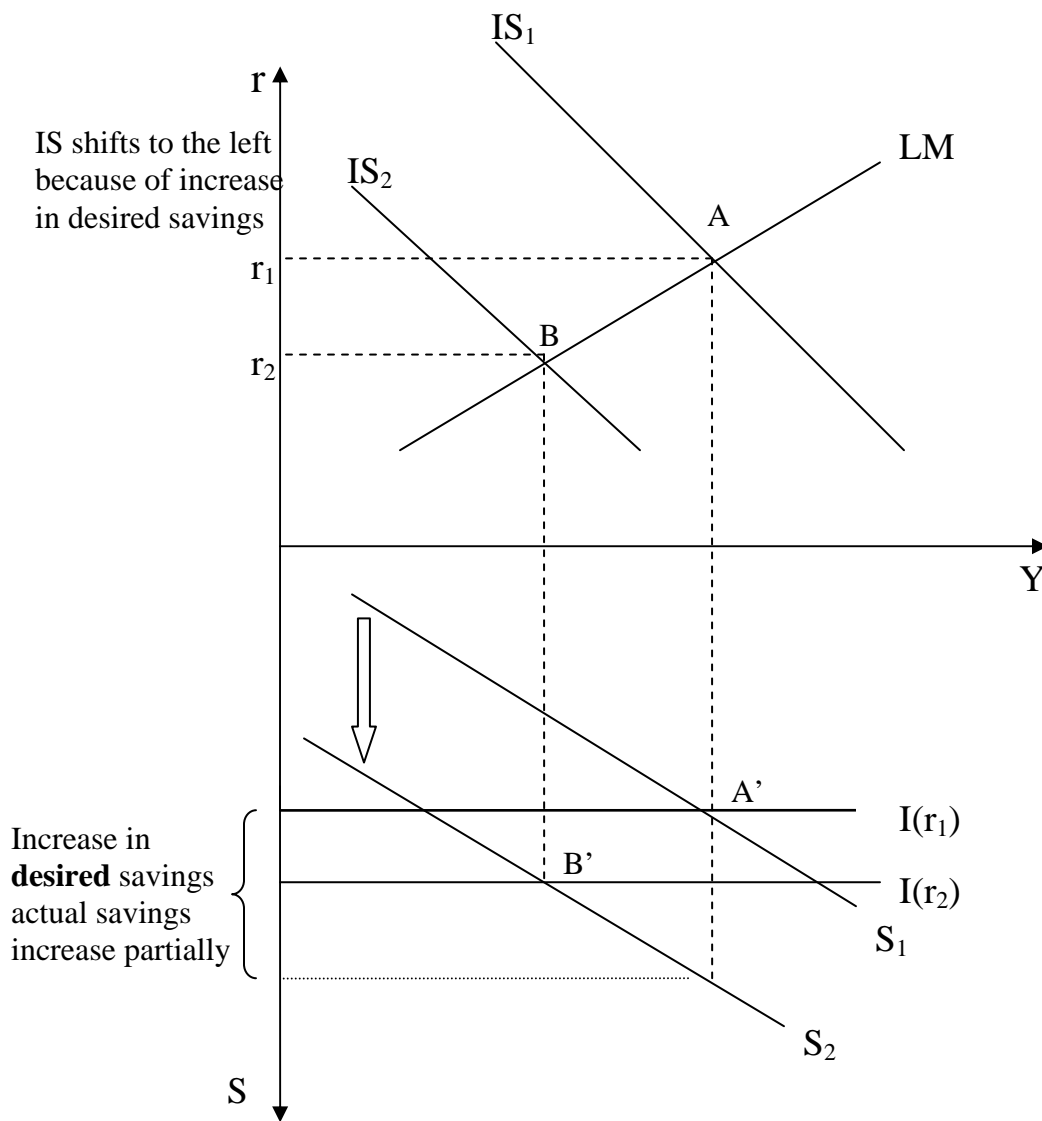
The previous analysis implicitly assumed an impaired banking system which leads to a liquidity trap (a flat LM-curve). Thus, we assumed a double stock problem, i.e. a debt problem of consumers and a banking problem. What if we relax the banking problem? We do this in figure 2. We now assume that the LM curve has the normal upward slope. Thus when the central bank lowers the interest rate, this is passed on to consumers and firms. As a result, the economy is stimulated.

We analyze the effect of an increase in desired savings in the same way as in figure 1. The IS- and S-curves shift downwards to IS_2 and S_2 respectively, so that the interest rate declines from r_1 to r_2 . This leads to an increase in investment. This is shown in the lower part of figure 2 by the shift of $I(r_1)$ to $I(r_2)$. We now find that in the new equilibrium, B and B’, savings have increased relative to the initial level (in A’). Thus consumers succeed in reducing their debt levels. The fundamental reason is that firms have decided to invest more, i.e. to dissave. In other words, somebody must be willing to dissave for consumers to succeed in saving more and to reduce their debt levels.

We now obtain an important result. Suppose the economy stays in the new equilibrium B and B’. This means that at the end of the next period, consumers will have added additional savings, which allows them to reduce their debt levels even further. Thus at the end of that period, debt levels will be lower than at the end of the previous period. This

will go on. This implies that just staying in the equilibrium B and B' will lead to a continuous decline in debt levels until consumers have reached their desired debt levels. They will stop saving more. At that moment they may decide to go back to their initial desired savings. As a result, the S-curve will shift back up again leading to a stimulus in economic activity.

Figure 2: Interaction of flow and stock deflation with well-functioning banking system



We conclude that fixing the banking system allows the economy to find a stable equilibrium even if the Keynesian flow deflation interacts with the Fisher debt deflation. It should be noted that even in this case the decline in output may still be uncomfortably high and may last for some time. Nevertheless the result is qualitatively different in that there is now a stable equilibrium. This contrasts with the case when the Keynesian flow deflation interacts with the Fisher debt deflation and with a banking crisis. Thus, the key problem is the banking crisis which prevents the system from finding a stable equilibrium.

6. Role of government: Solving the coordination failures by taking collective action.

We have argued that the intensity of the present economic downturn is the result of the fact that the flow deflations that are characteristic of “normal” recessions coincide and interact with stock deflations. The latter are the result of previous unsustainable debt and asset price developments that now have to be wound down. The common characteristic of these different deflationary spirals is a coordination failure. The market fails to coordinate private actions towards an attractive collective outcome. This market failure can in principle be solved by collective action. Such a collective action can only be organized by the government. Let us analyze what this collective action must be to deal with the different forms of deflation. As will be clear, the principles are easy to formulate, the implementation is more difficult.

The key to economic recovery is the stabilization of the banking sector. The simple model of section 5 teaches us that a banking sector that is in the grips of credit deflation and deleveraging can destabilize the economy and can push the economy into a true deflationary spiral.

There is no secret about how the bank credit deflation can be stopped. Here are the principles (see Hall and Woodward(2009) for more detailed analysis). First, bad loans should be separated from good loans, putting the former in separate entities (“bad banks”) to be managed by specialized management teams whose responsibility it is to dispose of these assets. Losses on these bad assets are inevitable, and so is the inevitability that the

taxpayer will be asked to foot the bill. The managers of the bad bank should minimize these losses.

The good loans remain on the balance sheet of the “good bank”. The hope is that this good bank, freed as it is from the toxic assets, will feel liberated and will be willing to take more risk so that the credit flow can start again. One can doubt, however, that a privately run good bank will have sufficient incentives to start lending again. The reason is that extreme risk aversion and a desire to “save the skin” of the shareholders will restrain the managers of the good bank in extending loans. If that is what the managers of the good bank do, the bank credit deflation process described earlier will not stop. This leads to the issue of whether it is not desirable to (temporarily) nationalize the good bank. Such nationalization would take away the paralyzing fear that new bank loans put the bank’s capital (and its shareholders) at risk.

There is a second reason why the government may want to temporarily nationalize the good bank. The bad bank – good bank solution carries the risk of socializing the losses while privatizing the profits. Indeed, the losses of the bad bank will necessarily be borne by the taxpayers. If then the good bank remains in private ownership the expected future profits will be handed out to the shareholders. But these profits will be realized only because the toxic assets have been separated and the losses on these assets have been borne by taxpayers. It is therefore more reasonable to make sure that these future profits are reserved for compensation of the taxpayers who have paid for the losses on the bad assets.

The resolution of the bank crisis along the lines discussed in the previous paragraphs is a necessary condition for the recovery. It will also make the use of other macroeconomic policies easier and more effective. These other macroeconomic policies must be geared towards resolving the other deflationary processes. Let us discuss these consecutively.

6.1 The Keynesian savings paradox

The collective action failure implicit in the Keynesian savings paradox calls for the government to do the opposite of what private agents do, i.e. to dissave. Dissaving by the government is a necessary condition for making it possible for private consumers to succeed in their attempts to save more.

From the analysis of section 4, however, it follows that a well-functioning banking sector reduces the need for dissaving by the government. This can be seen from a comparison of figures 1 and 2. When the banking sector works well (figure 2), the consumers' attempts to save more leads to a lower interest rate and induces firms to invest more (they dissave). The required dissaving by the government is reduced relative to the situation in which the banking sector is impaired (figure 1) where no dissaving occurs by private firms.

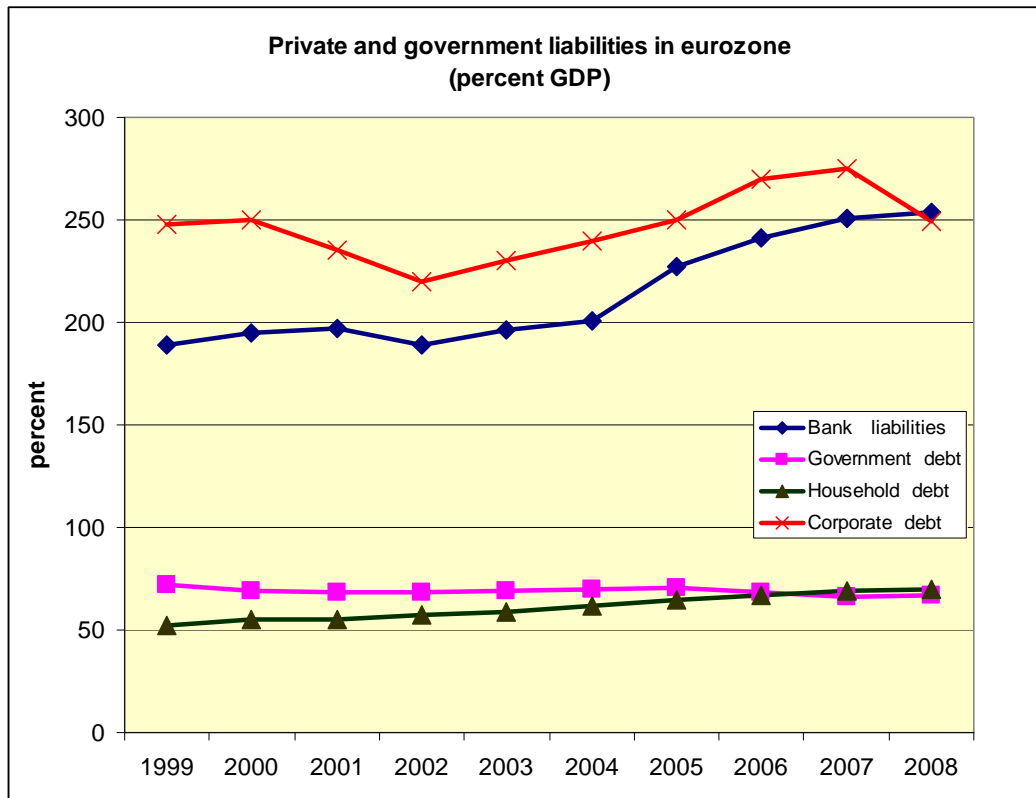
6.2 Fisher's debt deflation

Government action is required to solve the coordination failure implicit in the debt deflation process. This can be done by taking over private debt and substituting it with government debt. In doing so, the government makes it possible for the private sector to reduce its debt level. The private sector will then stop attempting (unsuccessfully) to reduce its debt level. The debt deflation process can stop.

The issue that arises here is whether the substitution of private by government debt will not lead to unsustainable government debt levels. There are two aspects to this issue. Let us first look at the debt levels of the public and private sectors in the eurozone. These are shown in figure 3. The most remarkable feature of this figure is how low the government debt is relative to private debt. In addition, the government debt is the only one that has declined (as a percent of GDP) during the last 10 years. This contrasts with the debt of households and especially the debt of financial institutions that has increased significantly and that stood at 250% of GDP in 2008. This is three times higher than the debt of the government which stood at approximately 70%. We conclude from figure 3 that more than the public debt, the private sector's debt has become unsustainable. The process of substitution of private debt by public debt can go on for quite some time

before it reaches the levels of unsustainability of the private debt. Surprisingly many analysts continue to be horrified by public debt keeping a blind eye for private debt.

Figure 3



Source: European Commission

The second dimension to the sustainability issue of government debt arises from the question of what will happen in the absence of a government takeover of the private debt. The answer is that in that case the debt deflation process is not likely to stop soon. As a result, output and income is likely to go down further. This will negatively affect tax revenues and will increase future budget deficits, forcing governments to increase their debt. Thus, the substitution of private debt by government debt will then be stretched out over a longer period, and will make the recession more intense. Refusing to stop the debt deflation dynamics by issuing government debt today will not prevent the government

debt from increasing in the future. The same problem of sustainability of the government debt will reappear.

To conclude it is useful to formulate a methodological note. The effectiveness of fiscal policies has been very much analyzed by economists. It appears from the empirical evidence that fiscal policy is limited in its effect to boost the economy. This evidence, however, is typically obtained from models estimated during “normal” business cycle movements (see e.g; Wieland(2009), Cogan, et al. (2009)). In the context of the flow and stock deflations that are at the core of the present economic downturn, fiscal policy becomes an instrument to stabilize an economy that otherwise can become unstable. This feature is absent from traditional macroeconomic models that are intrinsically stable. The evidence obtained from these models may not be very relevant to gauge the effectiveness of fiscal policies in the present context.

7. Conclusion

The sharp fall in economic activity in the world is the result of an interaction between stock and flow deflation spirals. We identified two flow deflation spirals, the Keynesian savings paradox and the cost cutting spiral, and two stock deflation spiral, the Fisher debt deflation and the banking crisis. These four deflationary spirals have the same origin, i.e. a collective movement of fear, distrust or risk aversion (animal spirits). This leads to actions by economic agents that create a negative externality making these actions self-defeating. Individuals (savers, firms, banks) are unable to internalize these externalities because collective action is costly. There is thus a failure to coordinate individual actions to avoid a bad outcome.

We used a simple IS-LM model (yes, not a DSGE-model, that we argue is useless to understand the present crisis) to analyze the interactions between these different deflationary spirals. We found that it is the interaction between the flow and stock spirals that create an unstable. The banking crisis is at the center of this vicious downward spiral.

In order to solve the coordination failure implicit in the deflationary spirals, the government must take action. Private agents have no incentives to take collective action.

We described the nature of the collective action by the government. Key is the resolution of the banking crisis, without which the economy cannot be stabilized.

Modern macroeconomics based on the paradigm of the rational agent who understands the complexities of the world has become a misleading tool of analysis. In the virtual world of the DSGE-models agents who understand the “Truth” can be aggregated into one representative agent. As a result, all the problems relating coordination failures and movements of collective fears that are at the core of the present macroeconomic reality disappear from the picture. It will not be surprising that modern macroeconomic analysis based on the rational and fully informed agent has not informed us correctly about the nature of the economic crisis.

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