12. Misunderstanding the Great Depression and the Great Recession

Bernanke’s Essays on the Great Depression (Bernanke 2000) is near the top of my stack of books that indicate how poorly neoclassical economists understand capitalism. Most of the other are books of pure theory, like Debreu’s Theory of Value (Debreu 1959), or textbooks like Varian’s Microeconomic Analysis (Varian 1992). Bernanke’s distinguished itself by being empirical: he was, he claimed, searching the data to locate the causes of the Great Depression, since:

To understand the Great Depression is the Holy Grail of macroeconomics. Not only did the Depression give birth to macroeconomics as a distinct field of study, but also—to an extent that is not always fully appreciated—the experience of the 1930s continues to influence macroeconomists' beliefs, policy recommendations, and research agendas. And, practicalities aside, finding an explanation for the worldwide economic collapse of the 1930s remains a fascinating intellectual challenge. (Bernanke 2000, p. 5)

However, what Bernanke was actually doing was searching for an explanation that was consistent with neoclassical theory. Statements to this effect abound throughout the Essays, and they highlight the profound difficulty he faced—since according to neoclassical theory, events like the Great Depression should not occur. This disconnection between reality and neoclassical theory had at least the following manifestations that Bernanke admitted to in his Essays:

- Monetary variables affect inflation, but are not supposed to affect real variables—it is supposed to be “neutral”:

  Of course, the conclusion that monetary shocks were an important source of the Depression raises a central question in macroeconomics, which is why nominal shocks should have real effects. (p. 7)

  the gold standard theory leaves unsolved the corresponding “aggregate supply puzzle,” namely, why were the observed worldwide declines in nominal aggregate demand associated with such deep and persistent contractions in real output and employment? Or, in the language of contemporary macroeconomics, how can we explain what appears to be a massive and very long-lived instance of monetary nonneutrality? (p. 277)

- A prolonged macro downturn is inconsistent with rational micro behavior:
my theory … does have the virtues that, first, it seems capable of explaining the unusual length and depth of the depression; and, second, it can do this without assuming markedly irrational behavior by private economic agents. Since the reconciliation of the obvious inefficiency of the depression with the postulate of rational private behavior remains a leading unsolved puzzle of macroeconomics, these two virtues alone provide motivation for serious consideration of this theory. (p. 42; emphasis added)

- Rational behavior by agents should lead to all prices—including money wages—adjusting rapidly to a monetary shock, so that its impact should be transient:

  slow nominal-wage adjustment (in the face of massive unemployment) is especially difficult to reconcile with the postulate of economic rationality. We cannot claim to understand the Depression until we can provide a rationale for this paradoxical behavior of wages. (p. 7)

- Rapid adjustment of prices should bring the economy back to equilibrium:

  the failure of nominal wages (and, similarly, prices) to adjust seems inconsistent with the postulate of economic rationality (p. 32; emphases added)

Bernanke began well when he stated that the causes of the Great Depression had to lie in a collapse in aggregate demand—though even here he manifested a neoclassical bias of expecting capitalism to rapidly return to equilibrium after any disturbance:

Because the Depression was characterized by sharp declines in both output and prices, the premise of this essay is that declines in aggregate demand were the dominant factor in the onset of the Depression.

This starting point leads naturally to two questions: First, what caused the worldwide collapse in aggregate demand in the late 1920s and early 1930s (the “aggregate demand puzzle”)? Second, why did the Depression last so long? In particular, why didn’t the “normal” stabilizing mechanisms of the economy, such as the adjustment of wages and prices to changes in demand, limit the real economic impact of the fall in aggregate demand (the “aggregate supply puzzle”). (Bernanke 2000, p. ix)

However, from this point on, his neoclassical priors excluded both salient data and rival intellectual perspectives on the data. His treatment of Hyman Minsky’s “Financial Instability Hypothesis”—which is outlined in Chapter 13—is
particularly reprehensible. In the entire volume, there is a single, utterly dismissive reference to Minsky:

Hyman Minsky (1977) and Charles Kindleberger (1978) have in several places argued for the inherent instability of the financial system but in doing so have had to depart from the assumption of rational economic behavior. [A footnote adds] I do not deny the possible importance of irrationality in economic life; however it seems that the best research strategy is to push the rationality postulate as far as it will go. (Bernanke 2000, p. 43)

As we shall see, this is a parody of Minsky’s Hypothesis. He devoted slightly more space to Irving Fisher and his debt-deflation theory, but what he presented was likewise a parody of Fisher’s views, rather than a serious consideration of them:

The idea of debt-deflation goes back to Irving Fisher (1933). Fisher envisioned a dynamic process in which falling asset and commodity prices created pressure on nominal debtors, forcing them into distress sales of assets, which in turn led to further price declines and financial difficulties. His diagnosis led him to urge President Roosevelt to subordinate exchange-rate considerations to the need for reflation, advice that (ultimately) FDR followed.

Fisher’s idea was less influential in academic circles, though, because of the counterargument that debt-deflation represented no more than a redistribution from one group (debtors) to another (creditors). Absent implausibly large differences in marginal spending propensities among the groups, it was suggested, pure redistributions should have no significant macro-economic effects… (Bernanke 2000, p. 24)145

145 Bernanke went on to rephrase debt-deflation using several concepts from neoclassical microeconomics—including information asymmetry, the impairment of banks’ role as adjudicators of the quality of debtors, and so on. He also ultimately developed a cumbersome neoclassical explanation for nominal wage rigidity which gave debt a role, arguing that “nonindexation of financial contracts, and the associated debt-deflation, might in some way have been a source of the slow adjustment of wages and other prices” (Bernanke 2000, pp. 32-33). By “nonindexation”, he meant the fact that debts are not adjusted because of inflation. This is one of many instances of Bernanke criticizing real-world practices because they don’t conform to neoclassical theory. In fact, only one country ever put neoclassical theory on debts into practice was Iceland—with disastrous consequences when its credit bubble burst.
There are many grounds on which this is a misrepresentation of Fisher, but the key fallacy is the proposition that debt has no macroeconomic effects. From Bernanke’s neoclassical perspective, debt merely involves the transfer of spending power from the saver to the borrower, while deflation merely increases the amount transferred, in debt servicing and repayment, from the borrower back to the saver. Therefore, unless borrowers and savers have very different propensities to consume, this transfer should have no impact on aggregate demand.

The contrast with the theoretical case that Marx, Schumpeter, Keynes and Minsky made about debt and aggregate demand (see pages 228-230) could not be more stark—and in the next chapter I’ll make the empirical case that a collapse in debt-financed demand was the cause of both the Great Depression and the Great Recession. Bernanke’s neoclassical goggles rendered him incapable of comprehending the best explanations of the Great Depression, and led him to ignore the one data set that overwhelmingly explained the fall in aggregate demand and the collapse in employment.

The three reasons he ultimately provided for the Great Depression were (a) that it was caused by the then Federal Reserve’s mismanagement of the money supply between 1928 and 1931 (b) that the slow adjustment of money wages to the fall in aggregate demand is what made it last so long; and (c) that the Gold Standard transmitted the collapse internationally. His conclusion on the first point was emphatic:

> there is now overwhelming evidence that the main factor depressing aggregate demand was a worldwide contraction in world money supplies. This monetary collapse was itself the result of a poorly managed and technically flawed international monetary system (the gold standard, as reconstituted after World War I). (Bernanke 2000, p. ix)

He was also emphatic about his “smoking gun”: the Great Depression was triggered by the Federal Reserve’s reduction of the US base money supply between June 1928 and June 1931:

> The monetary data for the United States are quite remarkable, and tend to underscore the stinging critique of the Fed’s policy choices by Friedman and Schwartz (1963)... the United States is the only country in which the discretionary component of policy was arguably significantly destabilizing... the ratio of monetary base to international reserves... fell consistently in the United States from... 1928:II... through the second quarter of 1931. As a result, U.S. nominal money growth was precisely zero between 1928:IV and 1929:IV,

146 For a start, Fisher’s process began with over-indebtedness, and falling asset prices were one of the consequences of this.
despite both gold inflows and an increase in the money multiplier.

The year 1930 was even worse in this respect: between 1929:IV and 1930:IV, nominal money in the United States fell by almost 6 [percent], even as the U.S. gold stock increased by 8 [percent] over the same period. The proximate cause of this decline in M1 was continued contraction in the ratio of base to reserves, which reinforced rather than offset declines in the money multiplier. This tightening seems clearly inconsistent with the gold standard’s “rules of the game,” and locates much of the blame for the early (pre-1931) slowdown in world monetary aggregates with the Federal Reserve. (p. 153)

There are four problems with Bernanke’s argument, in addition to the fundamental one of ignoring the role of debt in macroeconomics. Firstly, as far as smoking guns go, this is a pop-gun, not a Colt 45. Secondly, it has fired at other times since WWII (once in nominal terms, and many times when adjusted for inflation) without causing anything remotely like the Great Depression. Thirdly, a close look at the data shows that the correlations between changes in the rate of growth of the money supply and unemployment conflict with Bernanke’s argument that mismanagement of the monetary base was the causa causans of the Great Depression. Fourthly, the only other time that it has led to a Great-Depression-like event was when Bernanke himself was Chairman of the Federal Reserve.

Between March 1928 and May 1929, Base Money fell at an average rate of just over 1 percent per annum in nominal terms, and a maximum rate of minus 1.8 percent. It fell at the same rate between 1948 and 1950, and coincided with a

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147 There are numerous measures of the money supply, with varying definitions of each in different countries. The normal definitions start with currency; then the “Monetary Base” or M0, which is currency plus the reserve accounts of private bank at the Central Bank; next is M1, which is currency plus check accounts but does not include reserve accounts, then M2, which includes M1 plus savings accounts, small (under $100,000) time deposits and individual money-market deposit accounts, and finally M3—which the US Federal Reserve no longer measures, but which is still tracked by Shadowstats—which includes M2 plus large time deposits and all money market funds.

148 It then grew at up to 2.2 percent per annum until the October 1929 (the month of the Stock Market Crash) and then turned sharply negative, falling at a rate of up to 6 percent per annum by October 1930. However here it is quite likely that the Fed was being swamped by events, rather than being in control, as even Bernanke concedes was the case by 1931: “As in the case of the United States, then, the story of the world monetary contraction can be summarized as "self-inflicted wounds" for the period through early 1931, and "forces beyond our control" for the two years that followed.” (Bernanke 2000, p. 156).
garden-variety recession, rather than a prolonged slump: unemployment peaked at 7.9 percent and rapidly returned to boom levels of under 3 percent. So the pop-gun has fired twice in nominal terms, and only once did it “cause” a Great Depression.

It could also be argued, from a Neoclassical perspective, that the Fed’s reduction in Base Money in the lead-up to the Great Depression was merely a response to the rate of inflation, which had turned negative in mid-1924. Neoclassical theory emphasizes money’s role as a means to facilitate transactions, and a falling price level implies a need for less money. On this point Milton Friedman, whom Bernanke cited as a critic of the Federal Reserve for letting Base Money fall by 1 percent per annum, argued elsewhere that social welfare would be maximized if the money supply actually fell by 10 percent per year.149

Refer to Figure 89: Inflation and Base Money in the 1920s

When the inflation-adjusted rate of change of Base Money is considered, there were numerous other periods where Base Money fell as fast as in 1928-29, without leading to a Depression-scale event. The average inflation-adjusted rate of growth of Mₙ in mid-1928 to mid-1929 was minus 0.5 percent, and even in 1930 Mₙ fell by a maximum of 2.2 percent per annum in real terms. There were six occasions in the post-WWII period where the real rate of decline of Mₙ was greater than this without causing a Depression-like event150 (though there were recessions on all but one occasion). Why did the pop-gun fire then, but emit no smoke?

The reason is, of course, that the pop-gun wasn’t really the guilty culprit in the crime of the Great Depression, and Friedman and Bernanke’s focus upon it merely diverted attention from the real culprit in this investigation: the economy itself. Capitalism was on trial because of the Great Depression, and the verdict

149 “When prices are stable, one component of the cost [of holding money balances] is zero—namely, the annual cost—but the other component is not—notably, the cost of abstinence. This suggests that, perhaps, just as inflation produces a welfare loss, deflation may produce a welfare gain. Suppose therefore that we substitute a furnace for the helicopter. Let us introduce a government which imposes a tax on all individuals and burns up the proceeds, engaging in no other functions. Let the tax be altered continuously to yield an amount that will produce a steady decline in the quantity of money at the rate of, say, 10 per cent a year.” (Friedman 1969 p. 16; emphases added). Friedman went on to recommend a lower rate of deflation of 5 percent for expediency reasons (“The rough estimates of the preceding section indicate that that would require for the U.S. a decline in prices at the rate of at least 5 per cent per year, and perhaps decidedly more”, p. 46), but even this implied a rate of reduction of the money supply of 2 percent per annum—the same rate that he criticized the Fed for maintaining in the late 1920s.

could well have been attempted suicide—which is the last verdict that neoclassical economists could stomach, because they are wedded to the belief that capitalism is inherently stable. They cannot bring themselves to consider the alternative perspective that capitalism is inherently unstable, and that the financial sector causes its most severe breakdowns.

To neoclassicals like Friedman and Bernanke, it was better to blame one of the nurses for incompetence, than to admit that capitalism is a manic-depressive social system that periodically attempts to take its own life. It was better to blame the Fed for not administering its $M_0$ medicine properly, than to admit that the financial system’s proclivity to create too much debt causes capitalism’s periodic breakdowns.

Refer to Figure 90: Inflation and Base Money in the Post-War Period

It is therefore a delicious if socially painful irony that the only other time that the pop-gun fired and a Depression-like event did follow was when the Chairman of the Federal Reserve was one Ben S. Bernanke.

Bernanke began as Chairman on February 1, 2006, and between October 2007 and July 2008, the change in $M_0$ was an inflation-adjusted minus 3 percent—one percent lower than its steepest rate of decline in 1930-33. The rate of change of $M_0$ had trended down in nominal terms ever since 2002, when the Greenspan Fed had embarked on some Quantitative Easing to stimulate the economy during the recession of 2001. Then, $M_0$ growth had turned from minus 2 percent nominal (and minus 6 percent real) at the end of 2000 to plus 11 percent nominal (and 8 percent real) by July 2001. From there it fell steadily to 1 percent nominal—and minus 3 percent real—by the start of 2008.

Refer to Figure 91: Bernanke’s massive injection of base money in QE1

Whatever way you look at it, this makes a mockery of the conclusion to Bernanke’s fawning speech at Milton Friedman’s 90th birthday party in November 2002:

Let me end my talk by abusing slightly my status as an official representative of the Federal Reserve. I would like to say to Milton and Anna: Regarding the Great Depression. You’re right, we did it. We’re very sorry. But thanks to you, we won’t do it again. (Bernanke 2002)

Either Bernanke forgot what he learnt from Friedman and his own research once in office—since Friedman and Bernanke’s criticism of the 1920’s Fed was that it let the growth rate of $M_0$ drop too low before the crisis—or the advice itself was irrelevant. The latter is of course the case. As I argue in the next chapter, the key to preventing Depressions is to prevent an explosion in the ratio of private debt to GDP, so that debt-financed demand cannot reach a level from which its collapse will trigger a Depression. Far from explaining what caused the Great
Depression, Friedman and Bernanke’s simplistic perspective diverted attention from the real culprit—the expansion of private debt by the banking sector—and ignored the enormous growth of debt that occurred while the Central Bank was under the thrall of neoclassical economics.

The relative irrelevance of changes in base money as a cause of changes in unemployment, let alone a cause of serious economic breakdown, can be gauged by looking at the correlation between the growth of M₀ and the rate of unemployment over the period from 1920 till 1940—across both the boom of the Roaring Twenties and the collapse of the Great Depression (see Figure 92). If too slow a rate of growth of M₀ can trigger a Depression, as Bernanke asserts, then surely there should be a negative correlation between the change in M₀ and the rate of unemployment: unemployment should fall when the rate of change of M₀ is high, and rise when it is low.

The correlation is has the right sign for the period from 1920 till 1930 (minus 0.22 in for changes in nominal M₀ and minus 0.19 after inflation) but the wrong one for the period from 1930 till 1940 (plus 0.28 for nominal M₀ and 0.54 after inflation), and it is positive for the entire period 1920-1940 (plus 0.44 for nominal change to M₀, and 0.61 for the inflation-adjusted rate of change). Therefore unemployment increased when the rate of growth of M₀ increased, and fell when it fell. Lagging the data on the basis that changes in M₀ should precede changes in unemployment doesn’t help either—the correlation remains positive.

**Figure 92: Change in M₀ and Unemployment 1920-1940**
On the other hand, the correlation of changes in $M_1$ to unemployment is negative as expected over both the whole period (minus 0.47 for nominal change and minus 0.21 for inflation-adjusted change) and the sub-periods of the Roaring Twenties (minus .31 for nominal $M_1$ and 0.79 for inflation-adjusted) and the Great Depression (minus 0.62 for nominal and 0.31 for real). So any causal link relates more to private-bank-driven changes in $M_1$ than to Central-Bank-driven changes in $M_0$.

Refer to Figure 93: Change in $M_1$ and Unemployment 1920-1940

There are only two interpretations of this, neither of which support the case that Bernanke made against the 1920s Fed.

The first is that, far from changes in $M_0$ driving unemployment, the unemployment rate drives changes in $M_0$. The Fed largely ignored the level of unemployment when it was low (during the 1920s), but went into panic policy mode when it exploded during the Great Depression. It therefore increased the level of $M_0$ when unemployment rose, and decreased it when unemployment seemed to be falling. The causation between changes in $M_0$ and unemployment is therefore the reverse of the one Bernanke sought to prove.

The second is that other factors are far more important in determining the rate of unemployment—and by extension, causing Great Depressions as well—than the Fed’s quantitative monetary policy. Two hints that the private financial system was the culprit are given by the negative relationship between changes in $M_1$ and unemployment, and by the fact that the relationship of $M_0$ to $M_1$ shifted dramatically when the Great Depression hit.

Refer to Figure 94: Change in $M_0$ and $M_1$ 1920-1940

Before the Great Depression, there was a positive relationship between changes in $M_0$ and changes in $M_1$, and changes in $M_0$ appeared to lead changes in $M_1$ by about 1-2 months. This is the direction of causation expected by the conventional model of money creation—the “Money Multiplier”—which argues that commercial banks need reserves in order to be able to lend, though the magnitude is lower than might be expected.

Refer to Figure 95: $M_0$-$M_1$ correlation during the Roaring Twenties

After the Great Depression, this relationship broke down completely, and changes in $M_1$ appeared to lead changes in $M_0$ by up to 15 months. This contradicts the conventional theory—a point I elaborate upon shortly.

So Bernanke’s analysis of what caused the Great Depression is erroneous, and to make matters worse, he didn’t even follow his own advice prior to the Great Recession when he Chairman of the Federal Reserve. But he certainly took his own analysis seriously after the Great Recession began—increasing $M_0$ as never before in an attempt to turn deflation into inflation.
Refer to Figure 96: M0-M1 correlation during the Great Depression

AFTER THE GREAT RECESSION: BERNANKE

TO THE RESCUE?

Bernanke foreshadowed that he might do this in a speech for which he gained the nickname “Helicopter Ben” in 2002. With the unfortunate title of “Deflation: Making Sure "It" Doesn't Happen Here”, it proved to be remarkably unprescient in terms of the economic future, since the US did slip into deflation. But the speech accurately signaled what he did do, once what he had hoped to avoid actually occurred:

under a fiat (that is, paper) money system, a government (in practice, the central bank in cooperation with other agencies) should always be able to generate increased nominal spending and inflation, even when the short-term nominal interest rate is at zero…

Like gold, U.S. dollars have value only to the extent that they are strictly limited in supply. But the U.S. government has a technology, called a printing press (or, today, its electronic equivalent), that allows it to produce as many U.S. dollars as it wishes at essentially no cost. By increasing the number of U.S. dollars in circulation … the U.S. government can also reduce the value of a dollar in terms of goods and services, which is equivalent to raising the prices in dollars of those goods and services. We conclude that, under a paper-money system, a determined government can always generate higher spending and hence positive inflation…

Normally, money is injected into the economy through asset purchases by the Federal Reserve. To stimulate aggregate spending when short-term interest rates have reached zero, the Fed must expand the scale of its asset purchases or, possibly, expand the menu of assets that it buys. Alternatively, the Fed could find other ways of injecting money into the system—for example, by making low-interest-rate loans to banks or cooperating with the fiscal authorities. Each method of adding money to the economy has advantages and drawbacks, both technical and economic. One important concern in practice is that calibrating the economic effects of nonstandard means of injecting money may be difficult, given our relative lack of experience with such policies. Thus, as I have stressed already, prevention of deflation remains preferable to having to cure it. If we do fall into deflation, however, we can take comfort that the logic of the printing press example must assert itself, and sufficient injections of money will ultimately always reverse a deflation. (Bernanke 2002)
In late 2008, Bernanke turned on the printing presses as never before. In late 2008, he doubled base money in a mere 5 months, when the previous doubling had taken 13 years.

Refer to Figure 97: Bernanke's "Quantitative Easing" in historical perspective

In inflation-adjusted terms, he expanded $M_0$ at a rate of over 100 percent a year, when its average annual rate of growth for the preceding 5 decades was 2.3 percent. By the time Bernanke finally took his foot off the $M_0$ accelerator one and a half years later, base money had jumped from $850 billion to $2.15 trillion (see Figure 98).

Figure 98: Bernanke's "Quantitative Easing" in historical perspective

There is little doubt that this massive, unprecedented injection of base money did help reverse the deflation that commenced very suddenly in 2008, when inflation fell from plus 5.6 percent in mid-2008 to minus 2.1 percent a year later—the sharpest fall in inflation in post-WWII history. But I expect Bernanke was underwhelmed by the magnitude of the change: inflation rose from minus 2.1 percent to a peak of 2.7 percent, and it rapidly fell back to a rate of just 1 percent. That is very little inflationary bang for a large amount of bucks.

According to the conventional model of money creation—known as the “Money Multiplier”—this large an injection of government money into the
reserve accounts of private banks should resulted in a far larger sum of bank-
created money being added to the economy—as much as $10 trillion. This
amplification of Bernanke’s $1.3 trillion injection should have rapidly revived
the economy—according to neoclassical theory. This is precisely what President
Obama, speaking no doubt on the advice of his economists, predicted when he
explained the strategy they had advised him to follow, twelve weeks after he took
office:

And although there are a lot of Americans who
understandably think that government money would be better
spent going directly to families and businesses instead of banks
– “where’s our bailout?,” they ask – the truth is that a dollar of
capital in a bank can actually result in eight or ten dollars of
loans to families and businesses, a multiplier effect that can
ultimately lead to a faster pace of economic growth. (Obama
2009, p. 3; emphasis added.)

Only that isn’t what happened. The dramatic increase in bank reserves spurred
only a tiny increase in money in circulation: the 110 percent growth rate of M0
resulted in only a 20 percent rate of growth of M1.

Refer to Figure 99: Change in M1 and Inflation before and during the
Great Recession

The difference in growth rates was so great so that there is now less money in
check accounts and currency in circulation than there is money in the reserve
accounts of the commercial banks.

Refer to Figure 100: The Money Supply goes haywire

The “eight or ten dollars of loans to families and businesses” from each extra
“dollar of capital in a bank” simply didn’t happen. What went wrong?

THE MYTHICAL MONEY MULTIPLIER

Few concepts are more deserving than the “Money Multiplier” of Henry
Menchen’s aphorism that “Explanations exist; they have existed for all time; there
is always a well-known solution to every human problem—neat, plausible, and
wrong”.151

In this model, money is created in a two stage process. Firstly, the government
creates “fiat” money, say by printing dollar bills and giving them to an individual.
The individual then deposits the dollar bills in her bank account. Secondly, the
bank keeps a fraction of the deposit as a reserve, and lends out the rest to a
borrower. That borrower then deposits this loaned money in another bank
account, and the process repeats.

Let’s say that the amount created by the government is $100, the fraction the banks keep as a reserve (known as the “Reserve Requirement” and set by the government or Central Bank) is 10 percent, and it takes banks a week to go from getting a new deposit to making a loan. The process starts with the $100 created by the government. One week later, the first bank has created another $90 by lending 90 percent of that money to a borrower. A week later, a second bank creates another $81—by keeping $9 of the new deposit in reserve and lending out the other $81. The process keeps on going so that, after many weeks, there will be $1,000 created, consisting of the initial printing of $100 by the government, and $900 in credit money created by the banking system—which is matched by $900 in additional debt. There will be $900 of credit-money in circulation, facilitating trade, while another $100 of cash will be held by the banks in reserve (see Table 17).

Table 17: The alleged Money Multiplier process

<table>
<thead>
<tr>
<th>Week</th>
<th>Loans</th>
<th>Deposits</th>
<th>Cash kept by bank</th>
<th>Sum of Loans</th>
<th>Sum of Cash Reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$0</td>
<td>$100</td>
<td>$10</td>
<td>$0</td>
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<tr>
<td>1</td>
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<td>$90</td>
<td>$9</td>
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</tr>
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<td>2</td>
<td>$81</td>
<td>$81</td>
<td>$8</td>
<td>$171</td>
<td>$27</td>
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<td>$73</td>
<td>$73</td>
<td>$7</td>
<td>$244</td>
<td>$34</td>
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<td>$7</td>
<td>$310</td>
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<td>$470</td>
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<tr>
<td>10</td>
<td>$35</td>
<td>$35</td>
<td>$3</td>
<td>$586</td>
<td>$69</td>
</tr>
<tr>
<td>Total after 10 weeks</td>
<td>$686.19</td>
<td>$586.19</td>
<td>$68.62</td>
<td>$586.19</td>
<td>$68.62</td>
</tr>
<tr>
<td>Final totals</td>
<td>$1,000</td>
<td>$900</td>
<td>$100</td>
<td>$900</td>
<td>$100</td>
</tr>
</tbody>
</table>

In this simple illustration, all the notes remain in the banks’ vaults, while all commerce is undertaken by people electronically transferring the sums in their deposit accounts. Of course, we all keep some notes in our pockets as well for small transactions, so there’s less credit created than the example implies, but the model can be modified to take account of this.

This process is also known as “Fractional Reserve Banking”, and it’s the process that Obama, on the advice of his economists, relied upon to rapidly bring the Great Recession to an end. Its failure to work was superficially due to some
issues that Bernanke was well aware of, but the fundamental reason why it failed is that, as a model of how money is actually created, it is “neat, plausible, and wrong”.

The fallacies in the model were first identified by practical experience, and then empirical research.

In the late 1970s, when Friedman’s Monetarism dominated economic debate and the Federal Reserve Board under Volcker attempted to control inflation by controlling the rate of growth of the money supply, the actual rate normally exceeded the maximum target that the Board set (Lindsey, Orphanides et al. 2005, p. 213). Falling below the target range could be explained by the model, but consistently exceeding it was hard to reconcile with the model itself.

**Refer to Figure 101: Lindsey, Orphanides, Rasche 2005, p. 213**

Empirical research initiated by Basil Moore (Moore 1979; Moore 1983; Moore 1988; Moore 1997; Moore 2001) and later independently corroborated by numerous researchers including Kydland and Prescott (Kydland and Prescott 1990) confirmed a simple operational observation about how banks actually operate made in the very early days of the Monetarist controversy, by the then Senior Vice-President of the New York Federal Reserve, Alan Holmes.

The “Money Multiplier” model assumes that banks need excess reserves before they can make loans. The model process is that first deposits are made, creating excess reserves, and then these excess reserves allow loans to be made, which create more deposits. Each new loan reduces the level of excess reserves, and the process stops when this excess has fallen to zero.

But in reality, Holmes pointed out, banks create loans first, which simultaneously creates deposits. If the level of loans and deposits then means that banks have insufficient reserves, then they get them afterwards—and they have a

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152 The minimum fraction that banks can hold is mandated by law, but banks can hold more than this, weakening the multiplier; and the public can decide to hang onto its cash during a financial crisis, which further weakens it. Bernanke considered both these factors in his analysis of why the Great Depression was so prolonged: “In fractional-reserve banking systems, the quantity of inside money (M1) is a multiple of the quantity of outside money (the monetary base)… the money multiplier depends on the public’s preferred ratio of currency to deposits and the ratio of bank reserves to deposits... sharp variations in the money multiplier … were typically associated with banking panics, or at least problems in the banking system, during the Depression era. For example, the money multiplier in the United States began to decline precipitously following the “first banking crisis” identified by Friedman and Schwartz, in December 1930, and fell more or less continuously until the final banking crisis in March 1933, when it stabilized. Therefore, below we interpret changes in national money stocks arising from changes in the money multiplier as being caused primarily by problems in the domestic banking system.” (Bernanke 2000, pp. 125-126)

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two week period in which to do so. In contrast to the Money Multiplier fantasy of bank managers who are unable to lend until they receive more deposits, the real world practicality of banking was that the time delay between deposits and reserves meant that the direction of causation flows, not from reserves to loans, but from loans to reserves.

Banks, which have the reserves needed to back the loans they have previously made, extend new loans which create new deposits simultaneously. If this then generates a need for new reserves, and the Federal Reserve refuses to supply them, then it would force banks to recall old or newly issued loans, and cause a “credit crunch”.

The Federal Reserve is therefore under great pressure to provide those reserves. It has some discretion about how to provide them, but unless it was willing to cause serious financial ructions to commerce on an almost weekly basis, it has no discretion about whether those reserves should be provided.

Holmes summed up the Monetarist objective of controlling inflation by controlling the growth of Base Money—and by inference the Money Multiplier model itself—as suffering from “a naive assumption”:

that the banking system only expands loans after the [Federal Reserve] System (or market factors) have put reserves in the banking system. In the real world, banks extend credit, creating deposits in the process, and look for the reserves later. The question then becomes one of whether and how the Federal Reserve will accommodate the demand for reserves. In the very short run, the Federal Reserve has little or no choice about accommodating that demand; over time, its influence can obviously be felt. (Holmes 1969, p. 73; emphasis added)

With causation actually running from bank lending and the deposits it creates to reserve creation, the changes in credit money should therefore precede changes in fiat money. This is the opposite of what is implied by the “Money Multiplier” model (since in it government money—Base Money or M0—has to be created before credit money—M1, M2 and M3—can be created), and it is precisely what Kydland and Prescott found in their empirical analysis of the timing of economic variables:

There is no evidence that either the monetary base or M1 leads the cycle, although some economists still believe this monetary myth. Both the monetary base and M1 series are generally procyclical and, if anything, the monetary base lags the cycle slightly… The difference in the behavior of M1 and M2 suggests that the difference of these aggregates (M2 minus M1) should be considered… The difference of M2-M1 leads the

153 “the reserves required to be maintained by the banking system are predetermined by the level of deposits existing two weeks earlier.” (Holmes 1969, p. 73)
cycle by even more than M2, with the lead being about three quarters... (Kydland and Prescott 1990, p. 4)

Well before Kydland and Prescott reached this statistical conclusion, the Post Keynesian economist Basil Moore pointed out the implication of the actual money creation process for macroeconomic theory. When macroeconomic models actually considered the role of money, they treated the money supply as an exogenous variable under the direct control of the government—this is an essential feature of Hicks's IS-LM model, for instance. But since credit money is created before and causes changes in government money, the money supply must instead be endogenous. The “Money Multiplier” model of money creation was therefore a fallacy:

This traditional view of the bank money creation process relies on the bank reserves-multiplier relation. The Fed is posited to be able to affect the quantity of bank deposits, and thereby the money stock, by determining the nominal amount of the reserve base or by changing the reserve multiplier...

There is now mounting evidence that the traditional characterization of the money supply process, which views changes in an exogenously controlled reserve aggregate as “causing” changes in some money stock aggregate, is fundamentally mistaken. Although there is a reasonably stable relationship between the high-powered base and the money stock, and between the money stock and aggregate money income, the causal relationship implied is exactly the reverse of the traditional view. (Moore 1983, p. 538)

It is possible to interpret this reverse causation as representing “a lack of moral fiber” by Central Bankers—accommodating banks' loan-creation rather than regulating it in the interests of the economy—but Moore pointed out that the provision of reserves by Central Banks to match loan-creation by banks merely mirrored the standard behavior of banks with respect to their business clients. Businesses need credit in order to be able to meet their costs of production prior to receiving sales receipts, and this is the fundamental beneficial role of banks in a capitalist economy:

In modern economies production costs are normally incurred and paid prior to the receipt of sales proceeds. Such costs represent a working capital investment by the firm, for which it must necessarily obtain finance. Whenever wage or raw materials price increases raise current production costs, unchanged production flows will require additional working capital finance. In the absence of instantaneous replacement cost pricing, firms must finance their increased working capital needs by increasing their borrowings from their banks or by running down their liquid assets. (Moore 1983, p. 545)
Banks therefore accommodate the need that businesses have for credit via additional lending—and if they did not, ordinary commerce would be subject to Lehman Brothers-style credit crunches on a daily basis. The Federal Reserve then accommodates the need for reserves that the additional lending implies—otherwise the Fed would cause a credit crunch:

Once deposits have been created by an act of lending, the central bank must somehow ensure that the required reserves are available at the settlement date. Otherwise the banks, no matter how hard they scramble for funds, could not in the aggregate meet their reserve requirements. (Moore 1983, p. 544)

Consequently, attempts to use the “money multiplier” as a control mechanism—either to restrict credit growth as during the Monetarist period of the late 1970s, or to cause a boom in lending during the Great Recession—are bound to fail. It is not a control mechanism at all, but a simple measure of the ratio between the private banking system’s creation of credit money and the government’s creation of fiat money. This can vary dramatically over time: growing when the private banks are expanding credit rapidly and the government tries—largely vainly—to restrain the growth in money; collapsing when private banks and borrowers retreat from debt in a financial crisis, and the government tries—again, largely vainly—to drive the rate of growth of money up.

This is something that Bernanke should have known from his own research on the Great Depression. Then, the “Money Multiplier” rose from under 6 in the early 1920s to over 9 in 1930, only to plunge to below 4.5 by 1940 (see Figure 102).
Perhaps he did remember this lesson of history, since his increase in Base Money was far greater than that of his predecessors. He may well have put such a massive influx of money into the system simply because he feared that little or no additional credit money would be forthcoming as a result. Better then to flood the economy with fiat money and hope that that alone would cause the desired boost to aggregate demand.

We will have to await his memoirs to know, but even if so, he (and Obama’s other neoclassical economic advisors) made the wrong choice by putting this injection of fiat money into the reserve accounts of the banks, rather than giving it to the public—as Obama considered in his “where’s our bailout?” counterpoint in his April 2009 speech.

The money drove up the unused reserves of the banking sector as never before (from $20 billion before the crisis to over $1 trillion after it) and the “Money Multipliers”—which in reality, is no more than the ratios of the three measures of the broad money supply M3, M2 and M1 to Base Money—collapsed as never before. The M1 ratio fell from over 16 to under 8, and has continued to fall to below 7 since then; the M2 ratio—the one most comparable to the M1 ratio back in the 1920s-1940s—fell from 9 to below 4, while most embarrassingly of all, the M1 ratio fell below 1, hit as low as 0.78, and is still below 0.9 two years after Bernanke’s fiat money injection.
Some “multiplier effect”. Obama was sold a pup by his neoclassical advisors. The huge injection of fiat money would have been far more effective had it been given to the public, who at least would have spent it into circulation.

Refer to Figure 103: The empirical "Money Multiplier" 1960-2012

DON’T MENTION THE DATA

As this book details, neoclassical economics is awash with examples of its internal contradictions being ignored by its believers, so in one sense their practice of pretending that the Money Multiplier determines the amount of money in the economy is just another example of neoclassical economists believing in something that doesn’t exist. However the Money Multiplier is different in at least two ways. Firstly, many neoclassical economists know that it doesn’t exist, and secondly, its non-existence is empirically obvious. So rather than ignoring the problem because they are unaware of it, or of its ramifications—as with the Sonnenschein-Mantel-Debreu conditions—they ignore it simply because it is inconvenient to acknowledge it.

Admitting that the money multiplier doesn’t exist is inconvenient because, if so, then the supply of money is not exogenous—set by the government—but endogenous—determined by the workings of a market economy. This in turn means that this endogenous process affects real economic variables like the level of investment, the level of employment and the level of output, when it has always been a tenet of neoclassical theory that “money doesn’t matter”. So acknowledging the empirically bleedingly obvious fact that the money multiplier is a myth also means letting go of another favorite neoclassical myth, that the dynamics of money can safely be ignored in economic analysis. Consequently, clear evidence that the money multiplier is a myth has been ignored even by the neoclassical economists who know otherwise.

One of the clearest instances of this is the difference between the very emphatic conclusion that Kydland and Prescott reached about the importance of credit, and their subsequent theoretical work. In their conclusion to their empirical paper, they made a clear case for the need to develop a theory of endogenous credit:

The fact that the transaction component of real cash balances (M₁) moves contemporaneously with the cycle while the much larger nontransaction component (M₂) leads the cycle suggests that credit arrangements could play a significant role in future business cycle theory. Introducing money and credit into growth theory in a way that accounts for the cyclical behavior of monetary as well as real aggregates is an important open problem in economics. (Kydland and Prescott 1990, p. 15; emphasis added)

However they have done nothing since to develop such a theory. Instead, they have continued to champion the “Real Business Cycle Theory” that they
developed prior to this empirical research, and Carpenter and Demiralp note that Kydland continues “to refer to the very narrow money multiplier and accord it a principle role in the transmission of monetary policy” (Carpenter and Demiralp 2010, p. 2, commenting on Freeman and Kydland 2000).

This charade of continuing to believe in a concept whose non-existence was an empirically fact could be maintained for as long as the money multiplier didn’t have any real world significance. Unfortunately, the “bailout the banks” strategy that Obama was advised to follow by Bernanke depended crucially on the money multiplier working to turn the huge increase in reserves into an even larger increase in private sector lending. It was an abject failure: excess reserves increased by a factor of fifty, but private sector lending fell, as did credit-money.

Refer to Figure 104: The disconnect between private and fiat money during the Great Recession

A recent paper by Federal Reserve Associate Director Seth Carpenter entitled “Money, Reserves, and the Transmission of Monetary Policy: Does the Money Multiplier Exist?” (Carpenter and Demiralp 2010) finally acknowledges this:

Since 2008, the Federal Reserve has supplied an enormous quantity of reserve balances relative to historical levels as a result of a set of nontraditional policy actions. These actions were taken to stabilize short-term funding markets and to provide additional monetary policy stimulus at a time when the federal funds rate was at its effective lower bound.

The question arises whether or not this unprecedented rise in reserve balances ought to lead to a sharp rise in money and lending. The results in this paper suggest that the quantity of reserve balances itself is not likely to trigger a rapid increase in lending... the narrow, textbook money multiplier does not appear to be a useful means of assessing the implications of monetary policy for future money growth or bank lending. (Carpenter and Demiralp 2010, p. 29; emphasis added)

This acknowledgement of reality is good to see, but—compared both to the data and the empirically-oriented work of the rival “Post Keynesian” school of thought—it is 30 years and one economic crisis too late. It also post-dates the effective abolition of the Reserve Requirement—an essential component of the “Money Multiplier” model—by about two decades.

Since 1991, the publicly-reported Reserve Requirement has been effectively applicable only to household bank accounts, which are a tiny fraction of the aggregate deposits of the banking system (see Table 12 in O'Brien 2007, p. 52). As Carpenter and Demiralp note, today reserve requirements “are assessed on only about one-tenth of M2”: 338
Casual empirical evidence points away from a standard money multiplier and away from a story in which monetary policy has a direct effect on broader monetary aggregates. The explanation lies in the institutional structure in the United States, especially after 1990.

First, there is no direct link between reserves and money—as defined as M2. Following a change in required reserves ratios in early 1990s, reserve requirements are assessed on only about one-tenth of M2.

Second, there is no direct link between money—defined as M2—and bank lending. Banks have access to non-deposit funding (and such liabilities would also not be reservable), so the narrow bank lending channel breaks down in theory. Notably, large time deposits, a liability that banks are able to manage more directly to fund loans, are not reservable and not included in M2. Banks’ ability to issue managed liabilities increased substantially in the period after 1990, following the developments and increased liquidity in the markets for bank liabilities.

Furthermore, the removal of interest rate ceilings through Regulation Q significantly improved the ability of banks to generate non-reservable liabilities by offering competitive rates on large time deposits. Additionally, money market mutual funds account for about one-fifth of M2, but are not on bank balance sheets, and thus they cannot be used to fund lending. These facts imply that the tight link suggested by the multiplier between reserves and money and bank lending does not exist. (Carpenter and Demiralp, pp. 4-5).

The effective freedom of banks to decide how much they money will keep in reserve—and thus not use as a source of income—versus the amount they will lend, effectively leaves the private banks free to create as much credit as they wish. This is a freedom they have exploited with gusto, as I detail in the next chapter.

**AFTER THE GREAT RECESSION II: NEOLCLASSICAL RESPONSES**

One would hope that the complete failure of neoclassical models to anticipate the Great Recession might lead to some soul-searching by neoclassical economists: was there not something fundamentally wrong in their modeling that they could be blindsided by such a huge event?

Unfortunately, they are so wedded to their vision of the economy that even an event like the Great Recession can’t shake them. Their near-universal reaction has been that it was simply an extreme event—like a sequence of a dozen coin-tosses
that all resulted in “Heads”, which is a feasible though very rare outcome.\(^{154}\) Though such a thing is possible, when it will happen can’t be predicted.

In saying this, they of course ignored the public warnings from myself and others, as documented by Bezemer (Bezemer 2009, 2010), despite the fact that those warnings were made, not merely in non-mainstream academic publications, but in the media as well. Here I can’t resist quoting the Governor of my own country’s Central Bank, Glenn Stevens:

> I do not know anyone who predicted this course of events. This should give us cause to reflect on how hard a job it is to make genuinely useful forecasts. What we have seen is truly a ‘tail’ outcome – the kind of outcome that the routine forecasting process never predicts. But it has occurred, it has implications, and so we must on it. (Stevens 2008)

That speech, made in Sydney in December 2008, ignored not only the well-known warnings in the USA by Peter Schiff and Nouriel Roubini, but my own in Australia since December 2005. These had included appearances on the leading current affairs programs 60 Minutes (60 Minutes 2008) and The 7.30 Report (The 7.30 Report 2007).

Central Bankers like Stevens and Bernanke had to live in a cocoon not to know of such warnings, and neoclassical economics provides the silk of this cocoon, because they refuse to consider any analysis of economics that does not make neoclassical assumptions. Since those who predicted the crisis did so—as they had to—using non-neoclassical tools, to Bernanke and his brethren around the world, those warnings did not exist.

Unfortunately, the Great Recession does exist, and neoclassical economists have been forced to consider it. Their responses have taken two forms: tweaking the “exogenous shocks” to their models until the models generate results that look like the Great Recession; and adding additional tweaks to the core neoclassical model that at least to some degree incorporate the effects of debt. Both approaches completely miss the real causes of this crisis.

**IT’S JUST A JOLT TO THE LEFT…**

As of February 2011, there were two neoclassical papers that attempted to comprehend the Great Recession using New Keynesian models which, of course, had completely failed to anticipate it (McKibbin and Stoeckel 2009; Ireland 2011). Since the underlying theory generates tranquil equilibrium growth rather than crises, the authors instead looked for a plausible set of exogenous shocks that, if

\(^{154}\) Such a sequence has a one in four-thousand chance of occurring.
simulated in their models, generate something that resembled the Great Recession. These shocks remain unspecified however, beyond stating that they emanate from “households”, or “technology”. Neither even considered modifying their models to include the role of private debt.155

Ireland started promisingly, with the thought that perhaps the underlying theory itself should be challenged:

Indeed, the Great Recession’s extreme severity makes it tempting to argue that new theories are required to fully explain it. (Ireland 2011, p. 31)

However the apostate road was quickly abandoned, with the assertion that “it would be premature to abandon existing models just yet”. One ground given for persevering with neoclassical models displayed the standard neoclassical ignorance of dynamic modeling, by asserting that:

Attempts to explain movements in one set of endogenous variables, like GDP and employment, by direct appeal to movements in another, like asset market valuations or interest rates, sometimes make for decent journalism but rarely produce satisfactory economic insights. (p. 32)

Having dismissed the need for a change of approach, he went in search of “shocks” that might explain why the economy so suddenly and for so long diverged from its … equilibrium, with the objective of showing that the Great Recession was really no different to “the two previous downturns in 1990-91 and 2001”:

this paper asks whether, in terms of its macroeconomics, the Great Recession of 2007-09 really stands apart from what came before… (p. 32)

Using his small scale “New Keynesian” model, Ireland concluded that unspecified “adverse shocks” to the household’s consumption preferences and the firm’s technology caused all 3 recessions:

the Great Recession began in late 2007 and early 2008 with a series of adverse preference and technology shocks in roughly the same mix and of roughly the same magnitude as those that hit the United States at the onset of the previous two recessions…

What made this recession different however, was that the shocks went on for longer, and got bigger over time:

155 The word “debt” doesn’t even appear in the Ireland paper, and while McKibbin and Stoeckel’s model does incorporate borrowing, it plays no role in their analysis.
The string of adverse preference and technology shocks continued, however, throughout 2008 and into 2009. Moreover, these shocks grew larger in magnitude, adding substantially not just to the length but also to the severity of the great recession… (p. 48)

Ireland stated his positive conclusions for the New Keynesian approach halfway through the paper, claiming that his results:

speak to the continued relevance of the New Keynesian model, perhaps not as providing the very last word on but certainly for offering up useful insights into, both macroeconomic analysis and monetary policy evaluation.

(Ireland 2011, p. 33)

This is laughable, given both the author’s methodology, and manifest ignorance of the fallacies in neoclassical thought—as evidenced by the manner in which he measured the gap between output during the recessions and the ideal level of output. He envisages a “benevolent social planner”, who can derive a “social welfare function” that reconciles all social conflict over the distribution of income, reproducing—I am sure, without knowing the source—Samuelson’s bizarre vision of capitalism as one big happy family:

it is helpful to define a welfare-theoretic measure of the output gap, based on a comparison between the level of output that prevails in equilibrium and the level of output chosen by a benevolent social planner who can overcome the frictions associated with monetary trade and sluggish nominal price adjustment. Such a planner chooses the efficient level of output and the efficient amounts of labor to allocate to ... production ... to maximizing a social welfare function reflecting the same preference orderings over consumption and leisure embedded into the representative household’s utility function (p. 38; emphases added)

McKibbin and Stockel use a larger scale with six household-firm agents—one for each of six economic sectors (energy, mining, agriculture, manufacturing durables, manufacturing non-durables, and services)—and 15 countries as well. As a New Keynesian model it allows for various “imperfections”, and tellingly they remark that without “short-run nominal wage rigidity” and a stylized but trivial role for money (“Money is introduced into the model through a restriction that households require money to purchase goods”), the model would simply predict that full-employment equilibrium would apply at all times:

The model also allows for short-run nominal wage rigidity (by different degrees in different countries) and therefore allows for significant periods of unemployment depending on the labor-market institutions in each country. This assumption, when taken together with the explicit role for money, is what gives the model its ‘macroeconomic’ characteristics. (Here again the model’s
assumptions differ from the standard market-clearing assumption in most CGE models.)

Although it is assumed that market forces eventually drive the world economy to neoclassical steady-state growth equilibrium, unemployment does emerge for long periods owing to wage stickiness, to an extent that differs between countries owing to differences in labor-market institutions (McKibbin and Stoeckel 2009, p. 584; emphases added)

As with Ireland, they manipulate the shocks applied to their model until its short run deviations from the steady state mimic what occurred during the Great Recession, and as with Ireland, one shock is not enough—three have to be used:

1. the bursting of the housing bubble, causing a reallocation of capital and a loss of household wealth and drop in consumption;

2. a sharp rise in the equity risk premium (the risk premium of equities over bonds), causing the cost of capital to rise, private investment to fall, and demand for durable goods to collapse;

3. a reappraisal of risk by households, causing them to discount their future labor income and increase savings and decrease consumption. (p. 587)

Not even this was enough to replicate the data: they also needed to assume that two of these “shocks”—the risk tolerances of business and households—changed their magnitudes over the course of the crisis. A previous paper had found that a “a temporary shock to risk premia, as seems to have happened in hindsight, does not generate the large observed real effects”, so they instead considered an extreme shock, followed by an attenuation of it later:

The question is then, what would happen if business and households initially assumed the worst—that is, a long lasting permanent rise in risk premia—but unexpectedly revised their views on risk to that of a temporary scenario 1 year later whereby things are expected to return to ‘normal’? (p. 582)

The procedure adopted in both these papers amplifies Solow’s acerbic observation that “New Keynesian” models fit the data better than “New Classical” ones do, simply because the modelers add “imperfections … chosen by intelligent economists to make the models work better…” (Solow 2001, p. 26). Now, to cope with the Great Recession—whose characteristics cannot be fitted even by the base New Keynesian model—the modeler also adds shocks that make the imperfections fit the data better, and even manipulates the shocks themselves until the model’s output finally appears to match reality.
This is not science, but evasion. Adding tweaks to a deficient model—now including adding variable shocks—to avoid confronting the reality that the model itself is has failed, is the behavior of a “degenerative scientific research program”, to use Lakatos’s phrase.

Krugman’s paper should have been better than these, in that at least he admits that one key component of reality that has been omitted in neoclassical economics—the role of private debt—needs to be incorporated to explain the Great Recession.

“LIKE A DOG WALKING ON ITS HIND LEGS”:
KRUGMAN’S MINSKY MODEL

While Krugman’s “Debt, Deleveraging, and the Liquidity Trap: A Fisher-Minsky-Koo approach” (Eggertsson and Krugman 2010) deserves some praise as the first neoclassical attempt to model Minsky after decades of ignoring him, the paper itself embodies everything that is bad in neoclassical economics.

This reflect poorly, not so much Krugman—who has done the best he can with the neoclassical toolset to model what he thinks Minsky said—but on the toolset itself, which is so inappropriate for understanding the economy in which we actually live.

Attempts to increase the realism of the neoclassical model follow a mould that is as predictable as sunrise—but nowhere near as beautiful. The author takes the core model—which cannot generate the real world phenomenon under discussion—and then adds some twist to the basic assumptions which, hey presto, generate the phenomenon in some highly stylized way. The mathematics (or geometry) of the twist is explicated, policy conclusions (if any) are then drawn, and the paper ends.

The flaw with this game is the very starting point, and since Minsky put it best, I’ll use his words to explain it:

Can "It"—a Great Depression—happen again? And if "It" can happen, why didn't "It" occur in the years since World War II? These are questions that naturally follow from both the historical record and the comparative success of the past thirty-five years. To answer these questions it is necessary to have an economic theory which makes great depressions one of the possible states in which our type of capitalist economy can find itself. (Minsky 1982, p. xii; emphasis added)

The flaw in the neoclassical game is that it never achieves Minsky’s final objective, because the “twist” that the author adds to the basic assumptions of the neoclassical model are never incorporated into its core. The basic theory therefore remains one in which the key phenomenon under investigation—in this case, the
crucial one Minsky highlights of how Depressions come about—cannot happen. With the core theory unaltered, the performance is rather like that of a dog that learns how to walk on its hind legs on command, but which will revert to four legged locomotion when the performance is over.156

Krugman himself is unlikely to stop walking on two legs—he enjoys standing out in the crowd of neoclassical quadrupeds—but the pack will return to form once this crisis ultimately gives way to tranquility.

However, one way in which Krugman doesn’t stand out from the pack is how he treats rival schools of thought in economics: he ignores them.

The scholarship of ignorance and the ignorance of scholarship

Krugman’s paper cites 19 works,157 three of which are non-neoclassical—Fisher’s classic 1933 “debt deflation” paper, Minsky’s last book Stabilizing an Unstable Economy (Minsky 1986), and Richard Koo’s The Holy Grail of Macroeconomics: Lessons from Japan’s Great Recession (Koo 2009). The other 16 include one empirical study (McKinsey Global Institute 2010) and 15 neoclassical papers written between 1989 (Bernanke and Gertler 1989) and 2010 (Woodford 2010)—5 of which are papers by Krugman or his co-author.

Was this the best he could have done? Hardly! For starters, the one Minsky reference he used was, in my opinion, Minsky’s worst book—and I’m speaking as someone in a position to know. Anyone wanting to get a handle on the Financial Instability Hypothesis from Minsky himself would be far better advised to read the essays in Can “It” Happen Again? (Minsky 1982), or his original book John Maynard Keynes (Minsky 1975)—which despite its title is not a biography, but the first full statement of his hypothesis.158

Krugman’s ignorance of Minsky prior to the crisis was par for the course amongst neoclassical authors, since they only read papers published in what they call the leading journals—such as the American Economic Review—which routinely

156 Samuel Johnson’s aphorism, that something is “like a dog's walking on his hind legs. It is not done well; but you are surprised to find it done at all”, is one of those phrases that was offensive in its origins—since Johnson used it to deride the idea of women preaching—but utterly apt in its usage today.

157 An update in February 2011 made no changes to the paper apart from adding an additional 11 works, only one of which—a 1975 paper by James Tobin—could even remotely be described as non-neoclassical.

158 I actually posted a comment to this effect on Krugman’s blog when he announced that he had decided to read Minsky and had purchased this book.
reject non-neoclassical papers without even refereeing them. Almost all academic papers on or by Minsky have been published in non-mainstream journals—the *American Economic Review (AER)*, for example, has published a grand total of two papers on or by Minsky, one in 1957 (Minsky 1957) and the other in 1971 (Minsky 1971). If the AER and the other so-called leading journals were all you consulted as you walked up and down the library aisles, you wouldn’t even know that Minsky existed—and most neoclassicals didn’t know of him until after 2007.

Before the “Great Recession” too, you might have been justified in ignoring the other journals—such as the *Journal of Post Keynesian Economics*, the *Journal of Economic Issues*, the *Review of Political Economy* (let alone the *Nebraska Journal of Economics and Business*, where several of Hyman’s key papers were published) because these were “obviously” inferior journals, where papers not good enough to make it into the *AER*, the *Economic Journal, Econometrica* and so on were finally published.

But after the Great Recession, when the authors who foresaw the crisis came almost exclusively from the non-neoclassical world (Bezemer 2009; Bezemer 2010), and whose papers were published almost exclusively in the non-mainstream journals, neoclassical economists like Krugman should have eaten humble pie and consulted the journals they once ignored.

That might have been difficult once: which journals would you look in, if all you knew was that the good stuff—the models that actually predicted what happened—hadn’t been published in the journals you normally consulted? But today, with the Internet, that’s not a problem. Academic economists have as their bibliographic version of Google the online service Econlit, (http://www.aeaweb.org/econlit/index.php) and there it’s impossible to do even a cursory search on Minsky and not find literally hundreds of papers on or by him. For example, a search on the keywords “Minsky” and “model” turned up 106 references (including three by yours truly–Keen 1995; Keen 1996; Keen 2001).

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159 A paper based on the model that I described in this chapter (Keen 2011) was rejected *unrefereed* by both the AER and the specialist *AER: Macroeconomics*, before being accepted by the *Journal of Economic Behavior and Organization*. 346
27 of these are available in linked full text (one of which is also by yours truly; Keen 1995), so that you can download them direct to your computer from within Econlit, while others can be located by searching through other online sources, without having to trundle off to a physical library to get them. To not have any references at all from this rich literature is simply poor scholarship. Were Krugman a student of mine, he’d have failed this part of his essay.

So in attempting to model a debt crisis in a capitalist economy, Krugman has used as his guide Fisher’s pivotal paper, Minsky’s worst book, and about 10 neoclassical references written by someone other than himself and his co-author. How did he fare?

*Mishandling an “omitted variable”*

One thing I can compliment Krugman for is honestly about the state of neoclassical macroeconomic modeling before the Great Recession. His paper opens with the observation that “If there is a single word that appears most frequently in discussions of the economic problems now afflicting both the United States and Europe, that word is surely “debt”” (Eggertsson and Krugman 2010, p. 1), and then admits that private debt played no role in neoclassical macroeconomic models before the crisis:

> Given both the prominence of debt in popular discussion of our current economic difficulties and the long tradition of invoking debt as a key factor in major economic contractions, one might have expected debt to be at the heart of most mainstream macroeconomic models—especially the analysis of monetary and fiscal policy. Perhaps somewhat surprisingly, however, it is quite common to abstract altogether from this feature of the economy. Even economists trying to analyze the problems of monetary and fiscal policy at the zero lower bound—and yes, that includes the authors—have often adopted representative-agent models in which everyone is alike, and in which the shock that pushes the economy into a situation in which even a zero interest rate isn’t low enough takes the form of a shift in everyone’s preferences. (p. 2)

This, along with the unnecessary insistence on equilibrium modeling, is the key weakness in neoclassical economics: if you omit so crucial a variable as debt from your analysis of a market economy, there is precious little else you will get right. So Krugman has taken at least one step in the right direction.

However, from this *mea culpa*, it’s all downhill, because he made no fundamental shift from a neoclassical approach; all he did was modify his base “New Keynesian” model to incorporate debt as he perceived it. On this front, he fell into same trap that ensnared Bernanke, of being incapable of conceiving that aggregate debt can have a macroeconomic impact:
Ignoring the foreign component, or looking at the world as a whole, the overall level of debt makes no difference to aggregate net worth -- one person's liability is another person's asset. (p. 3)

This one sentence established that Krugman failed to comprehend Minsky, who realized—as did Schumpeter and Marx before him—that growing debt in fact boosts aggregate demand:

If income is to grow, the financial markets… must generate an aggregate demand that, aside from brief intervals, is ever rising. For real aggregate demand to be increasing… it is necessary that current spending plans, summed over all sectors, be greater than current received income … It follows that over a period during which economic growth takes place, at least some sectors finance a part of their spending by emitting debt or selling assets. (Minsky 1982, p. 6)

Krugman also has no understanding of the endogeneity of credit money—that banks create an increase in spending power by simultaneously creating money and debt. Lacking any appreciation of how money is created in a credit-based economy, Krugman instead sees lending as simply a transfer of spending power from one agent to another: *neither banks nor money exist in the model he built.*

Instead, rather than modeling the economy as a single representative agent, he modeled it as consisting of two agents, one of whom was impatient while the other was patient. Debt was simply a transfer of spending power from the patient agent to the impatient one, and therefore the debt itself had no macroeconomic impact—it simply transferred spending power from the patient agent to the impatient one. The only way this could have a macroeconomic impact was if the “impatient” agent was somehow constrained in ways that the patient agent was not, and that’s exactly how Krugman concocted a macroeconomic story out of this neoclassical microeconomic fantasy:

In what follows, we begin by setting out a flexible-price endowment model in which “impatient” agents borrow from “patient” agents [where what is borrowed is not money, but “risk-free bonds denominated in the consumption good” (p. 5)], but are subject to a debt limit.

To then generate a crisis, Krugman had to introduce an ad-hoc and unexplained change to this debt limit:

If this debt limit is, for some reason, suddenly reduced, the impatient agents are forced to cut spending; if the required deleveraging is large enough, the result can easily be to push the economy up against the zero lower bound. If debt takes the form of nominal obligations, Fisherian debt deflation magnifies
the effect of the initial shock. (Eggertsson and Krugman 2010, p. 3; emphasis added)

He then generalized this with “a sticky-price model in which the deleveraging shock affects output instead of, or as well as, prices” (p. 3), brought in nominal prices without money by imagining “that there is a nominal government debt traded in zero supply… We need not explicitly introduce the money supply” (p. 9), modeled production—yes, the preceding analysis was of a no-production economy in which agents simply trade existing “endowments” of goods distributed like Manna from heaven—under imperfect competition (p. 11), added a Central Bank that sets the interest rate (in an economy without money) by following a Taylor Rule, and on it went.

The mathematics was complicated, and real brain power was exerted to develop the argument—just as, obviously, it takes real brain power for a poodle to learn how to walk on its hind legs. But it was the wrong mathematics: it compared two equilibria separated by time, whereas truly dynamic analysis considers change over time regardless of whether equilibrium applies or not. And it was wasted brain power, because the initial premise—that aggregate debt has no macroeconomic effects—was false.

Krugman at least acknowledged the former problem—that the dynamics are crude:

The major limitation of this analysis, as we see it, is its reliance on strategically crude dynamics. To simplify the analysis, we think of all the action as taking place within a single, aggregated short run, with debt paid down to sustainable levels and prices returned to full ex ante flexibility by the time the next period begins. (p. 23)

But even here, I doubt that he would consider genuine dynamic modeling without the clumsy neoclassical device of assuming that all economic processes involve movements from one equilibrium to another. Certainly this paper remained true to the perspective he gave in 1996 when speaking to the European Association for Evolutionary Political Economy:

I like to think that I am more open-minded about alternative approaches to economics than most, but I am basically a maximization-and-equilibrium kind of guy. Indeed, I am quite fanatical about defending the relevance of standard economic models in many situations…

He described himself as an “evolution groupie” to this audience, but then made the telling observation that:

Most economists who try to apply evolutionary concepts start from some deep dissatisfaction with economics as it is. I won’t say that I am entirely happy with the state of economics.
But let us be honest: I have done very well within the world of conventional economics. I have pushed the envelope, but not broken it, and have received very widespread acceptance for my ideas. What this means is that I may have more sympathy for standard economics than most of you. My criticisms are those of someone who loves the field and has seen that affection repaid.

Krugman’s observations on methodology in this speech also highlight why he was incapable of truly comprehending Minsky—because he starts from the premise that neoclassical economics itself has proven to be false, that macroeconomics must be based on individual behavior:

Economics is about what individuals do: not classes, not "correlations of forces", but individual actors. This is not to deny the relevance of higher levels of analysis, but they must be grounded in individual behavior. *Methodological individualism is of the essence.* (Krugman 1996; emphases added)

No it’s not: methodological individualism is one of the key flaws in neoclassical macroeconomics, as the SMD conditions establish. Economic processes have to be modeled at a higher level of aggregation, as Kirman argued (Kirman 1989, p. 138) and Minsky, in practice, did.

So while Krugman reached some policy conclusions with which I concur—such as arguing against government austerity programs during a debt-deflationary crisis—his analysis is proof for the prosecution that even “cutting edge” neoclassical economics, by continuing to ignore the role of aggregate debt in macroeconomic dynamics, is part of the problem of the Great Recession, not part of its solution.

**CONCLUSION: NEAT, PLAUSIBLE, AND WRONG**

Menchen’s aphorism suits not merely the money multiplier, but the whole of neoclassical economics: “neat, plausible, and wrong”. If we are to avoid another Great Depression—more bleakly, if we are to get out of the one we are still in—then neoclassical economics has to be consigned to the dustbin of intellectual history. But that by itself is not enough: we need a replacement theory that does not make the many methodological mistakes that have made neoclassical economics such a singularly misleading and dangerous guide to the management of a capitalist economy.

The manner in which neoclassical economists have dealt with the crisis also makes a mockery of the basis on which neoclassical macroeconomics was based: its criticism of the preceding IS-LM “Keynesian” models that they were based on many “ad hoc” parameters—as Solow observed, “the main argument for this modeling strategy has been a more aesthetic one: its virtue is said to be that it is
compatible with general equilibrium theory, and thus it is superior to ad hoc descriptive models that are not related to ‘deep’ structural parameters” (Solow 2007, p. 8). However, to cope with the Great Recession, neoclassical economists are now introducing ad-hoc changes to these “‘deep’ structural parameters”—in order to explain why risk is suddenly re-evaluated and so on—and even introducing “ad hoc” shocks. Neoclassical attempts to reproduce the crisis therefore fail the Lucas Critique which gave birth to this approach in the first place.

A complete, ready-made replacement does not exist. But there are alternative ways of thinking about economics that provide a good foundation on which an empirically grounded, non-ideological theory of economics can be built. I now turn to these alternatives, starting with the perspective that enabled me to be one of the very few economists who saw the Great Recession coming.
ALTERNATIVES

Different ways to think about economics
13. Why I did see “It” coming

I was certainly not the only economist to expect that a serious economic crisis was imminent before the Great Recession began.

The Post Keynesian and Austrian schools of thought explicitly consider credit and money in their models of the economy, and many economists in these schools expected a crisis—the former group because of their familiarity with Hyman Minsky’s Financial Instability Hypothesis, and the latter because of their familiarity with Hayek’s argument about the impact of interest rates being held too low by government policy. However, the vast majority of these did not go public with their warnings.

Bezemer identified twelve individuals including myself who did publicly warn of its approach (Bezemer 2009, 2010), and a poll conducted by the Real World Economics Review to decide who should win the inaugural Revere Award for Economics\(^{160}\) resulted in an additional 84 individuals being nominated (Fullbrook 2010).

What distinguished me (and the late Wynne Godley) from the rest of these prescient and voluble few is that I had developed a mathematical model of how this crisis might come about. That model put into dynamic, disequilibrium form the economic vision of the late Hyman Minsky, which was in turn built on the insights of the great non-neoclassical thinkers Marx, Schumpeter, Fisher and Keynes. Minsky’s strength was to weave these individually powerful and cohesive but incomplete analyses into one coherent tapestry that explained capitalism’s greatest weakness: its proclivity to experience not merely economic cycles, but also occasional Depressions that challenged the viability of capitalism itself.

**THE FINANCIAL INSTABILITY HYPOTHESIS**

Minsky’s starting point was that, since the Great Depression had occurred, and since similar if smaller crises were a recurrent feature of the 19th century,

\(^{160}\) The Revere Award recognized “the three economists who first and most clearly anticipated and gave public warning of the Global Financial Collapse and whose work is most likely to prevent another GFC in the future”. More than 2,500 people—mainly economists—casted votes for a maximum of 3 out of the 96 candidates. I was the eventual winner with 1,152 of the 5,062 votes cast; Nouriel Roubini came second with 566 votes and Dean Baker third with 495 votes. See [http://rwer.wordpress.com/2010/05/13/keen-roubini-and-baker-win-revere-award-for-economics-2/](http://rwer.wordpress.com/2010/05/13/keen-roubini-and-baker-win-revere-award-for-economics-2/) for full details.
before “Big Government” became the norm in market economies, an economic model had to be able to generate a Depression as one of its possible outcomes:

Can “It”—a Great Depression—happen again? And if “It” can happen, why didn’t “It” occur in the years since World War II? These are questions that naturally follow from both the historical record and the comparative success of the past thirty-five years. To answer these questions it is necessary to have an economic theory which makes great depressions one of the possible states in which our type of capitalist economy can find itself. (Minsky 1982, p. 5; emphasis added)

For this reason, Minsky explicitly rejected neoclassical economics:

The abstract model of the neoclassical synthesis cannot generate instability. When the neoclassical synthesis is constructed, capital assets, financing arrangements that center around banks and money creation, constraints imposed by liabilities, and the problems associated with knowledge about uncertain futures are all assumed away. For economists and policy-makers to do better we have to abandon the neoclassical synthesis. (Minsky 1982, p. xiii)

In place of the non-monetary, equilibrium-fixated, uncertainty-free, institutionally barren and hyper-rational individual-based reductionist neoclassical model, Minsky’s vision of capitalism was strictly monetary, inherently cyclical, embedded in time with a fundamentally unknowable future, institution-rich and holistic, and considered the interactions of its four defining social entities: industrial capitalists, bankers, workers and the government.

I published my first paper on Minsky’s hypothesis in 1995 (Keen 1995), and the following summary of Minsky’s verbal model of a financially-driven business cycle is reproduced from that paper.161 I provide it verbatim here since its conclusion—written in 1993, long before neoclassical economists began to congratulate themselves about the “Great Moderation”—shows that the calamity the world economy fell into in 2007-08 was not an unpredictable “Black Swan” event, but something that was entirely foreseeable with the right economic theory:

Minsky’s analysis of a financial cycle begins at a time when the economy is doing well (the rate of economic growth equals or exceeds that needed to reduce unemployment), but firms are conservative in their portfolio management (debt to equity ratios are low and profit to interest cover is high), and this conservatism is shared by banks, who are only willing to fund

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cash-flow shortfalls or low-risk investments. The cause of this high and universally practiced risk aversion is the memory of a not too distant system-wide financial failure, when many investment projects foundered, many firms could not finance their borrowings, and many banks had to write off bad debts. Because of this recent experience, both sides of the borrowing relationship prefer extremely conservative estimates of prospective cash flows: their risk premiums are very high.

However, the combination of a growing economy and conservatively financed investment means that most projects succeed. Two things gradually become evident to managers and bankers: "Existing debts are easily validated and units that were heavily in debt prospered: it pays to lever" (Minsky 1982, p. 65). As a result, both managers and bankers come to regard the previously accepted risk premium as excessive. Investment projects are evaluated using less conservative estimates of prospective cash flows, so that with these rising expectations go rising investment and asset prices. The general decline in risk aversion thus sets off both growth in investment and exponential growth in the price level of assets, which is the foundation of both the boom and its eventual collapse.

More external finance is needed to fund the increased level of investment and the speculative purchase of assets, and these external funds are forthcoming because the banking sector shares the increased optimism of investors (Minsky, 1980, p. 121). The accepted debt to equity ratio rises, liquidity decreases, and the growth of credit accelerates.

This marks the beginning of what Minsky calls "the euphoric economy" (Minsky 1982, pp. 120-124), where both lenders and borrowers believe that the future is assured, and therefore that most investments will succeed. Asset prices are revalued upward as previous valuations are perceived to be based on mistakenly conservative grounds. Highly liquid, low-yielding financial instruments are devalued, leading to a rise in the interest rates offered by them as their purveyors fight to retain market share.

Financial institutions now accept liability structures for both themselves and their customers "that, in a more sober expectational climate, they would have rejected" (Minsky 1980, p. 123). The liquidity of firms is simultaneously reduced by the rise in debt to equity ratios, making firms more susceptible to increased interest rates. The general decrease in liquidity and the rise in interest paid on highly liquid instruments triggers a market-based increase in the interest rate, even without any attempt by monetary authorities to control the boom. However, the increased cost of credit does little to temper the boom, since anticipated yields from speculative investments normally far exceed prevailing interest rates, leading to a decline
in the elasticity of demand for credit with respect to interest rates.

The condition of euphoria also permits the development of an important actor in Minsky's drama, the Ponzi financier (Minsky 1982, pp. 70, 115; Galbraith, 1954, pp. 4-5). These capitalists profit by trading assets on a rising market, and incur significant debt in the process. The servicing costs for Ponzi debtors exceed the cash flows of the businesses they own, but the capital appreciation they anticipate far exceeds the interest bill. They therefore play an important role in pushing up the market interest rate, and an equally important role in increasing the fragility of the system to a reversal in the growth of asset values.

Rising interest rates and increasing debt to equity ratios eventually affect the viability of many business activities, reducing the interest rate cover, turning projects that were originally conservatively funded into speculative ones, and making ones that were speculative "Ponzi." Such businesses will find themselves having to sell assets to finance their debt servicing—and this entry of new sellers into the market for assets pricks the exponential growth of asset prices. With the price boom checked, Ponzi financiers now find themselves with assets that can no longer be traded at a profit, and levels of debt that cannot be serviced from the cash flows of the businesses they now control. Banks that financed these assets purchases now find that their leading customers can no longer pay their debts—and this realization leads initially to a further bank-driven increase in interest rates. Liquidity is suddenly much more highly prized; holders of illiquid assets attempt to sell them in return for liquidity. The asset market becomes flooded and the euphoria becomes a panic, the boom becomes a slump.

As the boom collapses, the fundamental problem facing the economy is one of excessive divergence between the debts incurred to purchase assets, and the cash flows generated by them—with those cash flows depending upon both the level of investment and the rate of inflation.

The level of investment has collapsed in the aftermath of the boom, leaving only two forces that can bring asset prices and cash flows back into harmony: asset price deflation, or current price inflation. This dilemma is the foundation of Minsky's iconoclastic perception of the role of inflation, and his explanation for the stagflation of the 1970s and early 1980s.

Minsky argues that if the rate of inflation is high at the time of the crisis, then though the collapse of the boom causes investment to slump and economic growth to falter, rising cash flows rapidly enable the repayment of debt incurred during the
boom. The economy can thus emerge from the crisis with diminished growth and high inflation, but few bankruptcies and a sustained decrease in liquidity. Thus, though this course involves the ruin "bads" of inflation and initially low growth, it is a self-correcting mechanism in that a prolonged slump is avoided.

However, the conditions are soon reestablished for the cycle to repeat itself, and the avoidance of a true calamity is likely to lead to a secular decrease in liquidity preference.

If the rate of inflation is low at the time of the crisis, then cash flows will remain inadequate relative to the debt structures in place. Firms whose interest bills exceed their cash flows will be forced to undertake extreme measures: they will have to sell assets, attempt to increase their cash flows (at the expense of their competitors) by cutting their margins, or go bankrupt. In contrast to the inflationary course, all three classes of action tend to further depress the current price level, thus at least partially exacerbating the original imbalance. The asset price deflation route is, therefore, not self-correcting but rather self-reinforcing, and is Minsky's explanation of a depression.

The above sketch basically describes Minsky's perception of an economy in the absence of a government sector. With big government, the picture changes in two ways: because of fiscal deficits and Reserve Bank interventions. With a developed social security system, the collapse in cash flows that occurs when a boom becomes a panic will be at least partly ameliorated by a rise in government spending—the classic "automatic stabilizers," though this time seen in a more monetary light. The collapse in credit can also be tempered or even reversed by rapid action by the Reserve Bank to increase liquidity. With both these forces operating in all Western economies since World War II, Minsky expected the conventional cycle to be marked by "chronic and . . . accelerating inflation" (Minsky, 1982, p. 85). However, by the end of the 1980s, the cost pressures that coincided with the slump of the early 1970s had long since been eliminated, by fifteen years of high unemployment and the diminution of OPEC's cartel power. The crisis of the late 1980s thus occurred in a milieu of low inflation, raising the specter of a debt deflation. (Keen 1995, pp. 611-614)

I added the following qualification about the capacity for government action to attenuate the severity of a debt-deflation—while not addressing its underlying causes—to my précis of Minsky in the first edition of Debunking Economics:

If a crisis does occur after the Internet Bubble finally bursts, then it could occur in a milieu of low inflation (unless oil price pressures lead to an inflationary spiral). Firms are likely to react
to this crisis by dropping their margins in an attempt to move stock, or to hang on to market share at the expense of their competitors. This behavior could well turn low inflation into deflation.

The possibility therefore exists that America could once again be afflicted with a debt deflation – though its severity could be attenuated by the inevitable increase in government spending that such a crisis would trigger. America could well join Japan on the list of the global economy’s ‘walking wounded’ – mired in a debt-induced recession, with static or falling prices and a seemingly intractable burden of private debt. (Keen 2001, p. 254)

That a crisis might occur, and even that government action might attenuate it, was something that one could anticipate with Minsky’s verbal economic theory. But a market economy is a complex system—the most complex social system that has ever existed—and its very complexity means that feedback effects might occur that are simply impossible to predict with a verbal model alone. For that reason, in my PhD I decided to attempt what Minsky had not succeeded in doing: to provide a mathematical model that did justice to the compelling verbal description he gave of debt deflation.

**MODELING MINSKY**

Minsky did develop a mathematical model of a financially-driven business cycle in his PhD, which resulted in the one paper he ever had published in a mainstream economic journal, the *American Economic Review* (Minsky 1957). But the model was unsatisfactory for a number of reasons, and he subsequently abandoned it to stick with predominantly verbal reasoning.

Minsky’s failure to develop a satisfactory mathematical model was partly due to bad timing: the 1950s predated the development of complexity theory, which made trying to build a model of his hypothesis virtually impossible. Minsky simply added a financial dimension to the dominant linear trade cycle model of the day, which was a particularly unsuitable foundation for his hypothesis. In 1993, well after complexity theory had developed, I built my initial Minsky model using the far more suitable foundation of the cyclical growth model developed by the non-neoclassical economist Richard Goodwin (Goodwin 1967).

Goodwin’s model considered the level of investment and the distribution of income in a simple two-class model of capitalism. A high initial wage and high

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162 Minsky made it into the *AER* on one other occasion, but only as a discussant of another paper at its annual conference.

163 The base model he used, known as the Hicks-Hansen-Samuelson multiplier-accelerator model, also derived its cycles from the economic error of equating an expression for actual savings to one for desired investment. See Keen 2000, pp. 88-92.
rate of employment meant that wages absorbed most of output, so that profit was low—and therefore investment was low. The low rate of investment meant that the capital stock grew slowly (or fell because of depreciation), leading to a low rate of growth of output (or even falling output) and hence a growing unemployment rate—since population growth would then exceed the rate of economic growth.

The rising unemployment rate reduced workers’ bargaining power, leading to stagnant or falling wages—which increased capitalists’ profit share. They then increased investment, leading to a boom that drove the employment rate up, which strengthened the bargaining power of workers. Wages then rose and, because employment was high, wages absorbed most of output—which is where the cycle began.164

This was a classic dynamic model of “circular causation” that is very common in biological modeling, but sadly a rarity in economics because of the neoclassical obsession with equilibrium. It also had a startling characteristic compared to the standard fare in economics: it was inherently cyclical. Given an arbitrary starting point, the model generated regular cycles in both the distribution of income and the employment rate. There was no tendency towards equilibrium, but no tendency to breakdown either: the same cycle repeated forever.

Refer to Figure 105: Goodwin’s growth cycle model

Economists were falsely of the opinion that this was impossible. As John Hicks (remember him?) put it:

A mathematically unstable system does not fluctuate; it just breaks down. The unstable position is one in which it will not tend to remain. (Hicks 1949)

As is so often the case, Hicks was right in particular and wrong in general. If they were unstable, then dynamic versions of the linear models that he and most neoclassical economists worked would indeed break down—by returning impossible values for variables, such as negative prices or infinite levels of output. But Goodwin’s model was inherently nonlinear, because two variables in the system—the wage rate and the level of employment—had to be multiplied together to work out wages and hence profits. As I explained in Chapter 9, nonlinear models can have persistent cycles without breaking down.

164 This verbal model of perpetual cycles in employment and income distribution was first developed by Marx, and published in Section 1 of Chapter 25 of Volume 1 of Capital (Marx 1867). Marx finished his verbal model with the statement “To put it mathematically: the rate of accumulation is the independent, not the dependent, variable; the rate of wages, the dependent, not the independent, variable”, and it is believed that his attempt to learn calculus late in his life was motivated by the desire to express this model in mathematical form (Marx 1881 [1983]).
The Professor of Applied Mathematics turned non-orthodox economist John Blatt observed that Goodwin’s model was the best of the many dynamic economic models he had reviewed, and suggested that it would provide an excellent foundation for modeling financial dynamics in capitalism. In stark contrast to the neoclassical obsession with equilibrium, one of Blatt’s criticisms of Goodwin’s basic model was that its equilibrium was not unstable:

Of course, the model is far from perfect. In particular, we feel that the existence of an equilibrium which is not unstable (it is neutral) is a flaw in this model... The first flaw can be remedied in several ways ... [such as] introduction of a financial sector, including money and credit as well as some index of business confidence. Either or both of these changes is likely to make the equilibrium point locally unstable, as is desirable... But, while it is obvious that much work remains to be done, we have no doubt that the Goodwin model is the most promising of all the “schematic models” of the trade cycle and well deserves further investigation. (Blatt 1983, pp. 210-211)

I took up Blatt’s suggestion in my PhD, by adding Keynes’s model of how capitalists form conventions to cope with uncertainty, and Minsky’s emphasis upon the role of debt in financing investment plans during a boom.

Of Keynes’s three conventions to cope with uncertainty, the most important was the tendency to project forward current conditions:

We assume that the present is a much more serviceable guide to the future than a candid examination of past experience would show it to have been hitherto. (Keynes 1937, p. 214)

A simple way to capture this in a mathematical model was to argue that capitalists would invest very little when the rate of profit today was very low, and invest a lot when the rate of profit was high. This was easily captured by a replacing Goodwin’s simple but unrealistic assumption that capitalists invested all their profits with a nonlinear relationship that meant investment would be less than profits when the rate of profit was low, and more than profits when the rate of profit was high.

Minsky improved upon Keynes by incorporating the insights of Schumpeter and Fisher on the essential role of debt in a capitalist economy: when capitalists’ desire to invest exceeded retained earnings—as they would do during a boom—then capitalists would borrow to finance the additional investment. I introduced
this with a simple differential equation that said the rate of change of debt equaled investment minus profits.165

My first Minsky model

This added one additional dynamic to Goodwin’s model: the rate of change of debt, which rose when investment exceeded profits and fell when profits exceeded investment. During a boom, capitalists borrow to finance investment, and this drives up the debt to output ratio. During a slump, capitalists invest less than profits, and this reduces the debt to output ratio. The change in the debt ratio then affects the rate of profit, since profits are now equal to output, minus wages, minus interest on outstanding debt.

This simple extension to Goodwin’s model dramatically altered its behavior. Goodwin’s basic model generated fixed cycles indefinitely; this extended system could generate several different outcomes, ranging from a convergence to equilibrium values for income distribution, the employment rate and the debt to output ratio, cycles in all three variables of varying magnitudes over time, or a blowout in the debt to GDP ratio: a debt-induced Depression.

The model also had three fascinating and, as it turned out, prescient characteristics.

Firstly, even though capitalists were the only borrowers in this simple model, the debt repayment burden actually fell on workers: the wages share of output fell as the debt level rose, while the profit share fluctuated around an equilibrium value.

Secondly, if the model did head towards a debt-induced breakdown, the debt to output ratio ratcheted up over time: debt would rise during a boom, reach a peak and then fall during a slump, but a new boom would begin before the debt to output ratio had dropped to its original value.

Refer to Figure 106: My 1995 Minsky Model

Thirdly, the breakdown was preceded by a period of reduced volatility: fluctuations in employment and output would start off very large and then fall—the model generated a “Great Moderation” before one appeared in the empirical record. But slowly, as the debt ratio rose even higher, the volatility started to rise again, until there was one last extreme cycle in which the debt level went so high that debt repayments overwhelmed the capacity of capitalists to pay.

Fama and French give empirical support for this equation, which is rather ironic given their role in promoting the empirically invalid CAPM model of finance: “These correlations confirm the impression that debt plays a key role in accommodating year-by-year variation in investment” (Fama and French 1999, p. 1954). In a draft version, they stated this even more clearly: “Debt seems to be the residual variable in financing decisions. Investment increases debt, and higher earnings tend to reduce debt.”

165
The economy then went into a death spiral as the level of debt overwhelmed the capacity of capitalists to service that debt. A “Great Moderation” gave way to a “Great Recession”—see Figure 107.

When I first completed this model in April 1992, the “Great Moderation” had yet to begin, but the peculiar dynamics of the model struck me as remarkable. This led me to finish my first published paper on this model with a flourish that at the time, seemed grandiose, but which ultimately proved to be prophetic:

From the perspective of economic theory and policy, this vision of a capitalist economy with finance requires us to go beyond that habit of mind which Keynes described so well, the excessive reliance on the (stable) recent past as a guide to the future. The chaotic dynamics explored in this paper should warn us against accepting a period of relative tranquility in a capitalist economy as anything other than a lull before the storm. (Keen, 1995, p. 634; emphasis added)

Figure 107: The vortex of debt in my 1995 Minsky model
However, Minsky had also noted that government spending could stabilize an unstable economy. In that same paper I modeled this possibility by introducing government spending as an effective subsidy to capitalists that grew as unemployment rose and fell as it subsided—though workers receive unemployment benefits, the unemployed spend everything they get on consumption, so that corporations are the ultimate recipients of government welfare. Similarly, I modeled government taxation of business as rising as profits rose, and fall when profits fell.

As well as adding a fourth “system state” to the model—the level of net government spending as a proportion of output—this modified the definition of profit. It was now output, minus wages, minus interest payments on debt, minus taxes plus the government subsidy.
In the model, the presence of government spending acted as a counterweight to the private sector’s tendency to accumulate debt: a rising subsidy and falling taxes during a slump gave business additional cash flows with which to repay debt during a slump, while rising taxes and a falling subsidy during a boom attenuated the private sector’s tendency to accumulate debt.

The result was a system which was inherently cyclical, but in which the cycles stayed within manageable bounds: there was no systemic breakdown, as there had been in the pure private sector model. It was a pure limit cycle of the kind Blatt thought should be generated by a realistic model (Blatt 1983, p. 211).

Refer to Figure 108: Cyclical stability with a counter-cyclical government sector

Reality, I expected, lay somewhat between these two extremes of a private sector en route to a debt-induced breakdown, and a cyclical system kept within bounds by the “automatic stabilizers” of government spending and taxation. The government sector modeled in this paper “held the line” against rising unemployment, whereas in the real world, governments had retreated from trying to restrain rising unemployment. I also knew that Ponzi-style behavior had become more dominant in the real world over time—something that I had not modeled explicitly, since in my model, all borrowing led to productive investment. Also, though the models considered the role of private debt, they were only implicitly monetary, and I could not capture the impact of inflation or deflation upon the economy.

So there were ways in which I did not expect the real world to match my models. I resolved to extend them over time—to make them explicitly monetary, to model governments that gradually reduced their role as fiscal stabilizers, to incorporate borrowing for purely speculative reasons and so on—but in the immediate aftermath I was distracted from this agenda by the ferocious reaction that neoclassical economists had to the chapter “Size Does Matter” in the first edition of Debunking Economics. That dispute consumed my research energies in the four years from 2001 till 2005.

Finally in December 2005, I resolved to leave this argument behind and at long last write the book-length treatment of Minsky’s hypothesis that I had first committed to do in 1998.166 When I checked the ratio of private debt to GDP for the first time in over a decade, I quickly realized that a crisis would strike long before my technical book on how such crises came about would be ready.

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REALITY CHECK DECEMBER 2005

The last thing I expected was that the real world would be in worse shape than my models implied, but that’s what appeared to be the case in December 2005. While drafting an Expert Witness report on debt in a predatory lending case, I scribbled—before I had checked the data—that “Debt to GDP ratios have been rising exponentially”. I expected that I’d need to attenuate that statement once I checked the data—the ratio would have been rising, I thought, though not at an exponential rate.

I vividly remember my stunned reaction when I first plotted the data, at about 1am on December 22nd in Perth, Western Australia. Australia’s private debt to GDP level had increased more than fivefold since the mid-1960s, and the rate of increase was clearly exponential—and it had a burst super-bubble in the 1980s, similar to the cyclical fluctuations in the debt to income ratio generated by my Minsky model.

Refer to Figure 109: Australia’s private debt to GDP ratio 1975-2005

I quickly downloaded the US Flow of Funds data to see whether Australia was unique. Obviously, it wasn’t—see Figure 110. This was, as I expected, a global phenomenon. The US debt ratio was slightly less obviously exponential, but had increased even more than the Australian, and over a longer time period. Similar data could be found for most OECD nations, and especially the Anglo-Saxon countries.
Such an exponential rise in the debt ratio had to break, and when it did the global economy would be thrust into a downturn that would surely be more severe than those of the mid-1970s and early 1990s—the last times that the bursting of speculative bubbles had caused serious recessions. There was even the prospect that this would be an “It” break: a debt-induced downturn so severe that the outcome would be not merely a recession, but a Depression.

Someone had to raise the alarm, and I realized that, at least in Australia, I was probably that somebody. I once again put *Finance and Economic Breakdown* on the backburner, and devoted myself to warning the general public and policy makers of the impending economic crisis. I began with media interviews, progressed to sending out a “Debtwatch” report on debt coinciding with the Reserve Bank of Australia’s monthly meetings from November 2006 (Keen 2006), and in March 2007, I established the Debtwatch blog (www.debtdeflation.com/blogs).

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167 This and later reports are downloadable from http://www.debtdeflation.com/blogs/pre-blog-debtwatch-reports/. I ceased writing the monthly report in April 2009, in order to devote more time to fundamental research. The blog posts, however, continued.
Raising the alarm was not enough. I also had to dramatically improve my empirical understanding of the role of debt in a capitalist economy, and extend my Minsky model to cover the issues that I clearly had not paid sufficient attention to in 1995: the impact of Ponzi Finance, and the active role of the financial sector in financial crises.

**The Empirical Dynamics of Debt**

The key insight about the role of debt in a capitalist society was provided by Schumpeter: in a growing economy, the increase in debt funds more economic activity than could be funded by the sale of existing goods and services alone:

> in real life total credit must be greater than it could be if there were only fully covered credit. The credit structure projects not only beyond the existing gold basis, but also beyond the existing commodity basis. (Schumpeter 1934, pp. 95, 101; emphasis added)

Aggregate demand in a credit-driven economy is therefore equal to income (GDP) plus the change in debt. This makes aggregate demand far more volatile than it would be if income alone was its source, because while GDP (and the level of accumulated debt) changes relatively slowly, the change in debt can be sudden and extreme. In addition, if debt levels are already high relative to GDP, then the change in the level of debt can have a substantial impact on demand.

A numeric example illustrates this process (see Table 18). Consider an economy with a GDP of $1,000 billion that is growing at 10 percent per annum, where this is half due to inflation and half due to real growth, and which has a debt level of $1,250 billion that is growing at 20 percent per annum. Aggregate demand will therefore be $1,250 billion: $1,000 billion from GDP, and $250 billion from the increase in debt (which will rise from $1,250 billion to $1,500 billion over the course of the year).

Imagine that the following year, GDP continues to grow at the same 10% rate, but debt growth slows down from 20% per annum to 10% (the debt to GDP ratio will therefore stabilize at 150 percent). Demand from income will be $1,100 billion—ten percent higher than the previous year—while demand from additional debt will be $150 billion (ten percent of the $1,500 billion level at the start of the year).

Aggregate demand in this second year will thus be $1,250 billion—exactly the same as the year before. However, since inflation is running at 5 percent, this will mean a fall in real output of about 5 percent—a serious recession. So just a slowdown in the rate of growth of debt can be enough to trigger a recession. An absolute fall in debt isn’t needed to cause problems, though it certainly will make things worse still.
Table 18: A hypothetical example of the impact of decelerating debt on aggregate demand

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real growth</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Inflation</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Nominal GDP</td>
<td>$1,000</td>
<td>$1,100</td>
</tr>
<tr>
<td>Nominal Debt</td>
<td>$1,250</td>
<td>$1,500</td>
</tr>
<tr>
<td>Debt growth rate</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td>Growth in debt</td>
<td>$250</td>
<td>$150</td>
</tr>
<tr>
<td>Nominal Aggregate Demand</td>
<td>$1,250</td>
<td>$1,250</td>
</tr>
<tr>
<td>Change in Nominal Demand</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Change in Nominal Demand</td>
<td>N/A</td>
<td>0.0%</td>
</tr>
<tr>
<td>Real Aggregate Demand</td>
<td>$1,250</td>
<td>$1,187.5</td>
</tr>
<tr>
<td>Change in Real Demand</td>
<td>N/A</td>
<td>-5.0%</td>
</tr>
</tbody>
</table>

Schumpeter ignored the role of asset markets in the economy, so that in his model the increase in debt financed investment, while consumption was financed from the sale of goods. Therefore in his model, aggregate demand equals aggregate supply, but part of aggregate demand is debt-financed. In this example, demand financed by the sale of goods and services purchased $1,000 billion of consumer goods, while $250 billion of investment goods were bought on credit. Twenty percent of aggregate demand therefore came from rising debt.

Two consequences follow from this, of which Schumpeter was fully cognizant.

Firstly, the expansion of credit must come, not from someone’s savings being transferred to another person via a loan—which is the conventional model of how banks operate—but by the banking sector creating new money and credit “out of nothing”:

“[I]n so far as credit cannot be given out of the results of past enterprise … it can only consist of credit means of payment created ad hoc, which can be backed neither by money in the strict sense nor by products already in existence…

It provides us with the connection between lending and credit means of payment, and leads us to what I regard as the nature of the credit phenomenon… credit is essentially the creation of purchasing power for the purpose of transferring it to the entrepreneur, but not simply the transfer of existing purchasing power.” (Schumpeter 1934, pp. 106-107)
The banking sector therefore must have the capacity to create purchasing power—an issue I return to in the next chapter.

Secondly, the numerical example given here involves an unsustainable rate of growth of debt in the first year, so that there has to be a slowdown in the rate of growth of debt, which will cause a recession. However, the increased debt also helps create productive capacity for the economy, which can later be used to service the debt. There is thus a limit to the severity of cycles that can result: though excessive debt growth will cause a boom, and the inevitable slowdown in the growth of debt will cause a slump, the economy’s capacity to produce is expanded by the growth of debt. Serious adjustments might be needed—falling prices, debt-write-offs as some firms go bankrupt, and so on—but ultimately the economy will be able to pay reduce debt to manageable levels again, and growth will resume once more.

Minsky extended Schumpeter by considering Ponzi Finance as well—lending to finance the speculative purchase of existing assets. Now, as well aggregate demand being both income plus the change in debt, aggregate supply is both the output of new goods and services and the net turnover of existing assets. This breaches the virtuous cycle that Schumpeter saw between rising debt and a rising capacity to service that debt, because the money borrowed to buy assets adds to society’s debt level without increasing its productive capacity. Thus when a slump follows a debt-fuelled boom, it is possible that debt servicing will exceed the economy’s available cash flows—leading to not merely a recession, but a Depression.

This Minskian process has been playing out in America ever since the mid-1960s when Minsky first developed his Financial Instability Hypothesis. Minsky himself identified 1966 as the time at which America made the transition from a productive to a Ponzi economy:

A close examination of experience since World War II shows that the era quite naturally falls into two parts. The first part, which ran for almost twenty years (1948-1966), was an era of largely tranquil progress. This was followed by an era of increasing turbulence, which has continued until today. (Minsky 1982, p. xiii)

Minsky’s judgment was based largely on his financial interpretation of the US business cycle from that point on:

The first serious break in the apparently tranquil progress was the credit crunch of 1966. Then, for the first time in the postwar era, the Federal Reserve intervened as a lender of last resort to refinance institutions—in this case banks—which were experiencing losses in an effort to meet liquidity requirements. The credit crunch was followed by a “growth” recession, but the expansion of the Vietnam War promptly led to a large
federal deficit which facilitated a recovery from the growth recession.

The 1966 episode was characterized by four elements: (1) a disturbance in financial markets that led to lender-of-last-resort intervention by the monetary authorities; (2) a recession (a growth recession in 1966); (3) a sizable increase in the federal deficit; and (4) a recovery followed by an acceleration of inflation that set the stage for the next disturbance. The same four elements can be found in the turbulence of 1969-70, 1974-75, 1980, and 1981. (Minsky 1982, pp. xiv-xv)

Empirically, the late 1960s also marked the point at which the accumulated debt of the private sector exceeded 100 percent of GDP. From that point on, the dynamics of debt began to dominate macroeconomic performance in the USA—firstly generating a false prosperity, and then a calamitous collapse when the great debt bubble finally burst (see Figure 111).

**Figure 111: Aggregate demand in the US 1965-2015**

For the first time since the Great Depression, the aggregate level of private debt began to fall in the January of 2009. But the economic downturn began well before, when the rate of growth of debt slowed from its peak level, just as the numerical example illustrates.
Refer to Figure 112: US Private Debt

The debt bubble went out with a bang: the increase in private sector debt in 2008, the final year of the bubble, was a truly stupendous $4 trillion, which boosted aggregate demand from GDP alone by over 28 percent. A year later, debt was growing by “only” $1.5 trillion, with the result that aggregate demand slipped from its peak level of US$18.3 trillion in 2008 to $15.7 trillion at the beginning of 2009. Though GDP had fallen slightly over calendar year 2009—from $14.3 trillion to $14.2 trillion—by far the biggest hit to the USA’s solar plexus came simply from a slowdown in the rate of growth of debt. Though real GDP fell by a mere 2.7 percent, aggregate demand fell by a massive 14.2 percent—see Table 19.

Table 19: The actual impact of decelerating debt on aggregate demand

<table>
<thead>
<tr>
<th>Year</th>
<th>2007-08</th>
<th>2008-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real growth</td>
<td>2.3%</td>
<td>-2.7%</td>
</tr>
<tr>
<td>Inflation</td>
<td>4.3%</td>
<td>0%</td>
</tr>
<tr>
<td>Nominal GDP</td>
<td>$14.29 tn</td>
<td>$14.19 tn</td>
</tr>
<tr>
<td>Nominal Debt</td>
<td>$40.6 tn</td>
<td>$42.1 tn</td>
</tr>
<tr>
<td>Debt growth rate</td>
<td>28.1%</td>
<td>10.7%</td>
</tr>
<tr>
<td>Growth in debt</td>
<td>$4 tn</td>
<td>$1.52 tn</td>
</tr>
<tr>
<td>Nominal Aggregate Demand</td>
<td>$18.3 tn</td>
<td>$15.7 tn</td>
</tr>
<tr>
<td>Change in Nominal Demand</td>
<td>N/A</td>
<td>-$2.6 tn</td>
</tr>
<tr>
<td>Change in Nominal Demand</td>
<td>N/A</td>
<td>-14.2%</td>
</tr>
<tr>
<td>Real Aggregate Demand</td>
<td>$18.3 tn</td>
<td>$15.7 tn</td>
</tr>
<tr>
<td>Change in Real Demand</td>
<td>168</td>
<td>-14.2%</td>
</tr>
</tbody>
</table>

2008 thus brought to a close a period of literally half a century in which private debt had always been growing, and thus adding to aggregate demand. This of itself was not inherently a problem: as both Schumpeter and Minsky argued, rising debt is necessary to finance entrepreneurial activity and to enable the economy to grow. The problem for America, and most of the OECD, was that this increase in debt was rising relative to GDP—indicating that what was being funded was not good, Schumpeterian innovation, but bad Ponzi-Finance speculation. The annual increase in debt, which had hovered around 5 percent of GDP in the 1950s and 1960s, rose in a series of peaks and troughs to the 28 percent peak of 2008, from where it plunged to a maximum rate of decline of over 18 percent in early 2010—see Figure 113.

168 The change in real demand was the same as the change in nominal demand since inflation was effectively zero in 2009.
Figure 113: The change in debt collapses as the Great Recession begins

The $2.6 trillion drop in aggregate demand hit America’s asset markets hard. Though the Dow Jones rallied towards the end of the year, it closed 34 percent down—a bone-crushing decline in the apparent wealth of America’s stock-owners (see Figure 114).
Figure 114: The Dow Jones nosedives

The long bubble in the housing market—which neoclassical economists like Ben Bernanke had strenuously denied was a bubble—burst under the weight of sheer fraud involved in Subprime Lending, well before the debt bubble propelling it started to slow.\textsuperscript{169} It continued its decline relentlessly in 2008-09, with house prices falling another 19\% (in real terms) on top of the 10 percent decline from its peak in March 2006—see Figure 115.

\textsuperscript{169} The authority here is Bill Black of the University of Missouri Kansas City, who as a public servant played a major role in the enforcing the law against fraudsters in the aftermath to the Savings and Loans fiasco. See (Black 2005; Black 2005; Galbraith and Black 2009).
Figure 115: The housing bubble bursts

Unemployment rose from 4.4 percent at the beginning of 2007 to 5.5 percent at its end, and then to 7.6 percent as 2009 began. Here the hand of debt was clearly visible, for the simple reason that, since the change in debt is a major component of aggregate demand, and aggregate demand determines employment, unemployment rises if the rate of change of debt falls (and vice versa). As the level of debt has risen relative to GDP, the ebb and flow of unemployment has fallen more and more under the sway of changes in the level of private debt.

Refer to Figure 116: The correlation of debt-financed demand and unemployment

The dominance of debt has been obvious, not only in the collapse into the Great Recession, but even in the apparent recovery from it in late 2010 and early 2011 (a recover that I believe will prove temporary, and which is also exaggerated by unreliable government statistics).\textsuperscript{170} Here an apparent paradox emerges:

\textsuperscript{170} [THIS WOULD BE BETTER AS A BOX ITEM] The official definition of unemployment has been redefined numerous times, in ways that reduce the recorded number, so much so that the published levels drastically understate the actual level. The official OECD definition (see \url{http://stats.oecd.org/glossary/detail.asp?ID=2791}) requires that those recorded as unemployment must be both available for work and actively looking for work in the reference period, which excludes those who have become discouraged by the sheer unavailability of employment opportunities during a major recession, but many OECD countries have further tailored the definition to reduce the recorded numbers.
because aggregate demand is the sum of GDP plus the change in debt, the rate of change of aggregate demand can be boosted by a slowdown in the rate at which debt is falling.

The Australian government’s definition is typical here: in addition to the OECD requirements, it also records as employed people who “worked for one hour for pay, profit, commission or payment in kind in a job or business, or on a farm; or worked for one hour or more without pay in a family business or on a farm” (McLennan 1996, p. 47). To regard someone who has worked only one hour in a week as employed is simply absurd—at least 15 hours of work at the minimum wage is needed to be paid even the equivalent of unemployment benefits.

Similar distortions apply in other countries. The USA, for example, ceases counting someone as unemployed if they have been out of work for more than a year—a change in definition introduced in 1994 (see http://en.wikipedia.org/wiki/Unemployment#United_States_Bureau_of_Labor_Statistics and http://en.wikipedia.org/wiki/Current_Population_Survey#Employment_classification for more details). Abuses of statistics like this have prompted private citizens to record what official statistics ignore. The opinion polling organization Roy Morgan Research (http://www.roymorgan.com.au/) now publishes its own survey of Australian unemployment, which it puts at 7.9 percent versus the recorded figure of 5.5 percent (the not-seasonally adjusted figure as of January 2011).

Shadowstats (http://www.shadowstats.com/alternate_data/unemployment-charts), maintains an alternate measure for the USA that includes long-term discouraged workers. This is now more than twice as high as the official US measure: at the time of writing (February 2011), the official U-3 measure was 9.0%, while the Shadowstats measure was 22.2%.

This, plus changes in the structure of employment, make comparisons with past economic crises like the Great Depression very difficult. John Williams, the founder of Shadowstats, estimates that his measure of unemployment would have shown that 34% to 35% of the workforce was unemployed during the Great Depression—versus the 25% actually recorded back then, since the proportion of the population working on farms was much higher in the 1930s than now (27% then versus 2% now). The workers who were underemployed on farms—but nonetheless fed—reduced the numbers officially recorded as unemployed back then.

Given these problems, I regard the US’s U-6 measure of unemployment today—which includes those who have been unemployed for 2 years or less—as more comparable to the Great Depression figures than its U-3 measure, which omits those who have been unemployed for a year or more. On that basis, one in six Americans are out of work today, versus the peak rate of one in four during the Great Depression. The current crisis, though it is called the Great Recession, is therefore really a Depression too.
The logic here is a simple extrapolation from the observation that the level of aggregate demand is the sum of GDP plus the change in debt; given this, the change in aggregate demand is equal to the change in GDP plus the acceleration of debt. Therefore the factor that determines debt’s impact upon the rate of economic growth—and hence the change in the rate of unemployment—is not the rate of change of debt, but the rate of change of its rate of change.

Biggs, Meyer and Pick, who first made this observation, noted that it had a seemingly counter-intuitive outcome that the economy can receive a boost from credit, even if the aggregate level of debt is falling, so long as the rate of that fall decreases: “the flow of credit and GDP can increase even while the stock of credit is falling” (Biggs, Mayer et al. 2010, p. 5). They measured the impact of the acceleration of credit on changes in aggregate demand using the ratio of the acceleration of debt to GDP (which they termed “the Credit Impulse”; Biggs, Mayer et al. 2010, p. 3), and this measure clearly illustrated their apparently bizarre conclusion that the slight recovery in late 2010 was driven in large measure by a slowdown in the rate of deceleration of credit—see Figure 117.172

Figure 117: The credit impulse and change in employment

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171 When I use GDP in this context I am referring to GDP as estimated by the income measure, not the production measure.

172 The Federal Government’s fiscal stimulus also played a major role—a topic I will consider in more detail in my next book.
There are thus three factors that need to be considered to understand the impact of debt on a capitalist economy: the level of debt, the rate of change of debt, and its rate of acceleration—all measured with respect to the level of GDP.

The first factor indicates the aggregate burden that debt imposes upon society. Since the level of debt is a stock, while the level of GDP is a flow (of income per year), the ratio tells us how many years of income it would take to reduce debt to zero. Of course, a target of zero debt is neither feasible nor desirable—as explained earlier, some debt is necessary to support entrepreneurial innovation. But the ratio indicates how debt-encumbered an economy has become, and the larger it is, the longer it will take to get back to any desired lower level.

It also provides the best measure of the burden the financial sector imposes upon the economy, since the net cost of the financial sector is the level of debt (multiplied by the inflation-adjusted gap between the rate of interest on loans and that on deposits—a gap that has been relatively constant, though the nominal and real rates of interest themselves have been very volatile).

The second factor indicates how much aggregate demand is being generated by rising debt—or reduced by falling debt. When the economy is growing, so too will credit, and again this is not a bad thing when that debt finances investment. The danger arises when the rate of growth of debt becomes a substantial determinant of overall demand—as it has in the Ponzi economy the US has become. A large debt-financed contribution to aggregate demand will almost certainly have a large component of Ponzi Finance behind it, and such an increase necessarily requires a decline in debt-financed spending in the near future, which will usher in a recession.

The third factor is the best leading indicator of whether employment and the economy are likely to grow in the near future. The Credit Impulse leads both changes in GDP and changes in employment, with the lead (in the USA) being about 2 months to employment and 4 months to GDP.

Refer to Figure 118: Correlation of credit impulse and change in employment & GDP

The Credit Impulse is also the key financial source of capitalism’s inherently cyclical nature. To maintain a stable rate of employment, the rate of growth of aggregate demand has to equal the rate of growth of employment and labor productivity, which are both relatively stable. But since the rate of growth of aggregate demand depends on the rate of growth of GDP and the acceleration of debt, a stable rate of growth of aggregate demand requires a constant acceleration of debt.

The only level at which this is possible is zero. Just as maintaining a constant positive rate of acceleration while driving a car is impossible—since otherwise the car would ultimately be travelling faster than the speed of light—a constant positive
rate of acceleration of debt can’t be maintained, because this would mean that
debt would ultimately be infinitely larger than GDP. Since in the real world it is
impossible for the acceleration of debt to always be zero, the economy will
therefore necessarily have cycles driven by the expansion and contraction of
credit.

These three factors—the level of debt, its rate of change, and its
acceleration—interact in complex ways that are best explained by an analogy to
driving in which the debt to GDP ratio is like the distance back to your starting
point, its rate of change relative to GDP is like the speed of the car, and the
Credit Impulse is like the car’s acceleration or deceleration.

A low ratio of debt to GDP is like having taken a short drive—say, from Los
Angeles to Phoenix (a distance of 370 miles). It’s easy to get back to LA at any
time, and the return journey is not something one has to plan all that much for. A
high ratio is like a drive from LA to New York: it’s a huge distance (2,800 miles),
and the drive back—which corresponds to reducing the debt to GDP ratio—will
take a long time.

The rate of change of debt (with respect to GDP) is like your speed of
travel—the faster you drive, the sooner you’ll get there—but there’s a twist. On
the way out, increasing debt makes the journey more pleasant—the additional
spending increases aggregate demand—and this experience is what fooled
neo-classical economists, who ignore the role of debt in macroeconomics, into
believing that the economy was experiencing a “Great Moderation”. But rising
debt increases the distance you have to travel backwards when you want to reduce
debt, which is what the USA is now doing. So rising debt feels great on the
outward drive from LA east (increasing debt), but lousy when you want to head
home again (and reduce debt).

The Credit Impulse is like acceleration—it’s a measure of the g-forces, so to
speak, generated by either rapid acceleration or rapid deceleration. Acceleration in
the debt level felt great on the way up: they were the real source of the booms in
the Ponzi Economy that the US has become. Equally, acceleration in the opposite
direction—in effect—going backwards at an accelerating speed—is terrifying: as
the rate of decline of debt increases, the fall in aggregate demand increases and
unemployment explodes.

The interactions of the level of debt, rate of growth of debt and the Credit
Impulse are akin to those between distance, speed and acceleration as well—and
here I’ll limit my analogy to the last few years when America went from increasing
debt—the drive from LA to New York—and then abruptly changed direction
into deleveraging.

The reversal of direction necessarily involves your acceleration changing from
zero or positive to negative, and it feels dreadful: imagine the feeling of slamming
on the brakes, putting the car in reverse, and then driving backwards at an accelerating speed.

At some point however, you will reach the maximum reverse speed of the car, and at that point the terrifying feeling of driving backwards more rapidly will give way to merely the unpleasant feeling of driving backwards at high speed. If you then start driving backwards less rapidly, you will actually feel a positive acceleration—even though you are still driving backwards. However if you keep slowing down your reverse speed, then at some point you will reverse direction, and start heading back towards New York again. You can’t maintain positive acceleration indefinitely without at some point changing from a negative to a positive velocity, and thus resuming your journey towards a place that you were initially trying to leave.

We can now get a handle on why this recession has been so extreme compared to its post-WWII predecessors, and why I believe that the crisis that has many years to run.

Firstly, all three debt indicators reached levels that are unprecedented in the post-WWII period. The debt to GDP ratio, which began the post-War period at barely 50 percent, increased by a factor of six in the subsequent 5 decades to reach a peak of 298 percent of GDP in early 2009.

Secondly, while private debt itself grew at a relatively constant if volatile ten percent per annum between 1955 and 2008, the debt-financed proportion of aggregate demand rose from 5 percent in the 1950s to 28 percent in 2008.

Refer to Figure 119: Relatively constant growth in debt

This occurred because the rate of growth of nominal debt was about 3 percent higher than that of nominal GDP from 1945 till 2008. The impact of rising debt on aggregate demand therefore doubled every 23 years.173

It then plunged to minus 19 percent in early 2010—an unprecedented event in post-WWII economic history. This debt level is still falling, though the rate of fall has slowed in recent times, from a peak rate of minus 19 percent of GDP in early 2010 to minus 12 percent in September 2010 (the last date at which debt data was available at the time of writing).

Refer to Figure 120: Growing level of debt-financed demand as debt grew faster than GDP

Thirdly, the Credit Impulse averaged plus 1.2 percent from 1955 till 2008, and then hit at an unprecedented minus 27 percent in 2009 at the depths of the downturn. It is now returning towards zero—which in part reflects its inevitable

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173 A variable that is growing at 1 percent per annum will double in roughly 70 years, so a 3 percent rate of growth means that it will double roughly every 23 years.
return towards zero as deleveraging becomes entrenched. This puts far less drag on aggregate demand, but also removes the “turbo boost” that a positive Credit Impulse gave to growth in the previous half-century. The Credit Impulse will also tend to be negative while deleveraging continues, just as it tended to be positive when rising debt was boosting aggregate demand. This means the economy will have a tendency towards recessions rather than booms until the debt to GDP ratio stabilizes at some future date.

Figure 121: The biggest collapse in the Credit Impulse ever recorded

The interaction of these three factors will determine the economic future of the United States (and many other OECD nations, which are in a similar predicament).

The Credit Impulse, as the most volatile factor, will set the immediate economic environment. While it remains negative, the rate at which the USA is deleveraging accelerates, so it therefore had to rise again at some stage—as it has since mid-2009. This will accelerate aggregate demand, but it can’t lead to a sustained rise in aggregate demand without causing the debt to GDP ratio to rise.

174 It also partly reflects the impact of misguided neoclassically-inspired government policies that are trying to return to “business as usual” by encouraging private credit growth—an issue I will consider in much more detail in my next book.
That is extremely unlikely to happen, since even after the deleveraging of the last 2 years, the aggregate level of private debt is 100% of GDP higher than it was at the start of the Great Depression.

These dynamics of debt were the key cause of both the Great Moderation and the Great Recession, yet they were completely ignored by neoclassical economists because of their fallacious belief that changes in private debt have no macroeconomic effects (Bernanke 2000, p. 24). Therefore, far from making sure that “It” won’t happen again, as Bernanke asserted in 2002, by ignoring and in fact abetting the rise in private debt, neoclassical economists have allowed the conditions for another Great Depression to develop. Worse, a comparison of the today’s debt data to that from 1920-1940 shows that the debt-deflationary forces that have been unleashed in the Great Recession are far larger than those that caused the Great Depression—see Figure 122.

**Figure 122: The two great debt bubbles**
DEBT-DEFLATION THEN AND NOW

Comparing the 1920s-1940s to now—the Roaring Twenties and the Great Recession to the “Noughty Nineties” and the Great Recession—is feasible, but complicated both by differences in the economic circumstances at the time, and differences in the quality of the statistics.

A major complication is the extreme volatility in economic performance over the 1920s—no-one was writing about “the Great Moderation” back then. The decade began and ended with a Depression, and recorded output fluctuated wildly. The average increase in nominal GDP over 1921-29 was 4.5 percent, but it fluctuated wildly from -2 to +13 percent, with a standard deviation of 4.4 percent. In contrast, the Noughty Nineties recorded a higher rate of nominal growth of 5.3 percent, and this was very stable, ranging between 2.6 and 6.6 percent with a standard deviation of only 1.4 percent.

Refer to Figure 123: Change in nominal GDP growth then and now

However, as well as being a decade of stock market speculation, the 1920s also saw serious Schumpeterian investment and “creative destruction”. It was the decade of the Charleston and The Great Gatsby, but it was the decade of the production line, technological innovation in manufacturing and transportation, and the continuing transformation of American employment from agriculture to industry. The average rate of real economic growth was therefore higher in the 1920s than in the period from 1999-2009—though disentangling this from the gyrations in the price level is extremely difficult.

Refer to Figure 124: real GDP growth then and now

For example, the nominal rate of growth in 1922-23 was 13 percent, but the “real” rate was an even higher 20 percent. This impossible level reflected the simultaneous recovery from deflation of over ten percent to inflation of 3 percent, and unemployment falling—and hence output rising—from 12 percent to 2.5 percent as the economy recovered from the Depression of January 1920 to June 1921.

Refer to Figure 125: Inflation then and now

Overall, the rate of unemployment is the best means to compare the two periods, but here we run into the distortions caused by politically-motivated redefinitions of the unemployment rate since the late 1970s (see the Box Item). The U-3 measure for 1999-2009 averages 5 percent, only marginally higher than the average of 4.7 percent for 1920-1929; but the U-6 measure for 1999-2009 averages 8.8 percent, and I regard this as a fairer comparison of the two periods.

175 I expect that history will judge the period from 1997 to 2009 as one continuous Ponzi Scheme with two phases: the Internet Bubble and the Subprime Bubble. A term will be needed to describe the period, and this is my nomination for it.
The upshot of all this is that the Roaring Twenties saw more real growth than
the Noughty Nineties, and this masked the importance of debt at the time. But
categorically, the fundamental cause of both Great Depression and the Great
Recession was the bursting of a debt-financed speculative bubble that had fuelled
a false but seductive prosperity of the previous decade.

The Great Depression remains the greatest economic crisis that capitalism has
ever experienced, but on every debt metric, the forces that caused the Great
Recession are bigger. Private debt rose 50 percent over the 1920s, from $106
billion (yes, billion) in 1920 to $161 billion by 1930; it rose from $17 trillion to $42
trillion between 1999 and 2009—a 140 percent increase.

In inflation adjusted terms, the increase was very similar—a 72 percent
increase over the Roaring Twenties versus an 85 percent increase from 1999-2009.
Remarkably, the real level of debt grew at almost precisely the same rate for the
first 8 years in both periods—a rate of about 7 percent per year. This chimes with
one implication of the monetary model of capitalism I outline in the next chapter:
banks increase their profits by increasing debt, and they therefore have an
incentive to increase debt as fast as is possible. The easiest way to do this is to
fund Ponzi Schemes, which were the hallmark of both the Roaring Twenties and
the “Noughty-Nineties”.

Though the rate of growth of debt was similar, the level of debt compared to
GDP is far higher now than in the 1930s. The debt to GDP ratio was 175 percent
when the Great Depression began; it is over 100 percent higher today, and hit 298
percent before it began to reverse in 2009. The degree of deleveraging needed to
eliminate the Ponzi overhang is therefore much higher today than it was in 1930

Rising debt fuelled the Roaring Twenties, just as rising debt fuelled the false
prosperity of the Internet and Subprime Bubbles in the “Noughty Nineties”. Since
the rate of real economic growth was higher back in the 1920s than today,
the debt ratio itself remained roughly constant prior to the bursting of the Ponzi

Comparing the two periods is feasible, though changes in statistical standards
complicate matters. On the negative side, debt data from the 1920s (derived from the US
Census) is annual, whereas that data is quarterly today, so the date of changes can’t be
pinpointed as well for the 1920s-1940s as for today. On the positive, the measure of
unemployment was far less distorted back then than it is today, after all the politically
motivated massaging of definitions that has occurred since the mid-70s to understate the
level of unemployment in the OECD, and especially in the USA.
Scheme in the 1920s; however debt grew as rapidly in real terms in the 1920s as it did in the Noughties, and the collapse of debt in real terms when the crisis hit was also remarkably similar.

But from there they diverge, because the second scourge of the 1930s—deflation—has yet to occur in a sustained manner during the Great Recession. Consequently, while the real burden of debt rose during the early 1930s even as the nominal level of debt was falling, so far the Great Recession has involved falling debt in both real and nominal terms.

Refer to Figure 130: Real debt growth then and now

One possible reason for the marked difference in inflationary dynamics between the two periods is the composition of private debt. In the 1920s, the vast bulk of the debt was owed by business. Business debt was three times that of household debt, and four times that of the financial sector. Therefore, when the Roaring Twenties boom collapsed as debt-financing fell, businesses were the ones in serious financial difficulties. As Fisher surmised, individual businesses responded by cutting their markups to try to entice customers into their stores and not their competitors, leading to a general fall in the price level that actually increased the debt to GDP ratio, even as nominal debt levels fell.

Today the ranking is reversed in the insolvency stakes: the financial sector carried the highest level of debt leading into the Great Recession—virtually 125 percent of GDP, five times the level of debt it had in 1930. Households come second now, with a debt level of almost 100 percent of GDP, two and a half times the level they had in 1930. The business sector carried a modest debt level of 80 percent of GDP, when compared to its 1930s level of 110 percent—though even this is more than twice its debt level during the “Golden Age” of the 1950s and 1960s.

This composition difference may have implications for how the debt-deflationary dynamics of the Great Recession will play out. The prospects of a 1930s-style deflationary collapse are low, since businesses do not face the direct pressure of insolvency that they faced back then. However their retail customers, the consumer sector, have never been this debt-encumbered, and it is far harder for households to reduce debt than it is for businesses: to put it colloquially, businesses can get out of debt by going bankrupt, ceasing investment, and sacking the workers. Bankruptcy is far more painful for individuals than companies, it is much harder to stop consuming than it is to stop investing, and households can’t “sack the kids”.

This implies a far less severe tendency to deflation, but a more intractable one at the same time since consumer demand will remain muted while debt levels remain high.
Refer to Figure 131: Debt by sector--business debt then, household debt now

Finally, though the Roaring Twenties became a reference period for frivolous speculation in popular culture, they have nothing on the Noughty Nineties. Debt-financed spending never exceeded ten percent of GDP in the 1920s. In the Noughties, it rarely fell below 20 percent of GDP. The popular culture of the 21st century may ignore the Roaring Twenties and see the Noughty Nineties as the hallmark of delusional economic behavior.

Given this much higher level of debt-financed speculation, the plunge into negative territory was far faster in 2008-09 than it was in 1929-21—but the reversal of direction has also been far more sudden. The change in debt went from adding 28 percent of GDP to aggregate demand in 2008 to subtracting 19 percent from it in 2010, but the rate of decline turned around merely a year after the crisis began, compared to the three years that elapsed before the debt-financed contribution started to rise from the depths in the 1930s (a large part of this may be the product of the huge intervention by both the Federal Government and the Federal Reserve).

Figure 132: The collapse of debt-financed demand then and now

The Credit Impulse was also far more dramatic in the Noughties than in the Twenties: it was higher during the boom, and plunged far more rapidly and deeply
during the slump. The Credit Impulse took 4 years to go from its positive peak of 2.5 percent before the Great Depression to -16 percent in 1931. It began from the much higher level of 5 percent in late 2007 and fell to a staggering -26 percent in late 2009—a plunge of over 30 percent in just 2 years versus an 18 percent fall over 4 years in the Great Recession.

Refer to Figure 133: The Credit Impulse then and now

The collapse in debt-financed aggregate demand was the key factor behind both the Great Depression and the Great Recession. Though debt-financed demand played less of a role in the 1920s than it did in the Noughties, the collapse in the Great Depression was as deep as today’s, and far more prolonged, which caused unemployment to hit the unprecedented level of 25 percent in 1932. When the Credit Impulse finally rose again in 1933, so did employment, and unemployment fell to just over 11 percent in mid-1937—leading to hopes that the Depression was finally over.

However debt-financed demand turned negative once again in 1938, and unemployment rose with it to 20 percent. Only with the onset of the War with Japan did unemployment fall back to the average experienced during the 1920s.

Refer to Figure 134: Debt financed demand and unemployment 1920-1940

The same pattern has played out during the Great Moderation and Great Recession. When debt-financed demand collapsed, unemployment exploded to 10 percent on the U-3 measure, and 17 percent on the more comparable U-6 measure. Just as significantly, the unemployment rate stabilized when the decline in debt-financed demand turned around. Though the huge fiscal and monetary stimulus packages also played a role, changes in debt-financed demand dominate economic performance.

One statistical indicator of the importance of debt dynamics in causing both the Great Depression and the Great Recession and the booms that preceded them is the correlation coefficient between changes in debt and the level of unemployment. Over the whole period from 1921 till 1940, the correlation coefficient was minus 0.83, while over the period from 1990 till 2011, it was minus 0.91 (versus the maximum value it could have taken of minus one). A correlation of that scale, over time periods of that length, when economic circumstances varied from bust to boom and back again, is staggering.

Refer to Figure 135: Debt financed demand and unemployment 1990-2011

The Credit Impulse confirms the dominant role of private debt. The correlation between the Credit Impulse and the rate of change of unemployment was minus 0.53 in 1922-1940, and minus 0.75 between 1990 and 2011.
Changes in the rate of change of credit also lead changes in unemployment. When the Credit Impulse is lagged by 4 months, the correlation rises to minus 0.85.

**Refer to Figure 138: The Credit impulse leads change in unemployment**

This correlation is, if anything, even more staggering than that between debt-financed demand and the level of unemployment. The correlation between change in unemployment and the Credit Impulse is one between a rate of change and the rate of change of a rate of change. There are so many other factors buffeting the economy in addition to debt that finding any correlation between a first order and second order effect is remarkable, let alone one so large, and spanning such different economic circumstances—from the recession of the early 1990s, through the “Great Moderation”, into the Great Recession and even the apparent beginnings of a recovery from it.

**FIGHTING THE GREAT RECESSION**

The global economy won’t return to sustained growth until debt levels are substantially reduced. With debt at its current levels, the general tendency of the private sector will be to de-lever, so that the change in credit will deduct from economic growth rather than contributing to it. Any short-term boost to demand from the Credit Impulse—such as that occurring in early 2011—will ultimately dissipate, since if it were sustained then ultimately debt levels would have to rise again. Since the household sector in particular is debt-saturated, credit growth will hit a debt ceiling and give way to deleveraging again. The US economy in particular is likely to be trapped in a never-ending sequence of “double-dips”, just as Japan has been for the last two decades.

There is a simple, but confrontational way to stop this process: a unilateral write-off of debt.

This policy—which occurred regularly in ancient societies, where it was known as a Jubilee (Hudson 2000, p. 347)—goes strongly against the grain of a modern capitalist society, where paying your debts is seen as a social obligation. But the ancient and biblical practice addressed a weakness in those societies—the tendency for debtors to become hopelessly indebted given the enormous interest rates that were common then:

Mesopotamian economic thought c. 2000 BC rested on a more realistic mathematical foundation than does today's
orthodoxy. At least the Babylonians appear to have recognized that over time the debt overhead came to exceed the ability to pay, culminating in a concentration of property ownership in the hands of creditors. While debts grew exponentially, the economy grew less rapidly. The earning capacity of Babylonian rural producers hardly could be reconciled with creditor claims mounting up at the typical 33.333 percent rate of interest for agricultural loans, or even at the commercial 20 percent rate. Such charges were unsustainable for economies as a whole. (Hudson 2000, p. 348)

It would be foolish to deny that we have a similar weakness in modern capitalist society: our tendency to be sucked into Ponzi Schemes by a banking sector that profits from rising debt.

As I explain in the next chapter, when lending is undertaken for investment or consumption, debt tends not to get out of hand. But when borrowing is undertaken to speculate on asset prices, debt tends to grow more rapidly than income. This growth causes a false boom while it is happening, but results in a collapse once debt growth terminates—as it has done now.

Though borrowers can be blamed for having euphoric expectations of unsustainable capital gains, in reality the real blame for Ponzi Schemes lies with their financiers—the banks and the finance sector in general—rather than the borrowers. That was blindingly obvious during the Subprime Bubble in the USA, where many firms willfully wrote loans that they knew—or should have known—that borrowers could not repay them.

Such loans should not be honored. But that is what we are doing now, by maintaining the debt and expecting that debtors should repay debts that should never have been issued in the first place.

The consequences of our current behavior are twofold. Firstly, the economy will be encumbered by a debt burden that should never have been generated, and will limp along for a decade or more as has Japan. Secondly, the financial sector will continue to believe that “the Greenspan Put” will absolve them from the consequences of irresponsible lending.

A Debt Jubilee would address both those consequences. Firstly, debt repayments that are hobbling consumer spending and industrial investment would be abolished; secondly, this would impose the pain of bankruptcy and capital loss on the financial sector—a pain it has avoided in general thus far through all the rescues since Greenspan’s first back in 1987.

Needless to say, this would not be an easy policy to implement.

Its biggest hurdle would be political: it is obvious that the major political force in the USA today—and much of the OECD—is the financial sector itself. Since widespread debt abolition would bankrupt much of this sector, and eliminate
individual fortunes (those that have not already been salted away), it will be opposed ferociously by that sector.

The same was the case—though on a smaller scale than today—during the Great Depression. It took a Ferdinand Pecora (Perino 2010) to turn the tide against the bankers then, and a Franklin Roosevelt (Roosevelt 1933) to convert that tide into political power—and policies that included debt moratoria.

The recent Financial Crisis Inquiry Commission (Financial Crisis Inquiry Commission 2011) was a farce compared to Pecora’s work, and Obama’s Administration to date has focused more on returning the financial sector to its old ways than on bringing it to account.

The policy would also need to re-establish the practice of banking providing working capital and investment funds for industrial capitalism. This should be the primary role of banking, but it virtually died out as the financial sector became more and more an engine for speculation, so that most companies today raise their funds on the commercial paper market. A Debt Jubilee would bankrupt many banks, and put them into receivership; though painful, the receivers could also be required to re-establish this key but neglected banking practice.

It would also be necessary to compensate to some extent those not in debt as well—though they would also benefit from the sudden increase in spending power that such a policy would cause.

Such a policy would have to be accompanied by institutional reforms to finance that prevented a travesty like the Subprime Bubble from recurring; I discuss some possible reforms at the end of Chapter 14. It would also be far from a panacea for America’s woes on its own, since it would also expose the extent to which the gutting of American industry in the last three decades has been disguised by the growth of the financial sector on the back of the Ponzi Schemes of the stock and housing markets. The finance sector would shrink dramatically, and unlike the 1930s, there would not be potential factory jobs awaiting unemployed financial advisors.

A Debt Jubilee, and the reforms I suggest in Chapter 14, are politically improbable now. But the alternative I believe is a decade or more of economic stagnation. At some stage we are going to have to accept the wisdom in Michael Hudson’s simple phrase that “Debts that can’t be repaid, won’t be repaid”.

**CONCLUSION**

The data on debt confirms the conclusions that can be reached from assessing the logical coherence—or lack of it—in neoclassical theory: every methodological

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177 This is why the bankruptcy of Lehman Brothers was so disastrous: they had largely cornered the market for commercial paper, and when they went bankrupt this market collapsed—meaning that many ordinary firms could not pay their workers or suppliers.

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choice neoclassical economics made was wrong. The belief that economics can be reduced to microeconomics is false; money and credit cannot be ignored, capitalism cannot be modeled as a single “representative agent”, finance destabilizes the economy, and the economy is permanently in disequilibrium.

If we are to develop an economics that is relevant to capitalism, then it must be a strictly monetary, dynamic theory in which finance plays a fundamentally destabilizing role. In the next chapter, I show how such an economic theory can be developed, by building on the work of both the great non-neoclassical economists and recent empirical work by economists from the “Post Keynesian” school of thought.
14. A Monetary Model of Capitalism

Many of the foundations on which neoclassical macroeconomics is built arose from persevering with methodological choices that the 19th century Founding Fathers of Neoclassicism made out of expediency rather than preference. They assumed that all economic processes occurred in equilibrium, so that they could model the economy using comparative statics rather than using more difficult dynamic differential equations; they avoided thinking about money and modeled the simpler process of barter instead; they ignored uncertainty about the future and, as Keynes put it, tried to “deal with the present by abstracting from the fact that we know very little about the future” (Keynes 1937, p. 215) and so on.

Though these choices made it easy to concoct simple parables about supply and demand, they actually made mathematical modeling of the economy harder, not easier. The absurdities that later neoclassicals added—from fallacy of the horizontal demand curve to the intellectual travesty of the “Representative Agent”—were products of clinging to these simple parables, despite the deep research that contradicted them.

Economists trained on these methods are now scrambling to make ad hoc modifications to the core neoclassical parable to produce hybrid models that mimic the real world phenomenon of the Great Recession—which, according to the parables, cannot occur. Though such models will superficially ape reality, they will do so for the reasons that Solow gave, that the addition of various “imperfections” results in a model that “sounds better and fits the data better” simply because “these imperfections were chosen by intelligent economists to make the models work better...” (Solow 2001, p. 26).

This is the difficult road to relevance—take a theoretical framework in which the real world phenomenon you are trying to describe cannot happen, and tinker with it until something resembling reality emerges. It will not last. Once the global economy emerges from this crisis, if this approach still dominates economics, then within decades these “imperfections” will go the way of the Dodo. Economists will return to the core parable, and the crisis we are now in will be seen as the result of bad Federal Reserve policy, rather than a manifestation of

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178 I discuss one instance of this—Krugman’s attempt to build a model of debt-deflation—at the end of this chapter (Eggertsson and Krugman 2010).

179 The nominated policy failing this time would probably be the alleged deviation from the Taylor Rule after 2001—the case Taylor himself is already making.
capitalism’s innate instability—amplified by a finance sector that is almost designed to generate Ponzi Schemes.

We have to do better than that. We have to start with foundations from which the phenomena of reality emerge naturally by constructing monetary models of capitalism built on the melded visions of Marx, Schumpeter, Keynes and Minsky.

**METHODOLOGICAL PRECEPTS**

An essential first step towards a meaningful macroeconomics is to acknowledge the one profound lesson from the failure of the neoclassical experiment: that Strong Reductionism is a fallacy. Macroeconomic phenomena—and even phenomena within one market—are emergent properties of the dynamic, disequilibrium interactions of individuals and social groups in a rich institutional environment, constrained by the physical, temporal and environmental realities of production. These phenomena will not be predictable from the behavior of isolated individuals. Instead, macroeconomics is a self-contained field of analysis, and it must be reconstructed as such. The Reductionist route must be abandoned.

There are basically two routes by which models of a new “Emergent Phenomena” macroeconomics could be built: the “bottoms-up” approach that has always dominated economics, but modified in the light of the modern knowledge of Complex Systems; or the “tops down” approach that typified the work of Marx, Schumpeter, Keynes and Minsky, in which the economy is described at the level of aggregates—evolutionary change, social classes, aggregate production, aggregate debt levels and so on.

The former approach takes the macroeconomic phenomena as given, and attempts to build computer-based multi-agent models in which those macroeconomic phenomena arise as emergent properties of the models. The latter works at the level of aggregates, and puts the verbal models of the great non-neoclassical thinkers into the form of dynamic equations.

Most economists who are trying to build macroeconomic models that transcend the neoclassical dead-end are taking the former approach (Barr, Tassier et al. 2008; Seppecher 2010).180 This approach is worthwhile, though there are inherent difficulties in it that I discuss briefly later. I have taken the latter approach of trying to put the Marx-Schumpeter-Keynes-Minsky vision directly into mathematical form.

Doing this turned out to be far easier to do than I expected, once I made money the starting point of my analysis of capitalism.

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ENDOGENOUS MONEY

One of the many issues on which Keynes failed to convince his fellow economists was the importance of money in modeling the economy. One reason for this was that money’s explicit role in the *General Theory* itself was restricted largely to the impact of expectations about an uncertain future, and the difference between real and nominal wages. Keynes acknowledged that money did not feature heavily in his technical analysis, and that he saw a substantial continuity between monetary analysis and the Marshallian model of supply and demand:

> whilst it is found that money enters into the economic scheme in an essential and peculiar manner, technical monetary detail falls into the background. A monetary economy, we shall find, is essentially one in which changing views about the future are capable of influencing the quantity of employment and not merely its direction. But our method of analyzing the economic behavior of the present under the influence of changing ideas about the future is one which depends on the interaction of supply and demand, and is in this way linked up with our fundamental theory of value. We are thus led to a more general theory, which includes the classical theory with which we are familiar, as a special case. (Keynes 1936, pp. xxii-xxiii; emphases added)

It is therefore difficult to attack neoclassical “supply and demand” oriented models of money as misrepresentations of Keynes. Nonetheless, the Post Keynesian school of thought has made the fundamental importance of money a by-word of its analysis. An essential aspect of this has been the empirically-based analysis of how money is created (detailed in the previous chapter) which contradicts the conventional fractional reserve banking, “money multiplier” model of money formation.

Having empirically eliminated one model of money creation, another was needed—but the initial attempts to do so were clumsy. Rather than the “vertical money supply curve” of Hicks’s IS-LM model, some Post Keynesian economists proposed a “horizontal money supply curve” in which banks simply passively supplied whatever quantity of credit money that firms wanted, at the prevailing interest rate. This model, known as “Horizontalism” (Moore 1988), led to a lengthy dispute within Post Keynesian economics over whether the money supply curve was horizontal, or sloped upwards (Dow 1997).

This dispute put the empirically accurate findings of Post Keynesian researchers into the same methodological straitjacket that neoclassical economics itself employed: the equilibrium analysis of intersecting supply and demand curves. Though this was hardly the intention of the originators of endogenous money analysis, it effectively made monetary analysis an extension of supply and demand analysis.
Participants in this debate were aware of the limitations of this approach—as Sheila Dow observed, “[T]he limitations of a diagrammatic representation of a non-deterministic organic process become very clear. This framework is being offered here as an aid to thought, but it can only cope with one phase of the process, not with the feedbacks” (Dow 1997, p. 74). But one of the great ironies of economics is that, because critics of neoclassical economics were themselves trained by neoclassical economists, most critics weren’t trained in suitable alternative modeling methods, like differential equations or multi-agent simulation.

For real analytic progress to be made, a watertight basis for Keynes’s assertion that money “enters into the economic scheme in an essential and peculiar manner” was required, as well as a methodological approach that captured the feedback effects that diagrams and equilibrium analysis could not.

The former was supplied by the “Monetary Circuit” school in Europe, and specifically the Italian economist Augusto Graziani. Graziani argued that, if money is treated as just another commodity subject to the “laws” of supply and demand, then the economy is effectively still a barter system: all that has happened is that one more commodity has been added to the mix, or singled out as the commodity through which all barter must occur. This is quantitative change, not qualitative, and yet something qualitative must change if a monetary economy is to be distinguished from a barter system.

Graziani’s brilliant insight was that, for a monetary economy to be clearly distinguished from a barter economy, the monetary economy could not use a commodity as money. Therefore money had to be a non-commodity—something that was intrinsically worthless, and which could not be simply produced as commodities themselves can:

a commodity money is by definition a kind of money that any producer can produce for himself. But an economy using as money a commodity coming out of a regular process of production, cannot be distinguished from a barter economy. (Graziani 1989, p. 3)

This then led to a simple but profound principle:

A true monetary economy must therefore be using a token money, which is nowadays a paper currency. (Graziani 1989: 3)

The fact that a monetary economy uses a token—something that is intrinsically worthless—as a means of exchange implies two further key conditions ‘In order for money to exist’:

b) money has to be accepted as a means of final settlement of the transaction (otherwise it would be credit and not money);
c) money must not grant privileges of seigniorage to any agent making a payment. (Graziani 1989: 3)

From this he derived the insight that “any monetary payment must therefore be a triangular transaction, involving at least three agents, the payer, the payee, and the bank”:

The only way to satisfy those three conditions is to have payments made by means of promises of a third agent, the typical third agent being nowadays a bank... Once the payment is made, no debt and credit relationships are left between the two agents. But one of them is now a creditor of the bank, while the second is a debtor of the same bank. (Graziani 1989: 3; all emphases in original)

This perspective clearly delineates a monetary vision of capitalism from the neoclassical barter paradigm. As shown in Figure 139, in the neoclassical world, transactions are two sided, two commodity, barter exchanges: person \( A \) gives person \( B \) one unit of commodity \( X \) in return for some number of units of commodity \( Y \). Calling one of these ‘the money commodity’ does not alter the essentially barter personality of the transaction.

But in our monetary world, transactions are three-sided, single commodity, financial exchanges, as portrayed in Figure 140: person \( B \) instructs bank \( Z \) to debit

![Figure 139: The neoclassical model of exchange as barter](image)
Y units of currency from B’s account, and credit A’s account with the same amount, in return for which person A gives person B one unit of commodity X.

Figure 140: The nature of exchange in the real world

Banks are thus an essential component of capitalism, and are inherently different to industrial firms. Firms produce goods (and services) for sale by combining labor and other commodities in a production process that takes both time and effort. Banks generate and honor promises to pay that are used by third parties to facilitate the sale of goods.\(^\text{181}\) Therefore firms and banks must be clearly distinguished in any model of capitalism:

\[\text{Since in a monetary economy money payments necessarily go through a third agent, the third agent being one that specializes in the activity of producing means of payment (in modern times a bank), banks and firms must be considered as two distinct kinds of agents... In any model of a monetary economy, banks and firms cannot be aggregated into one single sector. (Graziani 1989: 4; emphasis in original)}\]

This simple but profound perspective on what is the essence of a monetary capitalist economy yielded two essential requirements for a model of capitalism:

\[^{181}\text{And they incur essentially no costs in doing so—the cost of “producing” a dollar is much less than a dollar. This is the source of Graziani’s third stricture that the system can’t enable banks to exploit this opportunity for seigniorage.}\]
• All transactions involve transfer of funds between bank accounts;
• The minimum number of classes\(^{182}\) in a model of capitalism is three: capitalists, workers and bankers.

It also implied that the best structure for modeling the financial side of capitalism is a double-entry system of bank accounts. This led me to develop a means to derive dynamic monetary models of capitalism from a system of double-entry book-keeping accounts (Keen 2008; Keen 2009; Keen 2010; Keen 2011), and a remarkable amount of the Marx-Schumpeter-Keynes-Minsky perspective on capitalism arose naturally out of this approach.

I’ll outline the simplest possible version of this model before expanding it to provide a monetary version of the Minsky model outlined in Chapter 13.

**A “PURE CREDIT” ECONOMY**

Our modern monetary economy is a system of such complexity that it makes the outrageous contraptions of Rube Goldberg, Heath Robinson and Bruce Petty appear trite by comparison: the Bank of International Settlements, Central Banks, commercial banks; merchant banks, hedge funds, superannuation funds, building societies; fiat money, credit money, multiple measures of money (Base Money, M0, M1, M2, M3, Broad Money); Reserve Ratios, Taylor Rules, Basel Rules…

Many of these components were instituted to try to control bank lending after the catastrophe of the Great Depression; many others were responses by the financial system to evade the intentions of these controls. To my cynical eye, the evasive maneuvers of the financial system have been far more effective than the regulatory structures themselves, and in essence our financial system approximates the behavior of the almost completely unregulated private banks of the “Free Banking” period in the 19th century.

**Refer to Figure 141: A 19th century private bank note**

For that reason, my base monetary model is a pure credit economy with no government or central bank, in which the private bank prints its own paper notes, and where transactions involve transferring paper notes from the accounts of the buyers to that of the sellers. There are 3 classes—workers, capitalists and

\(^{182}\) Economists normally say “agents” here rather than classes—given the microeconomic focus of neoclassical modeling, and the pejorative association that class was given by 19th century politics. I use the term classes because social classes are an objective reality in capitalism, and because the SMD conditions, which, as Alan Kirman, put it, suggest that “If we are to progress further we may well be forced to theorise in terms of groups who have collectively coherent behaviour… Thus demand and expenditure functions if they are to be set against reality must be defined at some reasonably high level of aggregation. The idea that we should start at the level of the isolated individual is one which we may well have to abandon.” (Kirman 1989, p. 138)
bankers—and, in the simplest possible model with no Ponzi Lending behavior, firms are the only borrowers, and they borrow in order to be able pay the wages needed to hire workers.

Five accounts are needed to describe the basic monetary flows in this system:

1. A Vault, in which the bank stores its notes prior to lending;
2. A “Bank Safe”, into and out of which interest payments are made;
3. Deposit Accounts for firms, into which money lent by the banks is put and through which all the firm sector’s transactions occur;
4. Deposit Accounts for workers, into which their wages are paid; and
5. A Loan Register, which is not an account as such, but a ledger that records the amounts that have been lent by the banks to firms, and on which loan interest is charged.

The basic monetary operations that occur in this simple model are:

1. The banking sector makes loans to the firm sector;
2. The banks charges interest on outstanding loans;
3. Firms pay the interest;
4. Firms hire workers;
5. Workers and bankers consume the output of the firms; and
6. Firms repay their loans

These operations are shown in Table 20, which (based on the standard accounting practice of showing “Assets minus Liabilities equals Equity”) shows the economy from the point of view of the banks, with the banking sector’s assets on the left hand side of the ledger and its liabilities and residual equity on the right hand side.

Actual transfers of money are shown in normal text, while operations that are not money transfers but accounting operations—such as the bank recording that interest due on loans has been paid—are shown in italics.

Table 20: A pure credit economy with paper money

<table>
<thead>
<tr>
<th>Operation</th>
<th>Bank Assets</th>
<th>Bank Liabilities plus Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lend Money</td>
<td>Vault</td>
<td>Loan Ledger</td>
</tr>
<tr>
<td></td>
<td>+ Lend Money</td>
<td>+ Lend Money</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liabilities (Deposits)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Firms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Equity</td>
</tr>
</tbody>
</table>

To register as a bank, and therefore to be able to print its own notes, “Free Banking” banks still had to meet various regulatory requirements, and normally also purchase state government bonds of an equivalent value to their initial printing of notes. In what follows, I’m taking these operations as given, and focusing just on the banking operations that followed incorporation.

My thanks to Peter Humphreys from the School of Accounting at UWS for advice on how to lay out this table in accordance with standard banking practice.
Since all the entries in this table indicate flows into and out of accounts (or additions and subtractions from the loan ledger), a remarkable thing is possible: a dynamic model of this monetary model can be derived just by “adding up” the entries in the columns, as in Table 21.

**Table 21: The dynamics of a pure credit economy with no growth**

<table>
<thead>
<tr>
<th>Rate of change of…</th>
<th>Equals…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vault</td>
<td>- Lend Money + Repay Loans</td>
</tr>
<tr>
<td>Loan Ledger</td>
<td>+ Loan Money – Repay Loans</td>
</tr>
<tr>
<td>Firm Deposits</td>
<td>+ Loan Money – Charge Interest + Deposit Interest – Wages + Bankers Consumption + Workers Consumption – Repay Loans</td>
</tr>
<tr>
<td>Worker Deposits</td>
<td>+ Wages – Workers Consumption</td>
</tr>
<tr>
<td>Safe</td>
<td>+ Charge Interest – Deposit Interest – Bankers Consumption</td>
</tr>
</tbody>
</table>

This model can be simulated if we put values on these flows. Some of these are obvious: the interest charged, for example, will equal the rate of interest on loans times the amount currently recorded on the Loan Ledger; interest paid is the rate of interest on deposits times the amount currently in the firms’ deposit accounts.\(^{185}\)

Others—lending from the Vault, payment of wages, consumption by workers and bankers and loan repayment—will in the real world depend on a whole host of factors, but to model the simplest possible system, I relate them here to the

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\(^{185}\) I have ignored interest on workers’ deposit accounts simply to make the table less cluttered. They are included in my more technical description of this model in the paper “Solving the Paradox of Monetary Profits” (Keen 2010), which is downloadable from [http://www.economics-ejournal.org/economics/journalarticles/2010-31](http://www.economics-ejournal.org/economics/journalarticles/2010-31).
balances in these other accounts, and use constants rather than variables simply to see whether the model is viable: obviously, if it's impossible to find a set of constants that makes this model viable, then no set of variables is likely to do it either.

Thus lending from the Vault is modeled at occurring at some constant rate times the amount of money in the Vault; the flow of Wages is some constant times the balance in firms’ deposit accounts; workers’ and bankers’ consumption depend on the balances in the workers deposit accounts and the Safe respectively; while the flow of loan repayments is some constant times the amount of loans outstanding.

The constants (known as “time constants” in dynamic modeling)\textsuperscript{186} used tell us how many times in a year the given account will turnover—so a value of \( \frac{1}{2} \), for example, indicates that the balance in the relevant account will be turned over every 2 years. One obvious value here is that for workers’ consumption: since workers wages are paid on a weekly basis, and most of workers’ incomes are expended on consumption, the constant for Workers Consumption will be 26—indicating that the balance in the workers accounts turns over 26 times a year. For the sake of illustration, I use \( \frac{1}{2} \) for lending money (so that the Vault turns over every 2 years), 3 for wages, 1 for bankers’ consumption, 26 for workers’ consumption, 1/10 for loan repayment, and I set the rate of interest on loans to 5\% and the rate of interest on deposits to 2\%.

If the model starts with $100 million initially in the Vault and no money in any other account, then after ten years, the amount in the Vault falls to 16.9 million, with $83.1 million in outstanding Loans, $2.7 million in the Safe, $72.1 million in Firm deposit accounts, and $8.3 million in the Workers’ deposit accounts—see Figure 142.\textsuperscript{187} It is also possible to calculate the annual wages bill and bank earnings. The annual wages bill is the time constant for wage payments times the balance in the firms’ deposit account, which is 3 times $72.1 million or $216.3 million, while bank gross earnings are the rate of interest on loans times the outstanding loan balance (5\% times $83.1 million or $4.16 million) minus the rate of interest on deposits times the firms’ deposit balance (2\% times $72 million or $1.44 million), for a net bankers’ income of $2.7 million per annum.

\textsuperscript{186} See http://en.wikipedia.org/wiki/Time_constant for an exposition. These are normally expressed as fractions of a year—so that the assumption that workers turn their accounts over 26 times a year means that the time constant for workers’ consumption is \( \frac{1}{26} \)—but to simplify the exposition I’m expressing them in times per year instead.

\textsuperscript{187} This point was disputed by early Circuitist literature, but this was an error of logic due to a confusion of stocks with flows (for a detailed exposition on this point, see Keen 2010, pp. 10-12).
Figure 142: Bank accounts

Capitalists’ income isn’t as obvious in this simple model, and to explain it properly will require incorporating production and pricing as well. But we can imply what profits are by realizing that net annual income in this simple model
equals the sum of wages plus profits—the income of bankers cancel out and adds nothing to aggregate income (see Table 22).

### Table 22: Net incomes

<table>
<thead>
<tr>
<th>Class</th>
<th>Net Income components</th>
<th>Amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers</td>
<td>Wages</td>
<td>216.3</td>
</tr>
<tr>
<td>Capitalists</td>
<td>Profits minus Loan Interest plus Deposit Interest</td>
<td>72.1 – 4.16 +1.44</td>
</tr>
<tr>
<td>Bankers</td>
<td>Loan Interest minus Deposit Interest</td>
<td>4.16 – 1.44</td>
</tr>
<tr>
<td>Total Income</td>
<td>Wages plus Profits</td>
<td>288.4</td>
</tr>
</tbody>
</table>

Since wages represent part of the net surplus generated in production, profits must represent the remainder. If workers wages represent, say, 75% of net income, then profits represent 25%—so in this numerical example they equal $72.1 million.\(^{188}\)

Annual income in this example is thus $288.4 million—almost 3 times the amount of money in the model, and precisely 4 times the amount of money in Firms’ deposit accounts. How can this be? Marx’s insight into why Say’s Law is invalid in a capitalist economy holds the key. Remember that Say’s Law holds under simple commodity production \((Commodity \rightarrow Money \rightarrow Commodity)\), but not in capitalism, because that also has the circuit \(Money \rightarrow Commodity \rightarrow More Money\)? Marx also pointed out that this “Circuit of Capital” takes time: it involves getting money in the first place, using it to hire workers and buy inputs, combine them in a production process, ship the finished goods and finally sell them to customers. There is thus a time lag between outlaying \(M\) and earning \(M^+\), which Marx called this the “period of turnover”. This can be significantly shorter than a year, though it’s highly unlikely to be as short as the example Marx himself gave:

> “Let the period of turnover be 5 weeks, the working period 4 weeks... In a year of 50 weeks ... Capital I of £2,000, constantly employed in the working period, is therefore turned over 12½ times, 12½ times 2,000 makes £25,000” \((Marx and Engels 1885, Chapter 16: The Turnover of Variable Capital)\).

Expressed as a fraction of a year, Marx’s example gives a value of 1/12.5 for the period of turnover—and in general the smaller the number, the faster a given amount of money turns over, and the more profit (and wages) that can be generated. Marx’s numerical example was extreme, but the basic insight is correct that a given sum of money can finance several times as much turnover in a given year.

\(^{188}\) It is just a coincidence that this equals the equilibrium amount in the Firms Deposit accounts—a different wage/profit share would return a different profit level.
The period of turnover can also be derived for our example, using the facts that the value of the time constant for wages is 3, and 75% of national income goes to workers as wages. Total income—wages plus profits—is thus 4 times the amount of money in the Firms’ deposit accounts. The turnover period is therefore one year divided by 4: it takes 3 months, in this toy economy, to go from M to M+.

Though the turnover period is an unfamiliar concept, it’s related to the well-known if less-well-defined concept of the velocity of money. The turnover period tells us how often the money in Firms’ Deposit Accounts turns over; the velocity of money in this model is the value of wages plus profits (GDP, which is $288.4 million in this example) divided by either the total money supply ($100 million) or the money in active circulation, which is the sum of the amounts in the Deposit accounts plus the Safe ($83.1 million). Measured the former way, the velocity of money is 2.88; measured the latter way, it’s 3.47.

This is an incredibly simple system, but even at this point it can give us some insights into why Bernanke’s QE1 was far less effective than he had hoped—and why it would have been far more effective if the money had been given to the debtors rather than to the banks.

A CREDIT CRUNCH

The crisis of 2007 was not merely a credit crunch (where the problem is liquidity) but the end point in process of Ponzi Lending that made much of the US economy insolvent. However the credit-crunch aspect of this crisis can be simulated in this model by halving the rate at which the Bank lends from the Vault, and doubling the speed at which firms try to repay their debts. The time constant for bank lending therefore drops from ½ to ¼—so that the amount in the Vault turns over every 4 years rather than every two—while that for repaying debts goes from 1/10 to 1/5—so that loans are repaid every 5 years rather than every 10.

The credit crunch has a drastic impact upon both bank account balances and incomes. The level of loans drops from over $83 million to under $56 million, while the amount in the Vault—and therefore inactive—rises from $16.9 million to $44.1 million.

Refer to Figure 143: A credit crunch

All incomes drop substantially as well: wages drop from $216 million to $145 million per year, profits drop from $72 million to $48.5 million, and bank income drops from $2.7 million to $1.8 million—a 32.8% drop.

Now let’s consider what would happen if an injection of $10 million was made one year after the crunch began, into either the Vault, or into the Deposit accounts of the Firms. The former approximates what Bernanke did in his attempt to exploit the mythical “Money Multiplier”, the latter approximates what
might have happened if the bailout had gone to debtors rather than to the banks—and this is also very similar to what was in fact done in Australia, where the Rudd Government effectively gave every Australian with a pulse $1,000 to spend.189

The results are intriguing, complex even though the model itself is simple, and the reverse of what Obama was told would happen by his neoclassical advisors.

**WHOSE BAILOUT WORKS BEST?**

The Bank bailout injects $10 million into the Vault over a one year period; the Firm and Worker bailouts inject the same amount of money over the same period of time into the deposit accounts of the firms or workers.

If you believed that the most important thing was to get lending going again after a credit crunch, then the Bank bailout wins hands down: neither the Firm nor the Worker bailouts affect the level of loans at all, which remain on the depressed Credit Crunch trajectory, while the Bank bailout leads to loans falling less steeply, so that ten years after the Crunch, they are $5.5 million higher than they would have been without the bailout.

Refer to Figure 144: A Bank Bailout’s impact on loans

However, if you believed that the most important thing was to restore economic activity, then the Bank bailout is the least effective way to do this!

Profits and wages do rise because of the Bank bailout, but the rise in income is far greater when the Firms or Workers receive the bailout than when the Banks do.190 The increase in incomes is immediate and large in the case of the Firms’ bailout, versus gradual and modest for the Bank bailout.

Refer to Figure 145: A Bank Bailout’s impact on incomes

The only people that do better if the Bailout goes to the Bankers … are the Bankers. Not only do they do better under their Bailout than if nothing is done, they do worse if the Bailout goes to Firms or Workers than if there is no bailout at all! The reason is that the Firm (or Worker) bailout increases the deposit accounts of the Banks while leaving their Loans unaffected. Their payment of interest to the rest of the economy therefore increases, while their receipts of interest payments remain the same.

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189 A cash handout of $960 was sent to every Australian over 18 who had a tax return for the previous year.

190 There is only a transient difference between the Firm and Worker bailouts on this front, while the Bailout it being made. Workers’ consumption is higher for the duration of the Bailout if they receive the money—since they spend almost all of what they receive—but their incomes are slightly lower than when the firms get the Bailout.
Refer to Figure 146: A Bank Bailout's impact on Bank income

This is a very basic and incomplete model, and much more needs to be added to it before any definitive implications could be drawn about the impact of a government bailout during a credit crunch.\(^{191}\) But the differences between this simple dynamic model, and the even simpler but false money multiplier model that lay behind Obama's decision to bail out the banks rather than the public, tempts me to write what Obama could have said, if his advisers were not neoclassical economists:

And although the banks have argued that government money would be more effective if it were given to them to lend, rather than going directly to families and businesses—"where's our bailout?" they ask—the truth is that an additional dollar of capital in a bank will dribble out slowly through the choked arteries of our sclerotic financial system, while that same dollar, if given to families and businesses, will enter circulation rapidly, a process that will cause a faster pace of economic growth.

But that's enough of fantasy. Let's bring this model up to date in terms of how money is created endogenously today, and extend it to include production, prices and growth.

**A Modern Credit Crunch**

The model we've just considered has a fixed amount of money in it, and since it's a paper-money system, the banks would need to print more notes if they wanted to expand the money supply. However, the majority of banking transactions have always involved the buyer writing a check drawn on an account in a bank, rather than handing over paper notes in return for goods—and today's innovation of electronic transfer banking has taken this one step further. The fact that these promises by banks to pay are accepted as money in their own right is what makes it possible for banks to expand the money supply simply by creating a new loan. The new loan creates a debt between the borrower and the bank, and it also creates additional spending power.

It's this capacity to create money "out of nothing" that state policies like Reserve Requirements and Basel Rules attempted to control, but the empirical evidence shown in the last chapter shows that these control mechanisms have

\(^{191}\) However, a more complete model is as likely to amplify these basic results as it is to attenuate them. For example, the injection of fiat money puts the banking sector's assets and liabilities out of balance, when an essential aspect of banking practice is that they are balanced. The Firms bailout could thus force the banks to lend more rapidly to bring their assets back into line with their liabilities, thus amplifying the boost from the fiat money injection.
failed: the banks create as much new money as they can get away with, because fundamentally, banks profit by creating debt.

We can model this endogenous creation of both debt and new money (in a check-account or electronic-money banking system) by adding two new rows to the table—one in which the Firms’ Deposit Accounts are credited with new money, the second in which the new debt the Firms have to the Banks is recorded on the Loan Ledger (see Table 23).

**Table 23: A growing pure credit economy with electronic money**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Bank Assets</th>
<th>Bank Liabilities plus Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liabilities (Deposits)</td>
<td>Equity</td>
</tr>
<tr>
<td>Lend Money</td>
<td>Vault</td>
<td>Loan Ledger</td>
</tr>
<tr>
<td>Record Loans</td>
<td>- Lend Money</td>
<td></td>
</tr>
<tr>
<td>Pay Interest</td>
<td>Charge Interest</td>
<td></td>
</tr>
<tr>
<td>Record Payment</td>
<td>- Charge Interest</td>
<td></td>
</tr>
<tr>
<td>Deposit Interest</td>
<td>- Deposit Interest</td>
<td></td>
</tr>
<tr>
<td>Hire Workers</td>
<td>- Wages</td>
<td>+ Wages</td>
</tr>
<tr>
<td>Bankers consume</td>
<td>+ Banks Consumption</td>
<td></td>
</tr>
<tr>
<td>Workers consume</td>
<td>+ Workers Consumption</td>
<td></td>
</tr>
<tr>
<td>Loan Repayment</td>
<td>+ Loan Repayment</td>
<td></td>
</tr>
<tr>
<td>Record Repayment</td>
<td>- Loan Repayment</td>
<td></td>
</tr>
<tr>
<td>Lend New Money</td>
<td>+ New Loan</td>
<td></td>
</tr>
<tr>
<td>Record New Loan</td>
<td>+ New Loan</td>
<td></td>
</tr>
</tbody>
</table>

This extension helps explain why banks are so willing to create debt, and discourage its repayment: the source of bank profits is interest on outstanding debt, and the more debt that is out there, the more they make. The amount of outstanding debt will rise if existing money is turned over more rapidly, if new money is created more rapidly, and if debts are repaid more slowly. Banks therefore have an innate desire to create as much debt as possible—which is why it is unwise to leave the level of debt creation up to the financial sector. As the Great Recession shows, they will be willing to create as much debt as they can, and if they can persuade borrowers to take it on—which is easy to do when banks
finance a Ponzi Scheme—then the economy will ultimately face a debt crisis where the banks’ willingness to lend suddenly evaporates.

Refer to Figure 147: Bank income grows if debt grows more rapidly

The extension also provides the means to link this purely monetary model to the cyclical Minsky model I outlined in the previous chapter, in a manner that is consistent with the argument that aggregate demand is the sum of income plus the change in debt.

In the model above, all expenditure financed consumption—we were in a “Say’s Law” world in which aggregate demand equaled aggregate supply, and there was no change in debt. However we now consider firms that wish to invest, and who are willing to take on new debt to finance it—which also causes new money to be created. Aggregate demand is now income plus the change in debt, where incomes finance consumption, and the change in debt finances investment. The new loans thus provide the money needed finance the investment that was an integral part of the Minsky model.

For simplicity, I assume that new money is created at a constant rate relative to the current level of debt (which halves when the Credit Crunch strikes); in the full Minsky model, this is a function of the rate of profit.

To link the two models, one more component is needed: a formula that describes how prices are set. For obvious reasons, this doesn’t involve working out where “marginal cost equals marginal revenue”. However, the equation I use is based on the proposition that prices will tend converge to a level that equates the monetary value of demand and the monetary value of supply. At the same time, the equation conforms to the empirical research into how firms set prices (see Chapter 4)—that they involve a markup on the wage cost per unit of output—which is the theory of price setting used by Post Keynesian economists (Lee 1998; Downward 1999).192

We also need an explanation of how wages are set, and this raises the vexed issue of “the Phillips Curve”. As explained earlier, a properly specified Phillips

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192 The equation is derived in Keen 2010, pp. 17-19. The basic idea is as follows. The monetary value of demand equals wages plus profits, and as explained above this equals the money in the Firms’ Deposit accounts, divided by the turnover period. The monetary value of supply is the price level times output, and output is labor times average labor productivity. The number of workers employed in turn equals the monetary value of wages divided by the wage rate. In this simple model, the monetary value of wages also depends on the balance in the Firms’ Deposit accounts: it’s equal to the amount in the Firms’ Deposit Accounts, divided by the turnover period, and multiplied by the share of surplus that goes to workers. Some cancelation yields the result that in equilibrium, the price level will equal the wage level, divided by labor productivity and multiplied by the inverse of workers’ share of surplus. A dynamic equation has prices converging to this level over time.
Curve should have 3 factors in determining money wages—the employment rate, its rate of change, and a feedback from inflation—but for simplicity here I'll just use the first factor (all 3 are used later in my monetary Minsky model).

The results of this model amplify the case made in the money-only, no-growth model. The Firms bailout works better on every front, on every metric—except one (any guesses which one?).

Loans recover more rapidly when the firms are bailed out rather than the banks;

Refer to Figure 148: Loans grow more with a debtor bailout

The rate of unemployment is turned around almost instantly with the firm bailout, and never reaches the extreme levels that apply with the bailout going to the banks (see Figure 149);

Figure 149: Unemployment is better with a debtor bailout

Both profits and wages are higher if the firms get the bailout money rather than the banks;

Refer to Figure 150: Profits do better with a debtor bailout

The only losers from the bailout going to the firms rather than to the banks are … the banks (did you guess right?). Once again, not only do they do worse if the firms get the bailout rather than them, they do worse under the firms' bailout than they do from no policy intervention at all.
Refer to Figure 151: Bank income does better with a Bank bailout

This is still a very simple model, and much more needs to be done to complete it—from replacing time constants with variables (which I do in the Minsky model to come), through to properly modeling government finances as well as those of private banks (which I haven’t yet done). But again it reaches results that are the opposite of the neoclassical “money multiplier” model that Obama, acting on the advice of his neoclassical advisors, actually followed. Given the poor response of the economy to the stimulus and QE1, I think it’s reasonable to argue that it’s time Obama—and politicians in general—looked elsewhere for their economic advice.

FROM TRANQUILITY TO BREAKDOWN

To a neoclassical economist, the most striking aspect of the Great Recession was the speed with which apparent tranquility gave way to sudden breakdown. With notable, noble exceptions like Nouriel Roubini, Robert Shiller, Joe Stiglitz and Paul Krugman, they paid little attention to the obvious Bonfire of the Vanities taking place in asset markets, so in a sense they didn’t see the warning signs, which were obvious to many others, that this would all end in tears.

My model, in contrast, is one in which the Great Moderation and Great Recession are merely different phases in the same process of debt-financed speculation, which causes a period of initially volatility to give way to damped oscillations as rising debt transfers income from workers to bankers, and then total breakdown occurs when debt reaches a level at which capitalists become insolvent.

The fixed parameters used in the previous models are replaced by functions where the rates of money creation and relending and debt repayment depend on the rate of profit, and where the rate of change of wages depends on the level of employment, its rate of change, and the rate of inflation. The link between the monetary and physical models is the creation of new money, which finances investment.

The model generates as sudden turnaround in output as any neoclassical model hit by “exogenous shocks”, but unlike those models there is continuity between the Great Moderation and the Great Recession.

Refer to Figure 152: Modeling the Great Moderation and Great Recession--Output

The model’s numbers and the magnitude of its crash are hypothetical and the main question is whether its qualitative behavior matches that of the US

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193 Fitting a nonlinear model to data is something mathematicians describe as a “non-trivial” exercise—which in lay speak is something that takes eons to do and requires
economy—which it clearly does. A period of extreme cycles in unemployment and inflation is followed by diminishing cycles which, if they were the only economic indicators one focused upon, would imply that a “Great Moderation” was occurring. But the third factor ignored by neoclassical economics—the ratio of debt to GDP—rises in a series of cycles until it takes off exponentially (see Figure 153).

**Figure 153: Modeling the Great Moderation and Great Recession—Inflation, Unemployment and Debt**

The qualitative similarity of this pattern to the actual US data (prior to the massive intervention by both the Government and the Federal Reserve) is striking—see Figure 154.

supercomputer processing power. I will do this for my next book with a far more complex model than the one shown here.
As in my 1995 model, though capitalists are the ones who actually take on debt, in practice the workers pay for it via a fall in their share of national income.

Refer to Figure 155: Income distribution--workers pay for the debt
Refer to Figure 156: Actual income distribution matches the model

This strictly monetary model generates one aspect of Minsky’s hypothesis that my 1995 model could not: the “deflation” part of the process of debt-deflation. Debt rises in a series of booms and busts as in my 1995 paper, but as well the rate of inflation falls in a cyclical manner until it becomes accelerating deflation.

This generates the phenomenon observed in the early years of the Great Depression: the debt to GDP ratio continues to rise, even though nominal debt is falling (see Figure 157).
Figure 157: Debt and GDP in the model

The model dynamic is more extreme than the data because the model doesn’t yet include the impact of bankruptcy—which reduces debt during a Depression. But again, the qualitative similarity between the model and the empirical data is striking—see Figure 158.
MAKING MONETARY MODELING ACCESSIBLE: QED

I originally developed the models in this chapter using differential equations, and I found it very difficult to extend them, or explain them to other economists who weren’t familiar with this approach to mathematics. Then a chance challenge to the accuracy of my models—Scott Fullwiler asserted that there must be errors in my models from the point of view of double-entry bookkeeping—inspired me to see whether I could in fact explain my models using double-entry bookkeeping.

Not only did that prove possible, it also transpired that a double-entry bookkeeping layout of financial flows could be used to generate the models in the first place.

This overcame a major problem that I had with using System Dynamics programs like Vissim (www.vissim.com) and Simulink (http://www.mathworks.com/products/simulink/) to build models of the financial sector. While these technologies were brilliant for designing engineering products like cars, computers and airplanes, they were poorly suited to modeling financial flows.
These programs use “wires” to link one variable to another, and this is fine for physical processes where, for example, a wire from the fuel injector module to the cylinder module indicates a flow of gas from one point to another, and only one such link exists per cylinder. However, in a model of financial flows, the same term could turn up as often as 3 times in one diagram: once for the source account for some monetary transfer, once for its destination, and once to record it on a ledger. This resulted in almost incomprehensible models, and made “wiring up” such a model extremely tedious.

I now use my double-entry bookkeeping methodology to develop models like the one in this chapter, and a simulation tool has also been developed for me to showcase this method. It’s free, fairly easy to use, and you can both simulate the models I’ve shown in this chapter and build your own using it.

It’s called QED—which stands for Quesnay Economic Dynamics—and can be downloaded from my blog at http://www.debtdeflation.com/blogs/qed/.

**CONCLUSION**

There are many aspects of this model of which I am critical. For example, it doesn’t distinguish borrowing for investment from borrowing for speculation, the government sector isn’t incorporated, and many factors that are variable in reality (such as interest rates and the markup that sets prices) are constants in the model. But these missing aspects can be easily introduced into later extensions of the model—a topic that I will take up in my next book *Finance and Economic Breakdown*—without needing to make the absurd assumptions that neoclassical economics makes when it tries to combine more realism with the fantasy that everything happens in equilibrium.

It is also possible—indeed it is essential—to make this theory one not merely of macroeconomics, but of finance as well. In counterpoint to the false neoclassical dichotomy between macroeconomics and finance on the basis of the counterfactual proposition that debt has no macroeconomic effects, a valid economic theory has to explain the behavior of both the macroeconomy and the financial markets. Such a coherent theory has not yet been developed. However, there are several realistic models of the behavior of financial markets themselves, which we’ll now consider.