

Policy Forum: Household Debt

Household Debt: The Final Stage in an Artificially Extended Ponzi Bubble

Steve Keen

School of Economics and Finance, University of Western Sydney

1. Macroeconomics of Private Debt

Private debt is largely ignored by conventional macroeconomics. It is a key issue in the unorthodox ‘Minskian’ approach to economics, which rejects the standard ‘veil over barter’ attitude towards money (Minsky 1982a). Ironically, though Friedman championed ‘money neutrality’, unintended support for Minsky’s ‘money matters’ position can be found in Friedman (1969). His well-known assertion, that the nominal quantity of money is irrelevant, contains an important, but neglected, proviso, highlighted below:

It is a commonplace of monetary theory that nothing is so unimportant as the quantity of money expressed in terms of the nominal monetary unit. . . let the number of dollars in existence be multiplied by 100; that, too, will have no other essential effect, *provided that all other nominal magnitudes (prices of goods and services, and quantities of other assets and liabilities that are expressed in nominal terms) are also multiplied by 100.*

[Friedman 1969, p. 1, emphasis added]

In the real world in which we live, assets and liabilities are *not* indexed to the rate of inflation.¹ Therefore, nominal magnitudes do matter in macroeconomics because they determine our capability to service past financial commitments out of current cash flows. My Minskian focus upon debt is the reason that I was able to anticipate a serious financial crisis (Keen 1995, 1996,² 2000, 2007), while leading neoclassical macroeconomists were busy debating the causes of the now-defunct ‘Great Moderation’ (Bernanke 2004).

The impact that private debt has on the economy is affected by its scale relative to gross domestic product (GDP), its composition,

purpose and rate of change. On all four fronts, our current debt crisis is more severe than that which caused the Great Depression (Fisher 1933).

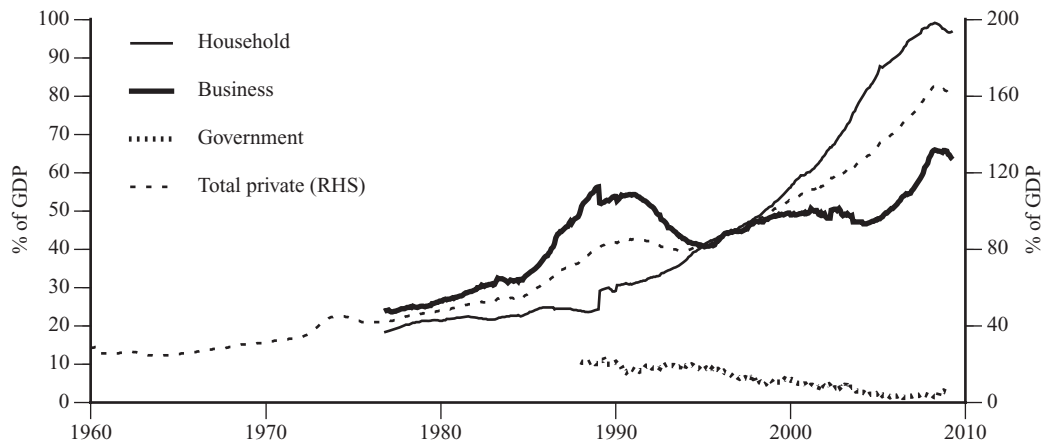
2. Magnitude, Composition and Purpose of Private Debt

In late 1990, Australia’s private debt-to-GDP ratio peaked at 85 per cent. It then fell to 79 per cent in mid-1993, only to more than double to a peak of 165 per cent in March 2008.

This literally exponential rise in the debt ratio masked an important change in its composition. The business ratio fell sharply between late 1990 and 1995 and only returned to 1990 levels in 2006. The household ratio, however, rose at 6.6 per cent per annum between 1990 and March 2008, while the mortgage ratio rose at 8.5 per cent per annum.³ This took household debt from 30 to 99 per cent of GDP—and mortgage debt from 20 per cent to 85 per cent—in just over 18 years (Figure 1).

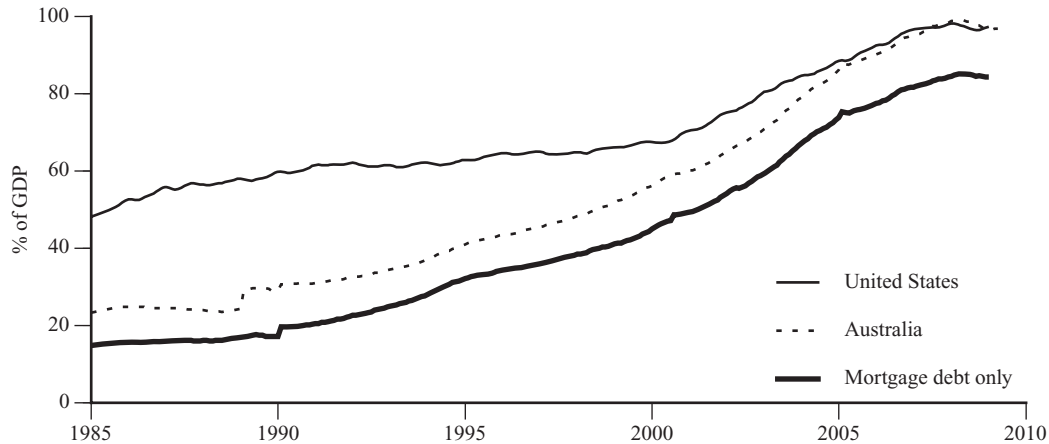
Though the US household debt binge has grabbed the headlines, the Australian household debt binge actually was more dramatic. The US ratio was twice that of the Australian ratio in 1990, but grew much more slowly, by a mere 2.3 per cent per annum from 1990 till its peak of 98 per cent in 2008. Though lending here might not have been as irresponsible at the individual level as in the United States, the aggregate effect has been the same: Australian households, like their US counterparts, have a higher ratio of debt to income than ever before (Figure 2).

Attempts to explain increasing debt as merely an equilibrium response to falling interest rates do not withstand scrutiny. The

Figure 1 Australian Debt-to-Gross Domestic Product Ratios

Note: RHS denotes that the series is graphed against the scale on the right axis of the graph.

Source: RBA Bulletin Tables D02 and G12.

Figure 2 Australian versus US Household Debt-to-Gross Domestic Product Ratios

Sources: RBA Bulletin; Federal Reserve Board Flow of Funds ltab1d, atab6d.

Reserve Bank of Australia's Governor Stevens put this proposition to the Parliamentary Standing Committee on Economics, Finance and Public Administration in 2007, in answering whether 'cheaply available credit' had influenced asset prices:

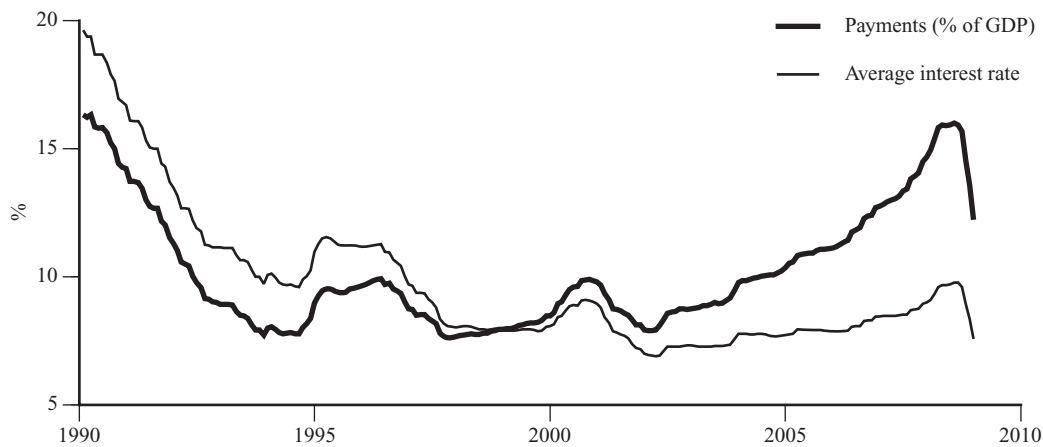
The rough statistic that I have quoted many times was that the average rate of interest was about half; that meant you could service twice as big a debt. Guess what? That is exactly what occurred, and that had a very profound effect on asset values.

[Standing Committee on Economics, Finance and Public Administration 2007, p. 26]

If this were true, then interest payments to GDP would have remained approximately constant as interest rates fell, rose and fell again over 1990–2008. At the aggregate level and at the two extremes—1990, when the average interest rate was almost 20 per cent, and 2008, when 'peak debt' occurred—this statement appears to be relatively correct. However, over time, the debt service ratio was not constant, but fell substantially as interest rates also fell, only to rise back to 1990 levels by 2008.

The aggregate data also masked the substantial changes in the composition of debt over

Figure 3 Private Debt-Service Ratio and Interest Rates



Source: RBA Bulletin.

time: though the aggregate ratio did approximately double, business debt increased by a mere 22 per cent (after having fallen as much as 25 per cent), while household debt more than tripled (Figure 3).

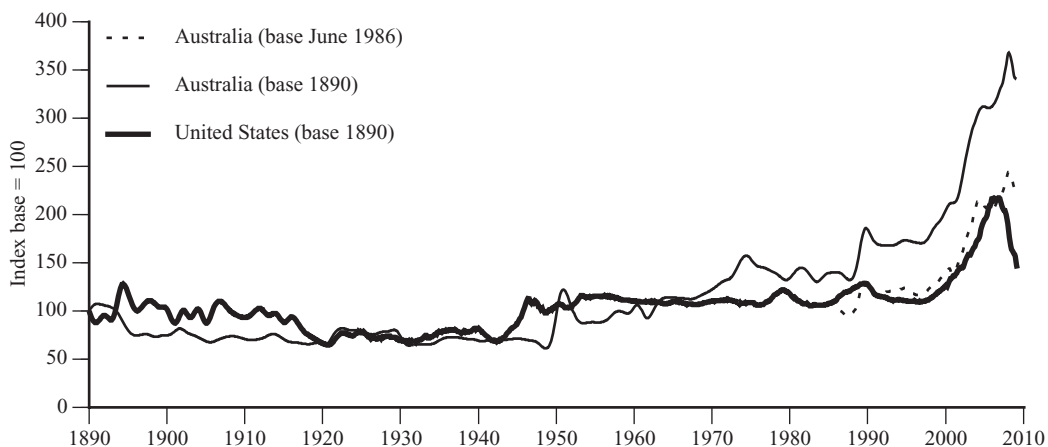
As in 1990, the debt service level in 2008 was not an equilibrium, but rather a maximum at which debt service costs caused a sudden swing from prosperity to a severe economic downturn.

Though the argument that the rise in debt was an equilibrium response to falling interest rates is false, the proposition that it drove asset prices is defensible. Again, though the

US house-price bubble has grabbed the headlines, on any measure, the Australian bubble has been bigger. Without adjusting for differences in base years, the peak in the Australian real house price index was 20 per cent higher than the peak in the US index. When adjusted to the same base year, using data from Stapledon (2007, pp. 64–5, Table 2.5), the Australian index was a mere 8 per cent higher than the US index in 1987, but rose to be 81 per cent higher than the US peak (Figure 4).

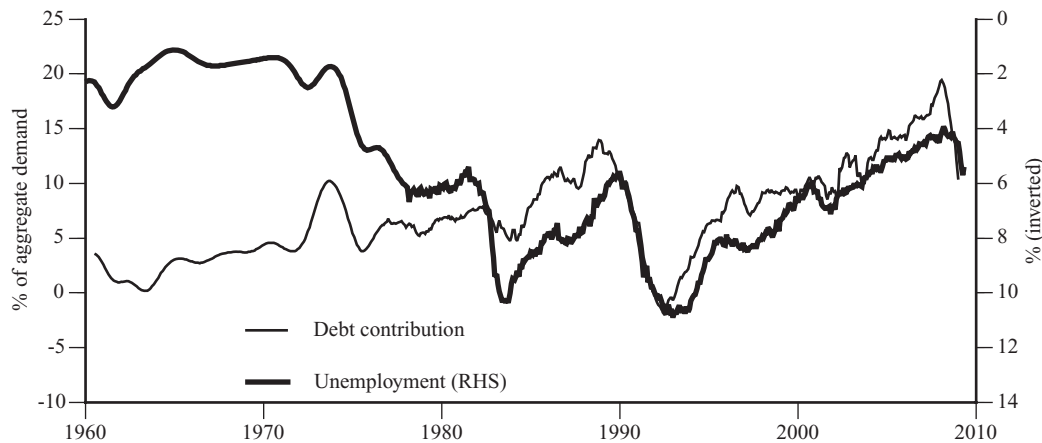
Speculation, rather than investment, was overwhelming the focus of post-1990 lending. The primary role of mortgage debt was to

Figure 4 Real House Price Indices



Sources: Stapledon (2007); ABS Cat. no. 6416; S&P/Case-Shiller U.S. National Home Price Index.

Figure 5 Debt Contribution to Demand and Unemployment



Note: RHS denotes that the series is graphed against the scale on the right axis of the graph.

purchase existing dwellings rather than to finance the construction of new ones: in 1985, less than 25 per cent of new mortgage finance was for new dwellings; by 2000, this had fallen below 10 per cent. Therefore, 85 per cent of the additional \$985 billion of mortgage debt accumulated since 1986 predominantly has inflated house prices, rather than built new homes. Margin lending—which rose from \$4.7 billion to \$37.75 billion between late 1999 and 2008—was clearly for speculative purposes only. As a substantial proportion of recent business debt also financed speculative activity—leveraged buyouts, mergers and acquisitions—over half of Australia’s \$1.9 trillion private debt financed speculation rather than investment.

3. Rate of Change of Debt

The rate of change of debt and its magnitude relative to GDP determine the contribution that changes in debt make to aggregate demand, which in our credit-driven world is the sum of GDP plus the change in debt. This demand is clearly spread across all markets, commodity and assets alike, so that where a change in debt-financed demand will fall cannot be determined a priori—but that impact is now substantial. Before 1970, the change in private debt was responsible for less than 5 per cent of aggregate demand. Since 1980, it has been responsible for up to 20 per cent of demand

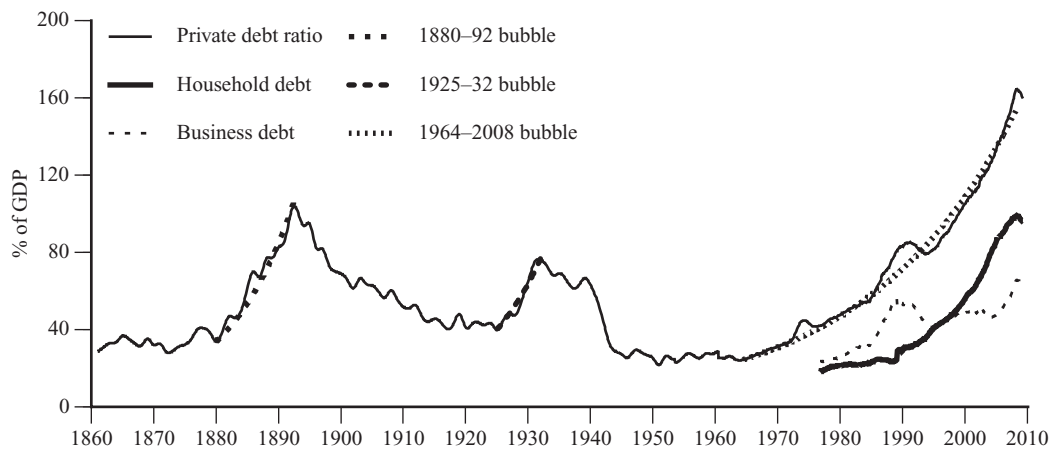
and it has become the dominant factor in determining the level of unemployment. In our debt-dependent economy, rising debt reduces unemployment, while falling debt increases it (Figure 5).

This is the third and, by far, the largest debt bubble in Australia’s economic history. Just as the bursting of the two earlier debt bubbles ushered in depressions, I expect the same will result from the bursting of this bubble and for the same reason. Deleveraging by the private sector will reduce significantly aggregate demand and cause a consequent severe reduction in economic activity and employment (Figure 6).

4. Drivers of the Bubble: Lenders or Borrowers?

Though focusing on aggregate debt alone from 1993 till now obscures the important recent role of rising household debt, over the much longer term, the aggregate ratio illustrates that the ultimate responsibility for debt bubbles lies not with the irrational exuberance of borrowers, but with the credit-creation practises of lenders (Fisher and Kent 1999, p. 7, Figure 4 and p. 9, Figure 5; Battellino 2007, p. 15, Graph 3).

At the aggregate level, the debt bubble can be dated back to mid-1964, when a 20 year period of a stable debt ratio gave way to 44 years in

Figure 6 Australian Long-Term Debt-to-Gross Domestic Product Ratios

Sources: Battellino (2007); Fisher and Kent (1999); *RBA Bulletin*.

Table 1 Growth Rates of Private Debt to Gross Domestic Product (GDP) Ratios

<i>Ratio to GDP</i>	<i>Time period</i>	<i>Growth rate (%)</i>	<i>Exponential correlation</i>
Aggregate	June 1964–March 2008	4.20	0.991
Business	September 1976–March 2008	3.09	0.769
Household	September 1976–March 2008	5.16	0.985

which private debt grew 4.2 per cent faster than nominal GDP. The correlation of the private debt ratio with a simple exponential function is both extraordinarily high and higher over the period of 1964–2008 than the correlation of either disaggregated series over the shorter time period for which data are available (see Table 1 and Keen 2009).

5. Modelling the Dynamics of Speculative Finance

In Keen (2009), I constructed a model of endogenous money creation that is consistent with the empirical data on money dynamics, which contradicts the standard ‘money multiplier’ model of credit money creation (see Moore 1979, 1983; Kydland and Prescott 1990). The model explained the tendency of the financial system to provide as much credit as businesses and households are willing to accept and simulated the impact of a credit crunch on economic activity.

Here, I extend my model of Minsky’s ‘Financial Instability Hypothesis’ (FIH; Keen 1995)

to include one aspect of Minsky’s hypothesis that I did not incorporate originally, but which is clearly of vital importance in the actual dynamics of debt: borrowing to finance not productive investment, but ‘Ponzi’ speculation on asset prices. As outlined above, this was the overwhelming purpose of the growth in household debt since 1990.

Minsky’s hypothesis considered an economy in historical time, starting at a time where the economy is growing relatively stably, but firms and banks are conservative about debt levels after a recent economic crisis. However, the combination of a relatively tranquil economy and conservative investment behaviour means that most projects succeed.

Two things gradually become evident: ‘Existing debts are easily validated and units that were heavily in debt prospered: it paid to lever.’ (Minsky 1982a, p. 66). As a result, both firms and banks come to regard the previously accepted risk premium as excessive. Investment projects are evaluated by 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 the growth in debt-financed investment, which is the foundation both of the boom and its eventual collapse. In Minsky's classic phrase, 'Stability—or tranquility—in a world with a cyclical past and capitalist financial institutions is destabilizing.' (Minsky 1977, p. 66).

The economy enters a phase that Minsky characterised as 'the euphoric economy', 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. Financial institutions now accept liability structures, both for themselves and their customers, '... that, in a more sober expectational climate, they would have rejected' (Minsky 1982b, p. 55).

Asset price inflation in the euphoric economy phase makes it possible to profit by trading assets on a rising market, giving rise to a class of speculators that Minsky called 'Ponzi financiers', after the well-known American swindler (Zuckoff 2005). These speculators are

willing to incur debts, of which the servicing costs exceed the cash flows of the assets they buy, because they expect to be able to on-sell these assets at a profit. However, the rising interest-servicing costs incurred in this period eventually force speculative and non-speculative investors alike to sell capital assets to meet their debt commitments and the entry of additional sellers into the asset market pricks the exponential rise in prices on which Ponzi financiers depend. The leading Ponzis go bankrupt, bringing the euphoric economy to an abrupt end and ushering in another debt-induced systemic crisis.

A comprehensive model of this process would include asset price dynamics, as well as debt.⁴ However, the essence of Ponzi speculation is that debt is taken on that does not add to the economy's productive capacity. This easily can be introduced into my Minsky Model (built as an extension to Goodwin's Growth Cycle Model; Goodwin 1967) via a non-linear Ponzi investment function that depends on the rate of economic growth and that is financed entirely by debt. The model structure is outlined in Table 2:

Table 2 Causal Links in the Model

<i>Element</i>	<i>Equation</i>	<i>Comments, parameters and initial values</i>
Output	$Y = K/v$	Capital stock and the accelerator determines output; $Y(0) = 300$; $v = 3$
Capital stock	$\frac{d}{dt} K = I(\pi_r) \cdot Y - \gamma \cdot K$	The rate of change of capital stock is investment minus depreciation; $\gamma = 1\%$
Profit	$\Pi = Y - W - r \cdot D$	Profit is output minus wages and interest payments; $r = 3\%$
Profit rate	$\pi_r = \Pi/K = \Pi/(v \cdot Y)$	—
Wage bill	$W = w \cdot L$	The wage bill is wages times labour employed
Wages	$\frac{1}{w} \cdot \frac{d}{dt} w = P_c(\lambda)$	A Phillips curve relation for wage determination; $w(0) = 1$
Employment rate	$\lambda = L/N$	—
Labour	$L = Y/a$	Output and labor productivity determine employment

Table 2 Continued

<i>Element</i>	<i>Equation</i>	<i>Comments, parameters and initial values</i>
Debt	$\frac{d}{dt} D = I - \Pi + P_K$	The rate of change of debt equals investment minus profits plus speculation; $D(0) = 0$
Speculation	$\frac{d}{dt} P_K = \kappa(g) \cdot Y$	The rate of change of Ponzi speculation is a non-linear function of the rate of growth; $P_K(0) = 0$
Rate of growth	$g = (I(\pi_r)/v) - \gamma$	—
Investment	$I(\pi_r) = G_{\text{Exp}}(\pi_r, 3\%, 3\%, 1, 0)$	Investment is a non-linear function of the rate of profit
Phillips curve	$P_C(\lambda) = G_{\text{Exp}}(\lambda, 96\%, 0, 2, -4\%)$	Wage change is a non-linear function of the rate of employment
Ponzi behaviour	$\kappa(g) = G_{\text{Exp}}(g, 3\%, 0, 3, -25\%)$	Speculation is a non-linear function of the rate of growth
Generalised exponential	$G_{\text{Exp}}(x, x_v, y_v, s, m) = (y_v - m) \cdot e^{\frac{s}{y_v - m} \cdot (x - x_v)} + m$	Generalised exponential; arguments (x_v, y_v) coordinates, slope at (x_v, y_v) and minimum value m
Population	$\frac{d}{dt} N = \beta \cdot N$	$\beta = 1\%$; $N(0) = 330$
Labour productivity	$\frac{d}{dt} a = \alpha \cdot a$	$\alpha = 2\%$; $a(0) = 1$

This reduces to a model with six system states:

$$\begin{aligned}
 \frac{d}{dt} Y &= g \cdot Y \\
 \frac{d}{dt} w &= P_C(\lambda) \cdot w \\
 \frac{d}{dt} D &= I(\pi_r) \cdot Y - \Pi + P_K \\
 \frac{d}{dt} P_K &= \kappa(g) \cdot Y \\
 \frac{d}{dt} a &= \alpha \cdot a \\
 \frac{d}{dt} N &= \beta \cdot N
 \end{aligned} \tag{1}$$

Without Ponzi finance, the model can generate a debt crisis given extreme initial conditions but, near its equilibrium, the model is stable (the

equilibrium debt ratio is negative—see Keen 2000—implying a net positive financial position for firms). With Ponzi finance, however, the system undergoes a series of boom/bust cycles, with debt levels ratcheting up over time until, ultimately, the debt incurred in the final cycle overwhelms the economy's debt-servicing capacity and a depression ensues, as shown by the simulation results presented in Figure 7.

The presence of Ponzi finance also leads to bigger cycles in output with a longer period. Though the average rate of growth prior to the crisis is similar to that achieved without Ponzi lending, volatility is far greater, but the rise in volatility is somewhat masked by the increase in the period between downturns. The simulations for the employment and income distributions are shown in Figures 8 and 9.

Figure 7 Output

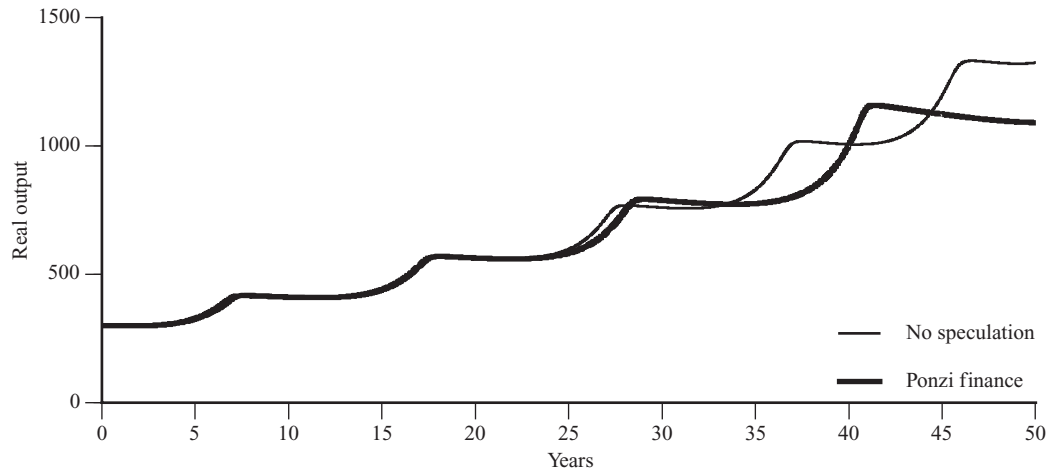


Figure 8 Employment

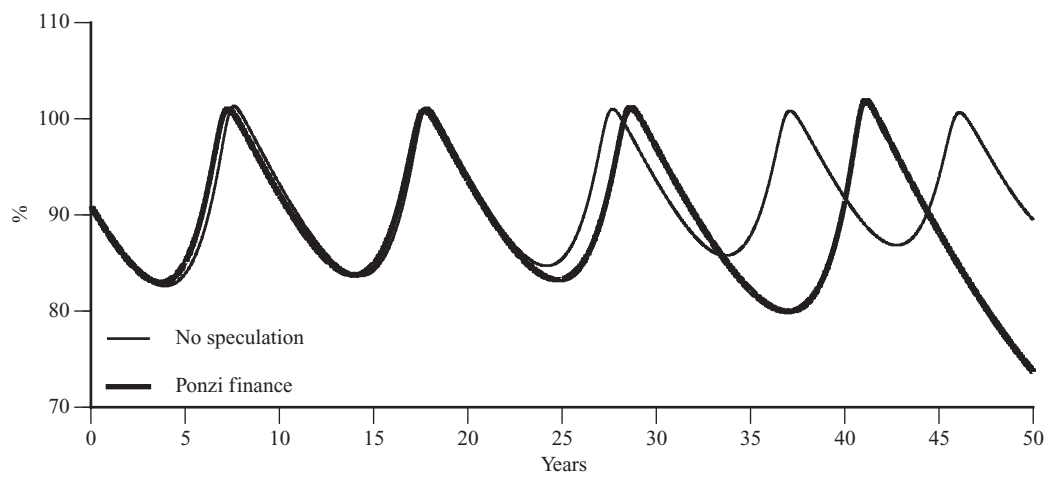


Figure 9 Employment and Income Distributions

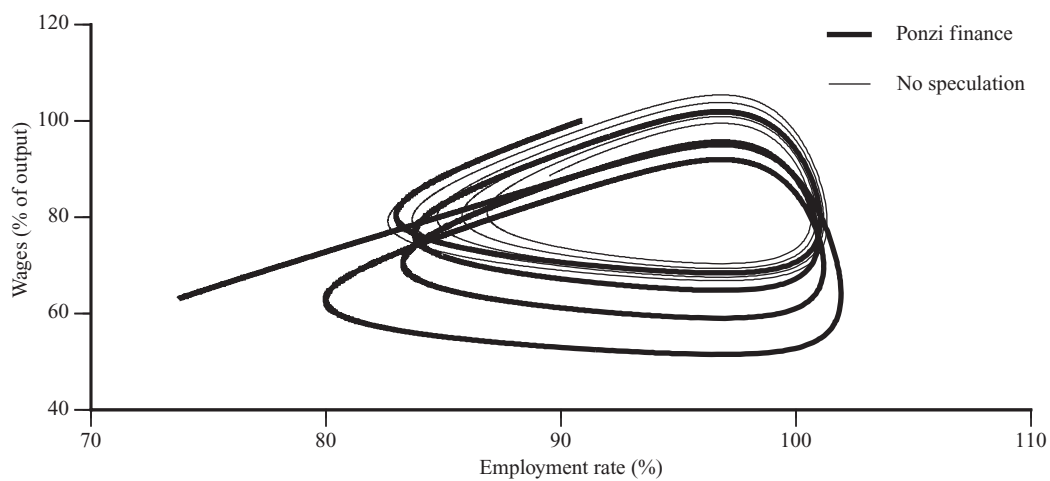
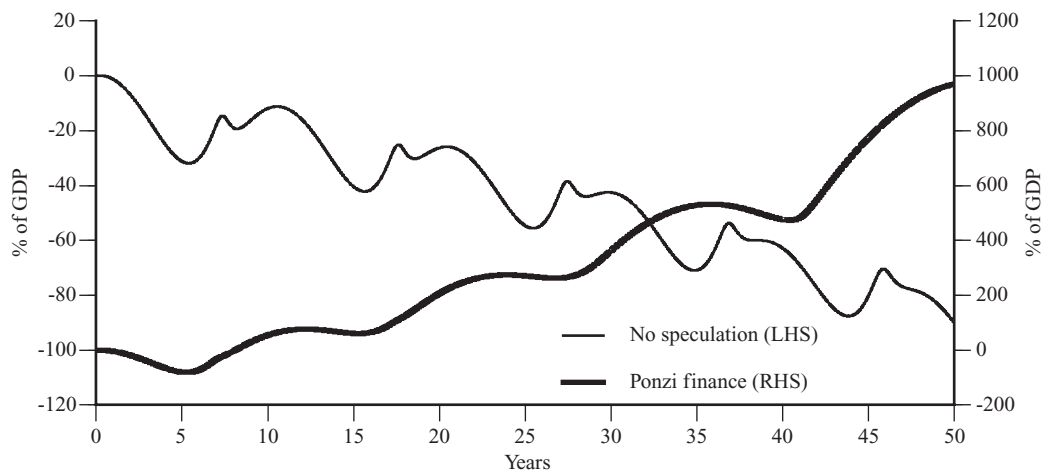


Figure 10 Debt to Gross Domestic Product



Note: LHS denotes that the series is graphed against the scale on the left axis of the graph; RHS denotes that the series is graphed against the scale on the right axis of the graph.

A far higher level of debt is accumulated with Ponzi lending than without it (Figure 10) and that debt level ultimately causes not merely a cyclical downturn but a complete economic collapse. Though this model has yet to be fitted to the actual data, its qualitative behaviour matches the pattern that has led to the global financial crisis.

6. Conclusion

Had the Federal Reserve not intervened to rescue Wall Street from its excesses in 1987, there could have been a mild depression back then. The debt levels were comparable to those of 1929: 159 per cent of GDP in the United States versus 173 per cent in 1929 and 73 per cent in Australia versus 64 per cent in 1929. Debt-financed demand was a much smaller fraction of aggregate demand—13 per cent in the United States and under 10 per cent in Australia—so that deleveraging would have occurred from a much lower base than that of the present.

Inflation was also higher—4.5 per cent in the United States versus zero in 1929 and 7.8 per cent in Australia versus 2 per cent in 1929—so that the debt burden would have been reduced by nominal factors. Finally, most

of the debt was owed by businesses, which can eliminate it more easily than can households (via reducing employment, terminating investment and bankruptcy), and the scourges of derivatives and securitised lending had only just begun.

By forestalling a depression, we might have been set up for a far more serious problem now. Today, US debt is 1.7-fold as high as in 1929 and deflation is already running at 0.75 per cent. Australia's debt ratio is 2.5-fold what it was in 1929 and, although we have not fallen yet into deflation, inflation is less than half of the 1987 level. Debt-financed demand accounted for 23 per cent of aggregate demand at its peak in the United States, and 20 per cent here, so deleveraging today could swamp government attempts to reflate the economy. Households hold more debt than businesses and the ownership of that debt has been dispersed throughout society via securitised lending.

Bernanke famously apologised to Friedman on behalf of the 1929 Federal Reserve, stating that, '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). In fact, thanks to Friedman's flawed theory of money, the Greenspan–Bernanke Federal Reserve one day might justly stand accused of

having caused a far greater crisis than that of 1929.

May 2009

Endnotes

1. Except in Iceland, where debts (but not other nominal magnitudes, such as wages) were indexed to the rate of inflation, with disastrous results.

2. In my supplementary remarks to the Wallis Committee Inquiry in 1996 (sent via email), I anticipated that a financial crisis could result from the practice of securitised lending: 'Should a substantial proportion of eligible assets (for example, residential houses during a real estate boom like that of 1987–89) be financed by securitised instruments, the inability of borrowers to pay their debts on a large scale will not, of course, directly affect liquidity in the same fashion that a failure of bank debtors does. Instead, the impact will be felt by those who purchased the securities... Where the securities are tradeable, there would obviously be a collapse in the tradeable price, and, potentially, the bankrupting of many of the investors...'

3. The correlation coefficient of the total private debt ratio between mid-1993 and March 2008 to a simple exponential function with a growth rate of 4.6 per cent was 0.9966; the coefficient for the household debt ratio between 1990 and March 2008 with a growth rate of 6.05 per cent was 0.9969.

4. In future research, I will combine this model and that in Keen (2009) into a strictly monetary model of the FIH.

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