Are We “It” Yet?

Steve Keen
University of Western Sydney
Debunking Economics
www.debtdeflation.com/blogs
www.debunkingeconomics.com
Are We “It” Yet?

- Biggest debt bubbles in history...

Private debt to GDP ratios

Flow of Funds Table L1+Census Data; RBA Table D02
• “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

• and that some market technique exist by which aggregate spending in excess of aggregate anticipated income can be financed.

• 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; emphasis added)
Are We “It” Yet?

- **Debt and GDP**
  - US Private Debt and GDP 1920-1940

- **Aggregate Demand**
  - US Aggregate Demand GDP 1920-1940
Are We "It" Yet?

- Aggregate demand & unemployment 1920-1940

Correlation of change in private debt and unemployment

R² = -0.938

Change in Debt (lagged one year)

Unemployment
Are We “It” Yet?

- Aggregate demand & unemployment 1990-2010

Correlation of change in private debt and unemployment

$R^2 = -0.955$
Are We “It” Yet?

- Debt-financed proportion of aggregate demand: \( \frac{\Delta \text{Debt}}{\text{GDP} + \Delta \text{Debt}} \)

Debt-financed demand percent of aggregate demand

Scale of downturn 2.25 years in Scale of government response

Years since peak rate of growth of debt (mid-1928 & Dec. 2007 resp.)
Are We “It” Yet?

- Unemployment: end of the storm or just a lull?

Unemployment Great Depression vs Today

Percent of workforce vs Years since peak rate of growth of debt (mid-1928 & Dec. 2007 resp.)
Are We “It” Yet?

- Far larger Fed response: quantitative easing then & now
- “Printing press” may have stopped nascent deflation
- But will it be sustained?
- Over to modelling...
Are We “It” Yet?

- Minsky: Ponzi finance extension to Keen 1995

Click on icon to run simulation after installing Vissim Viewer
Are We “It” Yet?

- **Circuit:** Which gives more “bang for buck” —rescuing bankers or debtors?

- **Click on icons to run**

[Images of graphs and models]
Are We "It" Yet?

- **Integrating Minsky & the Circuit**

\[ \frac{d}{dt} B_C(t) = \frac{F_L(t)}{\tau_{RL}(\theta(t))} - \frac{B_C(t)}{\tau_{LC}(\theta(t))} \]

\[ \frac{d}{dt} B_{DL}(t) = r_t F_L(t) - r_d F_D(t) - r_D W_D(t) - \frac{B_{DL}(t)}{\tau_{B}} \]

\[ \frac{d}{dt} F_L(t) = \frac{B_C(t)}{\tau_{LC}(\theta(t))} - \frac{F_L(t)}{\tau_{RL}(\theta(t))} + P_{C(t)} \cdot Y_C(t) \cdot \text{inv}(\phi(t)) \]

\[ \frac{d}{dt} F_D(t) = r_t F_D(t) - r_t F_L(t) + \frac{B_C(t)}{\tau_{LC}(\theta(t))} - \frac{F_L(t)}{\tau_{RL}(\theta(t))} + P_{C(t)} \cdot Y_D(t) \cdot \frac{W_D(t)}{\theta(t)} + Y_C(t) \cdot \frac{W(t)}{\theta(t)} + \frac{B_{DL}(t)}{\tau_{B}} + Y_C(t) \cdot \frac{W(t)}{\theta(t)} + \text{inv}(\phi(t)) \]

\[ \frac{d}{dt} W_D(t) = r_t W_D(t) - \frac{W_D(t)}{\tau_{W}} + Y_C(t) \cdot \frac{W(t)}{\theta(t)} \]

System states and algebraic relations

- Level of output
  \[ Y_L(t) = \frac{K_C(t)}{v} \]

- Rate of Profit
  \[ \pi_C(t) = \frac{P_{C(t)} \cdot Y_C(t) - W(t) \cdot \frac{\theta(t)}{\theta(0)} - r_t F_L(t)}{v \cdot P_{C(t)} \cdot Y_C(t)} \]

- Rate of employment
  \[ \lambda(t) = \frac{Y_C(t)}{\theta(0) \cdot N(t)} \]

- Rate of real economic growth
  \[ g(t) = \frac{\text{inv}(\phi(t))}{v} - \delta \]

- Rate of change of wages
  \[ \frac{d}{dt} W(t) = W(t) \left[ P_{C(t)} - \frac{\theta(t)}{\theta(0) \cdot (1 - \delta) \cdot P_{C(t)}} \right] \]

- Rate of change of prices
  \[ \frac{d}{dt} P_{C(t)} = \frac{-1}{\tau_{P_C}} \left[ P_{C(t)} - \frac{W(t)}{\theta(t) \cdot (1 - \delta)} \right] \]

- Rate of change of capital stock
  \[ \frac{d}{dt} K_C(t) = K_C(t) \cdot g(t) \]

- Rates of growth of population and productivity
  \[ \frac{d}{dt} N(t) = \alpha \cdot u(t) \quad \frac{d}{dt} N(t) = \beta \cdot N(t) \]
Are We “It” Yet?

- Debt-deflationary dynamics in strictly monetary Minsky Circuit model
- “The Great Moderation”, then “The Great Crash”
Are We “It” Yet?

- Stability is destabilizing...
  Rate of employment and rate of profit

- Real growth rate

- Employment and wage share dynamics

- Worker share of GDP

- Employment rate
Are We “It” Yet?

- Income inequality
  - Not worker vs capitalist but worker vs banker

Income Distribution

![Graph showing income distribution over years with data points for workers, capitalists, and bankers.](image-url)
Are We “It” Yet?

- **QED**: a new approach to dynamic modelling
- Inspired by Godley SAM approach
  - Extended to continuous time
- Ideally suited to financial flows
  - Model dynamics via a GodleyTable:
Are We “It” Yet?

• Equation entry:

\[
\begin{align*}
A &= b_V \cdot BV(t) \\
B &= r_L \cdot FL(t) \\
C &= r_L \cdot FL(t) \\
D &= r_D \cdot FD(t) \\
E &= f_D \cdot FD(t) \\
F &= r_D \cdot WD(t) \\
G &= b_T \cdot BT(t) \\
H &= w_D \cdot WD(t) \\
I &= f_L \cdot FL(t)
\end{align*}
\]
Are We “It” Yet?

- Automatically generate “Forrester Diagram”
- Similar to standard systems engineering
  - Simulink, Vissim, Ithink, Stella, Vensim
- And also “Phillips Diagram”...
Are We “It” Yet?

- Tribute to Bill Phillips...
- Freely available at www.debtdeflation.com/blogs/qed
- Updates will be posted there