

# Out of the corridor: Keynes and the crisis

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We should learn from Keynes to focus on the macroproblems of our day. Today's problem is the financial crisis and the resulting great recession. Neither the standard Keynesian policies of decades past nor the monetary policy doctrine of recent years provides useful solutions. Dynamic stochastic general equilibrium theory is part of the crisis wreckage, but turning to old or to New Keynesian theory will be of little use. A balance sheet recession requires that policy address the problems in the private sector's capital as well as its income accounts. We need serious theoretical work on problems of system stability using, for example, agent-based methods. Monetary theory needs to develop analysis of processes in which intertemporal budget constraints are violated. Network theory will be useful in that quest.

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...today we have involved ourselves in a colossal muddle, having blundered in the control of a delicate machine, the working of which we do not understand.  
J. M. Keynes (1930)

## 1. Introduction

The most important lesson from the life and work of John Maynard Keynes may be that the macroeconomist should start from the important problems of the day and should face the following questions. (i) How are we to understand what is happening right now? (ii) What can be done about it? What is the best policy to follow? (iii) Do recent events force us to modify what, today, is widely accepted economic theory? If so, what is wrong and how might we go about arriving at a more satisfying theory? The paper will be divided into three corresponding parts.

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There are some things that Keynes would *not* have us do. He would not have us try to *deduce* how the world works from a small set of doubtful ‘axioms’ about tastes and technologies.<sup>1</sup> And he would not approve of strenuous attempts to squeeze every current issue into some such preconceived framework. Nor would he be happy to see economists get absorbed in scholastic disputes over the economic thought of 70 years ago.

## 2. Understanding what is happening

### 2.1 *The credit crisis*

The important economic problem of today is the ongoing financial crisis centered in the USA and the deepening world-wide recession. What might we learn from Keynes about it?

The current crisis developed in a manner quite contrary to that presupposed by Keynes in the *General Theory*. The background to the Great Depression in Britain, as Keynes saw it, was the declining trend in the return to investment after the end of World War I (at which time it had been exceptionally high). Britain had returned to gold at an overvalued parity and the imperative of defending the exchange rate had caused it to maintain too high a level of interest rates. The combination of a declining marginal efficiency of capital and interest rates that did not decline propelled the country into a recession that was deep even before the USA slipped into depression.

The process leading up to today’s American financial crisis had the dollar exchange rate supported by foreign central banks exporting capital to the USA. The Federal Reserve System has not had to defend the dollar (so far). On the contrary, this capital inflow was not even to be discouraged by a Federal Reserve policy of extremely low interest rates. The price elasticity of exports from the countries that prevented the appreciation of their own currencies in this way kept US consumer goods prices from rising. Operating an interest targeting regime keying on the consumer price index (CPI), the Fed was lured into keeping interest rates far too low for far too long. The result was inflation of asset prices combined with a general deterioration of credit quality (Leijonhufvud, 2007A). This, of course, does not make a Keynesian story. Rather, it is a variation on the Austrian overinvestment (or malinvestment) theme. But Mises and Hayek had very little to say about the financial side of an overinvestment boom that is of interest to us 80 years later. For a thorough analysis of that subject one has to turn to Hyman Minsky.

### 2.2 *Minsky*

Minsky worked out the financial side of business cycles more thoroughly than anybody else because, in his theory, finance was the *cause* of the instability of capitalism. In Keynes, finance can amplify fluctuations but in his theory, as in that of Hayek, financial developments are endogenous to the fluctuations in real activity that are due to other causes. In Minsky’s view, the capitalist economy had an ever present, inherent tendency to general speculative booms. Although Minsky always professed to draw his inspiration from Keynes, this *upward instability* hypothesis stands in stark contrast to the economy’s tendency, in Keynes’s theory, to gravitate to a state of unemployment equilibrium.<sup>2</sup>

<sup>1</sup> The kind of theory that makes one recall a great line by a great Dane: ‘But you are not thinking. You’re just being logical!’ (Niels Bohr)

<sup>2</sup> This contrast between Keynes and Minsky has been particularly emphasised by E. de Antoni (2009). Bellofiore and Ferri (2001) is a very good overview of Minsky’s work. Kindleberger and Aliber (2005) draw heavily on Minsky’s work, especially in chapter 2. Wray (2008) interprets the current crisis in the light of Minsky’s theory.

The concepts of hedge, speculative and Ponzi financing are central to Minsky's theory of *systemic fragility*.<sup>1</sup> A unit is hedged if expected cash flow from operations substantially exceeds its debt servicing commitments. It is engaged in speculative finance if it has to depend on periodically refinancing debt. A Ponzi unit has to constantly borrow more in order to meet its debt servicing commitments. A prolonged period of stability, Minsky argued, would induce some units to migrate from hedge to speculative and others from speculative to Ponzi finance. This makes the system as a whole increasingly *fragile*. In a highly fragile economy, no identifiable exogenous shock is needed to unleash a crisis. Some trivial, random event can be the trigger.

In Minsky's view, stability germinates the seeds of instability. The recently highly touted 'Great Moderation', which has now come to a crashing end, fits his theory perfectly. And the unmasking of Bernard Madoff and a host of smaller crooks has made the Minsky story almost too perfect!

It cannot be doubted, however, that the low interest policy of the Federal Reserve System gave significant impetus to the speculative boom. So there is a definite Austrian element to the events of the last few years. Austrian economists might press their case and argue that it makes the Minsky hypothesis of the upward instability of capitalism otiose. But central bank misjudgement does not by itself explain the blossoming of credit default swaps or 'squared', 'cubed' and multisectoral collateralised debt obligations (CDOs). They fit more naturally into the Minsky story—as does Bernard Madoff. Both theories have some validity. How much should be accorded to each cannot be settled here.

### 2.3 Keynes and the financial side of recessions

What then can we learn from Keynes that is relevant to the current crisis? The *General Theory* is not particularly helpful. The warning not to allow the real economy to be governed by the machinations of a casino may be well taken but, once you have ignored it to your peril then what do you do? His various papers from the early 1930s are more focused on the financial crisis than the *General Theory* where the notion has taken over that the real nexus of the problem is the coordination of household saving and business investment.

The *Treatise on Money* contains a piece of analysis that I have found illuminating. It deals with the financial side of a business downturn. Keynes assumes an initial equilibrium disturbed by a decline in expected future revenues from present capital accumulation. Firms cut back on investment and as activity levels decline direct some part of cash flow to the repayment of trade credit and of bank loans. As short rates decline, banks choose not to relend all these funds but instead to improve their own reserve positions. Thus, the system as a whole shows an increased demand for high-powered money and simultaneously a decrease in the volume of bank money held by the non-bank sector.<sup>2</sup> Keynes's preference for speaking of 'liquidity preference' rather than 'demand for money' becomes understandable in this context since while an increase in liquidity preference does constitute an increase in the demand for outside money it also leads to a decrease in the volume of inside money.

<sup>1</sup> Concisely summarised by Minsky (1977). Chapter 10 of Minsky (1986) is a particularly helpful analysis of bank behaviour.

<sup>2</sup> The last few months of 2008 showed a new wrinkle on this phenomenon as the Fed basically doubled the stock of base money. While M1 (currency plus demand deposits) did not actually shrink it grew so feebly that at year's end the base was actually *larger* than M1 and the base multiplier thus less than unity! The Fed was paying interest on reserves at a rate equal to the federal funds rate which left the banks no incentive to lend their excess reserves in the federal funds market.

What makes this analysis relevant in today's context is that it describes a process of general *deleveraging* as part of a business downturn. Causally, in Keynes's theory, it is the decline of investment expectations and the consequent contraction of output that prompts deleveraging. Today, we are faced with the converse problem where the deleveraging that the financial sector is rather desperately trying to carry through has driven the economy into the worst recession since the 1930s. Only a year ago we were still treated to brave protestations from all sorts of sources that the real economy was strong and not much affected by the credit crisis. Yet, it was quite clear that, in a closed system,<sup>1</sup> it is a fallacy of composition to suppose that general deleveraging can take place without a decline in asset prices and excess supply of goods and services in general (Leijonhufvud, 2007B, 2007C).

#### 2.4 *Leverage dynamics*

System-wide leverage has proven an unstable magnitude in the present regulatory regime. When leverage is increasing all around, with all parties buying on credit, all also find themselves making a profit. This reinforces the process. Risk is increasing but securitisation and default swaps obscure the fact. Competition makes it all but impossible to opt out of the process even for those decision makers who perceive the rising risk. Whoever does not run with the herd will show subpar returns (as long as the going is good). Hence the system as a whole gets constantly more fragile—until a 'Minsky moment' arrives and the process goes into reverse (Leijonhufvud, 2009A).

The American banks apparently increased their leverage substantially in the years preceding the crash. The large investment banks had leverage ratios in the high 20s or low 30s. Hedge funds and some European banks may have been even more highly levered. At leverage ratios in this range, a loss in asset values of a couple of percentage points will suffice to make a bank insolvent. Estimates of financial sector losses in the present crisis, says the Bank of England's Director for Financial Stability, 'lie anywhere between a large number and an unthinkably large number' (Haldane, 2009). This statement would apply just as well to the USA and several other countries. What it means is that many banks are, in fact, insolvent.<sup>2</sup> The maturity mismatch between their liabilities and assets then poses an immediate danger. To the extent that they do not finance their positions with insured deposits, they must constantly roll over their short-term debt. In a market where many institutions know themselves to be technically insolvent and suspect their counterparties to be so as well, this is an extremely perilous situation. To save themselves, they must, at all costs, deleverage by attracting new capital or by reducing their liabilities.

When more or less the entire financial sector is in this situation, capital injections of the requisite magnitude, in practice, can come only from government. When the sector as a whole attempts to deleverage by reducing liabilities, a variety of destabilising processes are set in motion. If many institutions try to sell the same classes of assets, the prices fall to the point where the sale proceeds will not retire enough debt to improve leverage ratios. They may actually deteriorate. Naturally, the banks will then hold off selling as long as possible and the markets 'freeze'. The result is that a large volume of hard-to-value assets carried by highly leveraged institutions is looming over the markets. Once some banks are

<sup>1</sup> Of course, the US private sector is not a closed system. Leverage can be reduced and liquidity improved by inducing sovereign wealth funds or other foreign entities to assume an equity interest in domestic enterprises as some American banks have done. But these injections have proved to be but the proverbial drops in the bucket.

<sup>2</sup> It also explains the sudden desire among financial institutions to get rid of 'mark-to-market' accounting, now that it works against them.

forced to sell, the decline in asset prices raises the capital requirements on other banks and this, in turn, is reinforced when the rating agencies downgrade the assets in question. This is a highly unstable situation for the sector as a whole.

The slow and gradual way for a bank to claw its way back from the brink of insolvency is to use the cash flow from customer's debt service to pay down their own debt. This, of course, cuts off credit to the non-bank sector. The priority that the banks have been forced to give to deleveraging explains the unavailability of ordinary trade credit in the USA for the last several quarters.

Deleveraging is not confined to the financial system. The business sector also learned the profitability of high leverage. Only two years ago, issuing debt to buy back equity was considered a smart tactic by many corporations. Now rolling over short-term debt is a problem for many firms, forcing them to try to run a positive cash-flow by drawing down inventory and by lay-offs. Meanwhile many American households find themselves highly leveraged as well and for most of them the only way to reduce debt is to increase saving.

### 3. Policies to deal with a credit crunch

Declining investment and increasing saving sounds like a textbook Keynesian recession. This is taking place, moreover, while a great many agents are under severe liquidity constraints. The financial conditions are such as to render the automatic adjustment tendencies of free markets peculiarly ineffective in producing a recovery.<sup>1</sup> So does the situation call for textbook Keynesian remedies?

Well, yes and no. The great weakness of Keynesian income-expenditure analysis is that it fails to deal systematically with the state of balance sheets. This is a balance sheet recession.<sup>2</sup> The trouble starts with the condition of private sector balance sheets, particularly of financial institutions, and this is the problem that must be solved if the recession is to end any time soon.

Japan's endless travails since the collapse of its twin stock market and real estate bubbles in 1990 provide a lesson not to be ignored. The Japanese government did not act to repair the balance sheets of the private sector following the crash. Instead, it chose a policy of keeping bank rate near zero so as to reduce deposit rates and let the banks earn their way back into solvency. This proved ineffectual. A number of long-suffering banks failed in 1997—seven years after the crash!—prompting limited government recapitalisation of the system. Finally, late in 2002—twelve years after the crash!—the government took decisive steps to clean up the bad loans problem in the banking system. This took another three years. *Eighteen years* after its big crash Japan has still not completely emerged from its aftermath.

Japan did try the kind of fiscal policies that were considered conventional Keynesian economics some decades ago. Enormous amounts of money were spent on 'bridges to nowhere' and other, hopefully better motivated, projects until Japan's national debt grew to a size that discouraged any continuation of the policy. All to little apparent avail.

Why so? Recall that, in the Keynesian theory, public works spending is supposed to work and have a strong multiplier effect when unemployed labour is cash constrained and unable to exercise effective demand for consumer goods. That was not Japan's problem. The

<sup>1</sup> The economy is 'outside the corridor' in the terms introduced in my earlier work (Leijonhufvud, 1973, 1981).

<sup>2</sup> The term is due to Richard Koo (2003).

effective demand failure that plagued Japan rather was that business firms could not, and later would not, do the intertemporal trade of expected revenues from future output for the factor services in the present needed to produce that output, that is, they could not or would not borrow to finance investment. In the early post-crash years, the state of the banks was such that they would not lend. Even when the Japanese banks eventually got into healthier shape, many business firms still had balance sheets in such condition that they were loath to borrow (Koo, 2003). So Japan was unable to resume the growth rates that it had achieved before the bubbles burst.

The other lesson to draw from the Japanese experience is that once the credit system had crashed a central bank policy of low interest rates could not counteract this intertemporal effective demand failure. Year after year after year, the Bank of Japan kept the bank base rate as close to zero as makes no difference and even then the economy was under steady deflationary pressure and healthy growth did not resume. The low interest policy served as a subsidy, which enabled the banks eventually to earn their way back into the black but this took a very long time.

Contrast this experience with that of Sweden or Finland in the wake of their real estate bubbles (and in Finland's case the loss of its Soviet Union export markets) in the early 1990s. Both the Nordic countries fell into depressions deeper than what they had experienced in the 1930s. Both had to devalue and Sweden in particular had to climb far down from its lofty perch in the world ranking of per capita real income. But, in contrast to the Japanese case, the governments intervened quickly and drastically to clean up the messes in their banking systems (Jonung, 2008, 2009). Both Sweden and Finland took some three years to overcome the crisis but have shown what is, by European standards, strong growth ever since. The devaluations that aided their export industries were no doubt of great importance for this growth record but it is extremely unlikely that anything like it could have been achieved without the policy of 'quarantining' and then settling the credit problems resulting from the crash.

The Great Depression in the USA saw no consistent policy of deficit spending on adequate scale in the 1930s. War spending not only brought the economy back to full resource utilisation but also crowded out private consumption to a degree. However, the deficits run during the war meant, on the one hand, that at war's end the federal government's balance sheet showed a debt of a size never before seen but also, on the other, that the balance sheets of the private sector were finally back in good shape. At the time, a majority of forecasts predicted that the economy would slip back into depression once defence expenditures were terminated and the armed forces demobilised. The forecasts were wrong. This famous postwar 'forecasting debacle' demonstrated how simple income-expenditure reasoning, ignoring the state of balance sheets, can lead one completely astray.

The lesson to be drawn from these examples is that deficit spending will be absorbed into the *financial sinkholes* in private sector balance sheets and will not become effective until those holes have been filled.<sup>1</sup> If the sinkholes are large, this will take a long, long time. Today, they are enormous. Policy *must* address both the capital accounts and the income accounts (Leijonhufvud, 2009B). Nationalisation of the crippling losses of the financial sector—whether or not the financial institutions are nationalised outright or just 'bailed out'—is a precondition for old-fashioned 'Keynesian' stimulus to work.

<sup>1</sup> Moreover, during the years that national income fails to respond, tax receipts will be lower so that the national debt is likely to end up larger than if the banking sector's losses had been 'nationalised' at the outset.

#### 4. Crisis wreckage

In Spring 2008, the failures of Bear Stearns, Northern Rock and Landesbank Sachsen were big news. Less than a year later, the list has grown long enough to benumb the public: Lehman, Fannie May and Freddie Mac, AIG, Washington Mutual, Wachovia, Fortis, the banks of Iceland, Bradford & Bingley, Dexia, Hypo Real Estate, the list goes on. But the damage is of course far more extensive and had it not been for the ‘bail-out’ operations of governments several other great names would have been added. In the process a great many Chief Executive Officers have had to go into ignominious retirement with only a few million<sup>1</sup> dollars as plaster on their wounded reputations. It is the rule of efficient capitalism that you must pay for your mistakes, alas!

There are two aspects of the wreckage from the current crisis that have not attracted sufficient attention so far. One is the wreck of what was, until 2007, the widely accepted central banking doctrine. The other is the damage to the macroeconomic theory that underpinned that doctrine.

##### 4.1 Central banking doctrine in light of the crisis

A year ago (8 April 2008) Paul Volcker, addressed the Economic Club of New York about the ongoing crisis. The Federal Reserve, he noted, had gone to ‘the very edge’ of its legal authority. ‘Out of necessity,’ said Volcker, ‘sweeping powers have been exercised in a manner that is neither natural nor comfortable for a central bank.’<sup>2</sup> He was referring to the \$29 billion guarantee of Bear Stearns assets that had been extended to JP Morgan and the subsequent offer to swap \$100 billion of Treasuries for illiquid bank assets. The Bear Stearns ‘rescue’ was aimed at averting a dangerous situation in the default risk derivative market and the swap operation at restoring some liquidity to ‘frozen’ markets. These were indeed unconventional measures but one year later they seem little more than a timid preamble to what was to follow. When Lehman Brothers was allowed to fail in September, widespread panic ensued and the markets seized up again. The Fed instituted a bewildering array of unconventional programmes designed to support various markets directly. It moved to the aid not only of money market funds but of non-depository institutions.<sup>3</sup> Most notable were the repeated bailouts of the giant insurance company, American International Group (AIG), in which the Fed participated. Clearly, the boundaries of the matters for which the central bank would assume responsibility had lost all definition.<sup>4</sup> In the short span of the last three months of 2008, the Fed’s balance sheet more than doubled in size! At the moment of this writing, it may be set to double once again in short order!<sup>5</sup>

<sup>1</sup> In one case apparently not all that few (reportedly 190 million!)

<sup>2</sup> Quoted as delivered orally (see [www.youtube.com/watch?v=ticXF2h3ypc](http://www.youtube.com/watch?v=ticXF2h3ypc)). New York Times, April 9, has slightly different wording.

<sup>3</sup> The Term Auction Facility had been started in early 2008. Among the new ones were the Commercial Paper Funding Facility, the Money Market Investor Funding Facility, the Primary Dealer Credit Facility, the Term Asset-Backed Securities Loan Facility and the Term Securities Lending Facility. Whoever at the Fed has the job of finding catchy labels for these programmes deserves a promotion for coming up with the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility.

<sup>4</sup> And Volcker’s language is getting less measured: ‘[The Federal Reserve and the Bank of England] are providing direct credit to markets in massive volume, *in a way that contradicts all the traditions and laws that have governed central banking behaviour for a hundred years*’ (Volcker, 2009, italics added)

<sup>5</sup> New commitments announced by the Fed in mid-March 2009 include \$300 billion to purchase long term Treasuries and \$750 billion added to its programme for buying mortgage backed securities. The *Wall Street Journal* (March 20, 2009) calculates that the new commitments may bring the Fed’s balance sheet close to \$4 trillion (up from \$900 billion just a year ago).

It is difficult to imagine a more drastic discontinuity in policy doctrine than the Federal Reserve System's response to the crisis.<sup>1</sup> Until only a year or two ago Bernanke, like so many others, was a consistent and outspoken advocate of a monetary policy of strict inflation targeting, which is to say, of a central banking doctrine that required an exclusive concentration on keeping consumer prices within a narrow range with no attention to asset prices, exchange rates, credit quality or (of course) unemployment. That said, it is probably fortunate that the Fed had at its helm the most distinguished student in his generation of the Great Depression and someone, therefore, prepared to realise the gravity of the situation, willing to change his mind and ready to take extraordinary measures.

It was only yesteryear that economists and central bankers prided themselves on having achieved worldwide consensus on the 'practical principles' of monetary policy and happily took credit for the 'Great Moderation' that the application of these principles had brought (Goodfriend, 2007). The consensus was that monetary policy is fundamentally only about controlling the price level<sup>2</sup> and that using the bank's power over nominal values to try to manipulate such real magnitudes as output and employment would have only transitory and, on balance, undesirable effects. The goal of monetary policy, therefore, could only be to stabilise the price level (or its rate of change). This would be most efficaciously accomplished by inflation targeting, an adaptive strategy that requires the bank to counter any deviation of the price level from target by changing the interest rate sufficiently to move the real rate in the same direction.

This strategy failed in the USA. The Federal Reserve lowered the federal funds rate drastically in an effort to counter the effects of the dotcom crash. In this the Fed was successful. But it then maintained the rate at an extremely low level *because* inflation, measured by various variants of the CPI, stayed low and constant. In an inflation targeting regime this is taken to be feedback confirming that the interest rate is 'right'. In the present instance, however, US consumer goods prices were being stabilised by competition from imports and the exchange rate policies of the countries of origin of those imports. American monetary policy was far too easy and led to the build-up of a serious asset price bubble, mainly in real estate, and to a general deterioration in the quality of credit. The problems we now face are in large part due to this policy failure.

A second tenet of the consensus doctrine was *central bank independence*. Since using the bank's powers to effect temporary changes in real variables was deemed dysfunctional, the central bank needed to be insulated from political pressures. This tenet was predicated on the twin ideas that a policy of stabilising nominal values would be distributionally, and therefore politically, neutral and that this could be achieved by inflation targeting. Monetary policy would then be a purely technical matter and the technicians would be best able to perform their task free from the interference of politicians.<sup>3</sup> However, the independence doctrine becomes impossible to uphold when monetary policy comes to involve choices of inflating or deflating, of favouring debtors or creditors, of selectively bailing out some and not others, of guaranteeing some private sector liabilities and not

<sup>1</sup> Bernanke (2009) concisely summarises the Fed's response to the crisis.

<sup>2</sup> This focus is one of the legacies of monetarism. Historically, central banks developed in order to secure the stability of credit. All of a sudden they now find themselves back in their traditional role.

<sup>3</sup> *Transparency* of central banking was a minor lemma of the doctrine. If monetary policy is a purely technical matter, it does not hurt to have the public listen in on what the technicians are talking about doing. On the contrary, it will be a benefit all around since it allows the private sector to form more accurate expectations and to plan ahead more efficiently. But if the decisions to be taken are inherently political in the sense of having inescapable redistributive consequences, having the public listen in on all deliberations may make it all but impossible to make decisions in a timely manner.

others, of allowing or preventing banks to collude. No democratic country can leave these decisions to unelected technicians.

#### 4.2 *The state of macrotheory*

So far I have argued that recent events should force us to re-examine recent monetary policy doctrine. Do we also need to reconsider modern macrotheory in general? I should think so. Consider briefly a few of the apparent empirical problems.

*The real interest rate.* In the old monetarism of Milton Friedman, the real interest rate was determined by real factors and could not be manipulated by the Central Bank. Any attempt to do so would quickly destabilise the price level in Wicksellian fashion. This property was carried over into rational expectations monetarism and then into real business cycle theory and Dynamic Stochastic General Equilibrium (DSGE) theory in general. The Federal Reserve System under Greenspan put this proposition to the test in the years following the dotcom crash, pursuing an extreme low interest policy. The result was more Keynesian than Monetarist and, as noted, more Austrian than Keynesian: virtually no CPI inflation, but drastic asset price inflation and very serious deterioration of credit standards (Leijonhufvud, 2007C).

Part of the problem is that the *real* interest rate does not exist in *reality* but is a constructed variable. What does exist is the money rate of interest from which one may construct a distribution of perceived ‘real’ interest rates given some distribution over agents of inflation expectations. Intertemporal non-monetary general equilibrium (or finance) models deal in variables that have no real world counterparts.<sup>1</sup> Central banks have considerable influence over money rates of interest, as demonstrated, for example, by the Bank of Japan and now more recently by the Federal Reserve.<sup>2</sup>

*Ricardian equivalence* was another property of rational expectations monetarism. It was tested, in effect, by the Bush administration, which swung the federal budget into large deficit. The increase in the deficit was not compensated by increased private saving. Instead, American households decreased their saving to basically nothing. The violation of Ricardian equivalence suggests that the transversality condition imposed in intertemporal general equilibrium models has no empirical counterpart. Without such a condition consistency of all decisions is no longer guaranteed in intertemporal models. But bubbles and crashes are admitted.

The *efficient markets hypothesis* of modern finance theory is incorporated as a component of dynamic stochastic general equilibrium theories. Its core assumption that future returns are normally distributed fits neatly into rational expectations models but has been proven false innumerable times.<sup>3</sup> The repeated occurrence of financial crashes or crises hardly seems consistent with intertemporal equilibrium theory. A list covering only the last 20 years would include the October 1987 stock-market crash on Wall Street and the Norway banking crisis in the same year, followed by Japan (1990), Sweden and Finland (1991), the East Asian crises (1997), Russia (1998) and Brazil (1999), the US dotcom crash (2000),

<sup>1</sup> Readers may recall that Keynes made a similar point against Pigou, namely, that he dealt with the labour market as if labour was bartered for wage goods.

<sup>2</sup> DSGE models with staggered sticky prices or wages, as in New Keynesian theory or the New Neoclassical Synthesis, do have the property that central bank action can affect the real interest rate. It seems implausible, however, that a little stickiness could account for the behaviour of real rates and the real distortions in all the years since the recovery from the dotcom crash. Besides, the monetary policy consensus of yesteryear would hardly be consistent with it.

<sup>3</sup> For an all-out assault on the theory, see Taleb (2007).

Argentina (2001), with the latest installment being the ongoing credit crisis centred in the USA.<sup>1</sup>

### 4.3 *The new neoclassical synthesis*

For many years the main alternative to Real Business Cycle Theory was a somewhat loose cluster of models given the label of New Keynesian theory.<sup>2</sup> New Keynesians differed from New Classical economists in the extent to which they emphasised inflexibilities of prices or other contract terms as sources of short-term adjustment problems in the economy. Lately the two traditions have tended to converge (Woodford, 2009). The New Keynesians have come to adhere to the DSGE modelling technology whereas the New Classicals are incorporating various ‘imperfections’ of markets to gain verisimilitude for their models. This convergence has been labelled the ‘New Neoclassical Synthesis’.

The Old Neoclassical Synthesis, which reduced Keynesian theory to a general equilibrium model with ‘rigid’ wages, was an intellectual fraud the widespread acceptance of which inhibited research on systemic instabilities for decades. Insofar as the New Synthesis<sup>3</sup> represents a return to this way of thinking about macroproblems it risks the same verdict. The obvious objection to this line of theorising is that the major problems that have had to be confronted in the last 20 years or so have originated in the financial markets—and prices in those markets are anything but ‘inflexible’. But there is also a general theoretical problem that has been festering for decades with very little in the way of attempts to tackle it. Economists talk freely about ‘inflexible’ or ‘rigid’ prices all the time, despite the fact that we do not have a shred of theory that could provide criteria for judging whether a particular price is more or less flexible than appropriate to the proper functioning of the larger system. More than 70 years ago, Keynes already knew that a high degree of downward price flexibility in a recession could entirely wreck the financial system and make the situation infinitely worse. But the point of his argument has never come fully to inform the way economists think about price inflexibilities.

What matters for the dynamic behaviour of a system are *relative* speeds of adjustment. A pertinent example of this point is given in Bookstaber’s (2007) account of how the October 1987 market crash was triggered. The stock market had gone through three consecutive days of big declines in the week ending Friday 16 October. The managers of portfolio insurance programmes started out to reset their dynamic hedges first thing on Monday morning, 19 October. This required selling S&P (Standard & Poor’s) futures. A massive amount of sell orders flowed in to the Chicago futures market and the price of futures fell rapidly. Induced by the widening gap between the current futures price and the Friday stock closing prices, cash-futures arbitrageurs stepped in to buy futures with the intention of shorting the stocks underlying the S&P index. However, at this point the New York Stock Exchange (NYSE) had not yet opened. When, half-an-hour later, the NYSE did open it was hit by a surge of sell orders. The wave hit a wall. The volume was too large for the specialists to add to inventory so they tried to find buyers by dropping prices. But

<sup>1</sup> Events in faraway countries tend to have little impact on macroeconomics in America. This lack of interest overlooks the fact that American financial institutions played important roles in most of the episodes mentioned.

<sup>2</sup> The ‘New Keynesian’ label refers back to the ‘rigid wages’ brand of Keynesian theory of 40 or 50 years ago. Except for this stress on inflexibilities this brand of contemporary macrotheory has basically nothing Keynesian about it.

<sup>3</sup> The New Synthesis is not altogether about price inflexibilities. It is also concerned with various ‘imperfections’ of capital markets, which do indeed need to be taken more seriously in macroeconomics.

the equity investors initially were not ready to reevaluate their positions that quickly and later on were frightened off by the very speed with which prices were falling. Thus, concludes Bookstaber, there was ‘a dislocation between the hair-trigger execution of the futures and the ponderous decision making on the cash-equity side, compounded by the insufficient capital of the specialist to bridge the gap...’ (Bookstaber, 2007, p. 22). Rephrasing the point, the specialists did not have the *buffer stock capacity* to keep the process orderly—to keep it within its ‘corridor’. The deviation-amplifying process gathered ever more momentum so that ‘in the last 75 minutes of the trading day, the Dow dropped . . . three times as much . . . as it had in any other full trading day in history’ (Bookstaber, 2007, p. 25).

The episode is worth telling because, obviously, this disaster was not fashioned by ‘inflexibility’ of prices—at least not ‘inflexibility’ in the sense that economists usually think about it. The story makes two points. First, ‘the time frame for being able to do transactions in the futures market was substantially different from the time frame in the equity market’ (Bookstaber, 2007, p. 21). Second, price formation in one market will be temporarily dependent on that in one or more other markets. These matters are completely ignored by General Equilibrium (GE) theory but are something we must study seriously if we are ever going to construct a truly dynamic macrotheory.

#### 4.4 DSGE and the high inflation evidence

There is another area where empirical evidence runs heavily counter to the DSGE constructions, namely, the economics of high inflations. The work that Daniel Heymann and I<sup>1</sup> did years ago resulted in a number of stylised facts, which, from the standpoint of DSGE theory, are to be regarded as anomalies. There were five major anomalies. First, the domestic money remains in use even at rates of ‘inflation tax’ amounting to thousands of percentage points per year. Second, the legal unit of account plays a far more important role than recognised by standard theory. When the value of money becomes sufficiently unstable monetary accounting becomes meaningless. But monetary accounting is vital to the monitoring of innumerable principal-agent relationships in a modern economy. So unstable money disrupts economic organisation in innumerable ways. Third, almost all intertemporal markets simply disappear. Only a few quite thin markets in ultrashort maturities survive. Fourth, spot markets instead fragment as spatial arbitrage fails even between close locations. Fifth, relative prices become extremely volatile. None of these characteristic high inflation phenomena are predicted by monetary GE models. In fact they constitute strong evidence against these constructions.

Of these five, I regard the second, third and fifth as the most important. In the present context, however, the fifth one is the most germane of the lot. The usual interpretation of the excess volatility of relative prices has been that it must be due to the infrequency with which certain prices are adjusted and that this is to be explained by invoking ‘menu costs’. This, of course, is in line with the New Keynesianism discussed above—it is DSGE with ‘inflexibilities’. It is taken for granted that ‘flexible’ prices must track the inflation of the ‘general price level’ perfectly but that others (we may call them ‘menu prices’) do so only spasmodically. The ‘spasms’ then give rise to the relative price changes that would not be observed in the absence of inflation. Heymann and I came to believe that this

<sup>1</sup> Heymann and Leijonhufvud (1995). The major anomalies are briefly summarised in Leijonhufvud (1997).

interpretation is very nearly the complete opposite of the truth, that the general price level statistics are largely reflecting the adjustment of ‘fix-prices’ while the ‘flex-prices’ become exceedingly volatile and erratic as stabilising intertemporal and spatial arbitrage mechanisms are destroyed by the inflation (anomalies three and four).

It was one of the conceits of the Washington consensus that these high inflations in Latin America and elsewhere were the fault of irresponsible governments. The private sector, it used to be believed, would do just fine if governments could only be constrained to act responsibly (Leijonhufvud, 2004).<sup>1</sup> The work of the late Daniel Vaz (1999) provided a useful corrective to this simple worldview. He studied four crises, all of which originated in the private banking sector. In three of the cases, governments stepped in to prevent the banks from failing and thus to avoid depression. However, the ‘nationalisation’ of large volumes of bad debts undermined the public finances. The average voter was not willing to ante up the taxes required to cover the ‘bailouts’ made necessary by the policies of irresponsible, and perhaps corrupt, bank managements. The average citizen had to pay anyway, of course—through the inflation tax. So the results were lengthy periods of high inflation.

The lesson to be drawn from these cases is that effective policies to combat a severe recession have to be conducted by *solvent* governments. A state is solvent, roughly speaking, if (rationally) *expected* future surpluses will balance present deficits. That expectation, in turn, requires the belief that the political consensus needed to carry out such a budget programme over time can be reached and can be maintained. In the USA, at the present time, the political consensus needed to support further ‘bailouts’ and further ‘stimulus’ spending so as to reverse the slide into deep recession may already be slipping out of reach. It does not seem possible—it simply may not be possible—to construct programmes that will come anywhere close to satisfying common notions of distributional fairness. Suppose, however, that, nonetheless, another trillion dollars are added to the current deficit, that the Fed’s balance sheet is doubled for the second time and that these measures do bring us out of recession in reasonably short order. Will the political consensus then exist to raise taxes enough to bring the deficit to a sustainable level? And will the Fed be able to sell back to the private sector something like \$3 trillion dollars worth of assets without causing interest rates to rise to a level that the polity will not tolerate? The USA may have to confront a well-known Latin American predicament a few years down the road.<sup>2</sup>

## 5. Two items for the agenda

Recent events do, I believe, prompt some dissatisfaction with current macrotheory. What then needs to be done? I have two suggestions.

### 5.1 Stability

About 40 years ago, theorists gave up the quest for meaningful stability conditions for general equilibrium systems. Stability has been taken on faith ever since and what is today considered ‘rigorous’ theory rests on little else.

<sup>1</sup> One constraint that was supposed to bring this about was, of course, central bank independence.

<sup>2</sup> In the earlier version of this paper, I thought that the medium term prospect for the US was stagflation. I had no idea of how enormous were the losses on bank balance sheets. As long as the ‘sinkholes’ are not filled the threat is deflationary stagnation after the Japanese pattern. If they are filled, the problem will be to stave off inflation. So rather than stagflation, the threatening prospect may be stagnation first and inflation later.

Since August 2007, policy makers have been scrambling to contain the ongoing crisis. Drastic actions have been taken and unconventional programmes instituted with little time given to deliberation. Despite acting in great haste, policy makers are constantly criticised for being ‘behind the curve’. Making policy in a general equilibrium world would not be like this. As long as the policy maker has credibility, timing of actions would matter little—and not very long ago the major central banks of the world were all supremely confident that they enjoyed much well-deserved credibility. What then should matter is by and large just the present value of policies.

What have all these recent desperate policy measures been about? Policy makers have been striving to prevent destabilising positive feedback processes<sup>1</sup> from overwhelming the usual negative feedback market forces and sending the economy crashing. The leverage dynamics briefly discussed above involve several coupled positive feedback loops. Such loops are missing from DSGE theory.<sup>2</sup> DSGE models are also peculiarly prone to fallacies of composition,<sup>3</sup> most particularly so, of course, in their representative agent versions. The models are blind to the consequences of too many people trying to do the same thing at the same time. The representative lemming is not an intertemporal optimising creature. For these reasons, models of this family are peculiarly useless as guides for policy in our present predicament.

Whereas a negative feedback loop operates to reduce the discrepancy between the actual and the ‘equilibrium’ value of a variable, a positive one takes the variable that it controls farther and farther away from some initial value. Normally, the range is bounded. The process does not collapse the variable to zero or blow it up to infinity.<sup>4</sup> But although systemic deleveraging, for example, may have a lower bound, it may be reached at a level where the economic, social and political consequences are such as to irrevocably change the entire structure of society. The present crisis threatens dangerous upheavals in many parts of the world.

It is obviously important that we reach a better understanding of the conditions under which destabilising feedback processes will be triggered<sup>5</sup> and of what policies can keep them in check. This will require us to develop *adaptive* dynamic<sup>6</sup> theory for these problems where current intertemporal optimising models are of little, if any, use. To make progress on this area, we will have to rely increasingly on agent-based modelling.

## 5.2 Broken promises

Credit crises and high inflation crises have one thing in common, namely, that budget constraints are violated on a grand scale. They differ in that in credit crises the violations

<sup>1</sup> Bernanke has been speaking of ‘adverse’ rather than ‘positive’ feedback loops whereas, more recently, Lawrence Summers prefers ‘vicious circles’. Either terminology is probably more helpful to the layman.

<sup>2</sup> Perhaps it is more accurate to say that they are lurking beneath the surface. Peter Howitt (2006A) provides a number of examples of instabilities that pop up as soon as the models are modified to address the question of how agents might learn to form rational expectations.

<sup>3</sup> This lacuna has been particularly stressed by Peter Howitt who observes that ‘by the start of the 21st century, the education of a macroeconomist no longer included any warnings against the fallacy of composition’ (Howitt, 2006B).

<sup>4</sup> In the ‘banana parable’ of the *Treatise on Money*, Keynes gave a first sketch of the deviation-amplifying process that was to become his multiplier. But it was not bounded. Richard Kahn eventually showed him how to make the process converge in a reasonable manner (Barens, 1987).

<sup>5</sup> That is, of the conditions that define the boundaries of the ‘corridor’ of conventional stability.

<sup>6</sup> For the last 10 years I have organised a PhD level programme of Summer Schools in Adaptive Economic Dynamics at the University of Trento. Further information is available at [www-ceel.economia.unitn.it/](http://www-ceel.economia.unitn.it/) Summer School.

occur in the private sector whereas in inflation crises it is the government that is breaking the rule.

The rule is 'equal value in exchange'. Society's reliance on voluntary cooperation through exchange in markets to meet our economic needs depends on this rule being followed. The principal function of the monetary system is to monitor adherence to the rule. When the rule has been violated, legal and/or political coercion has to be brought to bear to keep the economy going.

General equilibrium theory assumes that the equal value in exchange is binding everywhere and thereby the applicability of the theory is circumscribed.<sup>1</sup> There is nothing wrong with that, as long as it is acknowledged that it excludes the kind of crises the study of which is the primary social responsibility of macroeconomists.

Unanticipated default means that individual endowments have to be recalculated. One might imagine a system where such defaults occur periodically but endowments are quickly and accurately reset so that the economy evolves as a sequence of temporary general equilibria, separated by these recalculations of wealth positions. The time-path would not be an equilibrium path, but general equilibrium theory would still be of use in analysing the temporary equilibria. Unfortunately, there is no timeless, costless *tâtonnement*, no magic reset button, to calculate the gains and losses to individual accounts. Trivial cases may be settled quickly in small claims court but even rather small bankruptcies may drag out for a long time with the transaction costs maintaining a good part of the legal profession.

When an economy goes through a period of general credit expansion with almost everyone extending credit to customers and taking credit from suppliers, the web of claims and obligations becomes denser and more complex. As the leverage of the typical agent increases, his ability to meet his obligations becomes increasingly dependent on the ability of others to meet theirs. If now it becomes known that large volumes of claims somewhere in the system may not be honoured, many individual agents will be at risk of being forced into default and virtually all will be uncertain as to what their net worth will eventually turn out to be. To reduce the risk and to get an overview of the situation, the individual agent will try to collect on his claims and pay down his debts. The general attempt to deleverage will trigger numerous interacting feedback loops, some of which have already been discussed in Section 2.3 above.

The network of debts and claims has a structure and this structure is important in determining how the deleveraging dynamics will work themselves out. The financial intermediaries, for example, are obviously strategically important nodes, in some cases 'too big to fail'. But the overall degree of connectivity can also be of critical importance. The US regulatory system inherited from the 1930s segmented the financial system into watertight compartments. Each segment was assigned its own classes of assets and liabilities and its own regulatory agency. Financial innovation had already undermined the system in part when deregulation in the 1990s led to the complete abandonment of the compartmentalisation of finance. Financial institutions of all sorts were basically allowed to engage in all kinds of transactions. Several things went wrong in the process. Most obviously, the regulatory structure was not reworked. The old matching of regulators to industry segments was entirely lost, leaving a confused division of labour between agencies with

<sup>1</sup> General equilibrium theory can, of course, handle rationally expected 'defaults' where two parties have agreed that if a particular state of nature occurs, the probability of which is known, the debtor will not pay. But the assumptions made in this case put it in the 'equal value in exchange' category and so is not properly classifiable as a 'default'. However there are other cases that may be a bit trickier, cf. Heymann (2008), p. 76.

many overlaps and many lacunae, which the industry quickly learned to exploit. Second, as compartmentalisation was abandoned, connectivity in the financial system radically increased, a consequence entirely missed by monetary economists who only envisaged benefits from the increased opportunities to diversify that deregulation opened up. Third, the end of compartmentalisation turned out to mean also that the boundaries marking the responsibilities of the lender of last resort lost all definition. The implications of increased connectivity was eventually demonstrated for all to see when a small subsidiary *in London* of an American *insurance* company proved capable of endangering the entire US banking system, forcing the Treasury and the Federal Reserve into rescue operations mounting into the \$170 billions—and still counting.

Network analysis is a novel field for economists (Goyal, 2007; Jackson, 2008). The crisis shows, I believe, that it should be given a priority in the training of economists ahead of some of the mathematical skills required by graduate programmes today.

## 6. Conclusion

I began by arguing that there are three things we should learn from Keynes. The first was to take our social responsibilities seriously and focus on the macroproblems of our own day. Today's problem is the ongoing credit crisis and its gradually unfolding consequences. The second was to try to understand what can be done about it. Here I have argued that standard Keynesian policies are not the answer. Neither is the central banking doctrine that has dominated in recent years. The third was to ask whether events proved that existing theory needed to be revised. On that issue, I conclude that dynamic stochastic general equilibrium theory as an intellectually enterprise has been bankrupted by the crisis. However, like a zombie bank too-big-to-fail it will no doubt be with us for many years. This conclusion does not mean that we should revert to the old Keynesian theory that preceded it (or adopt the New Keynesian theory that has tried to compete with it). What we need to learn from Keynes, instead, are these three lessons about how to view our responsibilities and how to approach our subject.

Intellectual humility was not a character trait that his contemporaries noted in John Maynard Keynes. He did not suffer fools gladly and did not suffer many economists all that willingly either (perhaps the distinction sometimes escaped him). But he was wise enough to recognise that the complex system of a modern economy is 'a delicate machine, the workings of which we do not understand' and that 'blundering' in the control of it can bring misery to millions and endanger the social order. The economist of today has the tools to slap together a model to 'explain' any and all phenomena that come to mind. The flood of models is rising higher and higher, spouting from an ever increasing number of journal outlets. In the midst of all this evidence of highly trained cleverness, it is difficult to retain the realisation that we are confronting a complex system 'the working of which we do not understand'. Humility in the face of the reality we seek to explain is also a lesson to be learned from Keynes. That the economics profession might be humbled by recent events is a realisation devoutly to be wished.

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