Weak ties, empirical deficits and an update the Kalecki-Minsky agenda. Comments on post-Keynesian macroeconomics ten years after the crisis

Engelbert Stockhammer
outline

• Political background
• State of mainstream econ/NK
• State of PKE
• Progress report on Kalecki-Minsky research
  • Pseudo-Goodwin cycles
  • Size of financial effects vs distributional effects
  • Endogenous cycles
  • Inequality and household debt
  • Unemployment hysteresis
• Wrapping up
Political background

- Worst financial and economic crisis in two generations
- ... but the crisis did not turn into a great depression (except in Greece)
- Because of massive gov’t fiscal interventions and QE
- But instead resulted in ‘lost decade’
- And in Europe to a divergence of economic performance.
- Deflation of political hegemony of neoliberalism, while it stays firmly in power.
- Political discontent has moved to the right (Trump, Brexit, AfD, Salvini, Orban ...)
- The left has for the most part been unable to present a credible alternative
  - Greek tragedy of Syriza:
  - Pasokification of German and Austrian social democracy, despite comparatively swift economic recovery.
  - Glimmer of hope in a new anti-establishment social democracy (Sanders, Corbyn), but not in in power and economic policy not sufficiently clear
- Mazower (1998) *Dark Continent. Europe’s Twentieth Century* suggests that dominant liberalism may be the exception; Fascist, liberal and radical left here to stay?
  - Implications for PKE?
Mainstream econ: New Keynesian Econ

- Accept need for microfoundations of macro, but reject market clearing
- Takes market-clearing equilibrium as reference point
- In 1990s (Mankiw and Romer 1991): bewildering variety of partial equilibrium models sticky prices, staggered wage setting, credit rationing, financial accelerator, efficiency wages, NAIRU, multiple equilibria, noise trader models...
- In 2000s variety of NK models turns into NK-DSGE (ok, maybe ZLB)
- ‘even if...’ model turned into THE benchmark model
Recently, in the mainstream

- Theoretical stagnation: modifying NK DSGE
- lots of interesting empirical ‘NK’ work, to some extent reinventing PK wheels, but empirically more advanced
  - de Long and Summers 2012 on fiscal policy
  - Blanchard et al 2016 on hysteresis
  - Piketty, Saez on inequality
  - Mian and Sufi on macro economics with micro data
  - Haldane, Borio on financial instability
  - Cecchetti and Kharroubi 2012 on financial development
  - Jorda et al 2013 JMCB on debt and recessions
  - Ostry et al 2014 on inequality and growth
- Saltwater-sweetwater divide has broken up again in the USA (Romer 2016...)
- But in Europe not much (Wren Lewis, de Grauwe, Bofinger ...)

Where is PKE?

- PK has a well defined core
  - principle of effective demand,
  - fundamental uncertainty, animal spirits, liquidity preference
  - Endogenous money creation
  - Endogenous financial instability,
  - independent investment function in the long run,
  - class-specific saving propensities -> allows for wage-led demand regimes
  - hysteresis (natural rate endogeneity) in the long period...
- Note: that’s different from other heterodox streams that are often more heterogenous (Ecological Econ, Feminist Econ, Marxism...)
- It has set of journals and network of associations and conferences
- But is marginalised by the mainstream and has little impact on policy making
PKE: what has changed since 2008?

• Marginalisation has not changed much since the Financial Crisis 2008
• Essentially no opening of economics as an academic discipline in terms of hiring; mainstream journals still closed to PKE (in particular in macro)
• Austerity at universities has narrowed room for heterodox econs (in UK: only funding for 3* and 4* research => essentially no hetecon in REF2014/Econ; Stockhammer, Dammerer and Kapur 2017)
• Some increased interest by policy institutions (BoE, ILO...), but ultimately marginal
• Some increased interest by progressive parties, but no substantial impact on policy
• Today’s PK generation has few personal links to leading mainstream economists (different for previous cohort)
**Strong/weak ties: PKE a coherent paradigm or a ghetto?**

- Granovetter (1973): ‘the strength of weak ties’
- Strong ties are often within networks; strong ties “breed local cohesion, lead to overall fragmentation” (p. 1378); bridge to other networks are usually weak ties
- Illustrates importance of weak ties (rather than of strong ties) with respect to job search and the ability of different ethnic communities to organised here against community damaging building projects
- In this terminology PKE has a lot of strong ties, but few weak ties
- Kapeller and Dobusch (2012): citation analysis: most heterodox streams references their own stream and mainstream (who doesn’t cite them), but not other hetecons
Some openings

- Agent-based modelling (ABM) has gone macro.
  - Started out with microeconomic, mostly on innovation
  - Keynes meet Schumpeter (Dosi et al 2010, 2013, 2017 ....): it’a actually closer to Kalecki meet Schumpeter (wage-led demand, little on animal spirits...)
- Feminist Econ and PKE (Braunstein, van Staveren and Tavani 2011, Onaran et al 2019)
- Growing interest in IPE (International Political Economy) and CPE (Comparative Political Economy) in PK
  - Baccaro and Pontussen (2016) suggest founding CPE (VoC) in PK demand regimes rather than supply side institutions
  - Blyth and Mathijs (2017) regard lack of macroeconomics as a major shortcoming of IPE
  - Financialisation and financial instability have become important topics in Socio-Economics/economic sociology (van der Zwan 2014) and human geography
## PKE and other hetecon streams

<table>
<thead>
<tr>
<th></th>
<th>relation</th>
<th>Interaction</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feminist Econ</td>
<td>complementary</td>
<td>Modest</td>
<td>Growth models with gendered labour markets</td>
</tr>
<tr>
<td>Ecological Econ</td>
<td>Complementary</td>
<td>Growing</td>
<td>Growth with demand and resource constraints</td>
</tr>
<tr>
<td>ABM/Evolutionary</td>
<td>Complementary</td>
<td>Growing</td>
<td>ABM macro, endogenous tech change</td>
</tr>
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<td>Marxist Econ</td>
<td>Complementary/competing</td>
<td>ongoing</td>
<td>Wage vs profit-led growth</td>
</tr>
<tr>
<td>Institutionalist</td>
<td>Complementary</td>
<td>modest</td>
<td></td>
</tr>
<tr>
<td>Socio-Economics (economic sociology)</td>
<td>Complementary</td>
<td>Ongoing</td>
<td>Finance and financialisation</td>
</tr>
<tr>
<td>International Political Economy</td>
<td>Complementary</td>
<td>Modest</td>
<td>Growth regimes and political alliances</td>
</tr>
</tbody>
</table>
Kalecki-Minsky modelling

- Demand driven
- Allows for wage-led demand
- Financial instability
- Hysteresis/path-dependency

- Personal as well as function distribution
- Wealth distribution
Pseudo-Goodwin cycles

- Stockhammer and Michell (2017) demonstrate that pseudo-Goodwin cycles can arise in a Minsky model with a wage-led demand regime.
- Pseudo-Goodwin cycle: looks like a Goodwin cycle (cycle in profit share/output space), but isn’t. Goodwin cycle requires profit-led demand and counter-cyclical profit share (industrial reserve army distribution function).
- Assume a Minsky model, where cycles stem from the interaction of debt and demand. Add an industrial reserve army distribution function.
- Pseudo-Goodwin cycles also arise in wage-led Minsky model.
- Any business cycle mechanism (that is independent of distribution) can generate pseudo-Goodwin cycles if paired with a reserve army distribution function.
Model M3: Pseudo-Goodwin model with wage-led demand effect

- Minsky cycle with reserve army effect and wage-led demand equation.

\[
\begin{align*}
\dot{f} &= f(-1 + py) \\
\dot{y} &= y(1 - f + sw) \\
\dot{w} &= w(-c + ry - w)
\end{align*}
\]

f...financial variable (leverage ratio), y...output, w...wage share
implications

- Pseudo-Goodwin cycles can arise in wage-led economy
- Any business cycle mechanism (that is independent of distribution) can generate pseudo-Goodwin cycles if paired with a reserve army distribution function.
- (endogeneous) business cycle analysis: need to test heterodox business cycle arguments against each other, possibility of observational equivalence
- Interaction of business cycle mechanisms?
Bhaduri-Marglin model with financial variables

- Extending the Bhaduri-Marglin model to include financial variables (HHD, business debt, property prices, share prices)
  - Financial effects on demand stronger than distribution effects.
  - Negative effects of debt on investment, often positive effects on consumption.
- Stockhammer, Rabinovich and Reddy (2018): similar model for 4 countries with long historical series (1855-2014) based on Piketty Zucman, financial variable: Piketty’s ‘private wealth’
  - Domestically wage-led demand regimes, typically small effects
  - Varying, but at times substantial financial effects
  - In US, UK: pos effect of PW on consumption, neg on investment
  - In DE, FRA: no effect of PW on consumption, some pos effect on inv
Endogeneous financial cycles

- Families of Minsky models (Nikolaidi and Stockhammer 2018):
  - debt cycle model, speculative asset price models (momentum trader models)
  - HH debt vs business debt
  - A lot theoretical advances, only a handful of empirical studies.
- Mainstream literature on cycles
  - DSGE with exogeneous shocks, establish whether shock gets amplified
- In contrast, here: cycles resulting from interaction of a real (GDP) and a financial variable
A simple financial-real interaction model

\[ y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 f_{t-1} \]  \hspace{1cm} (1)

\[ f_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 f_{t-1} \]  \hspace{1cm} (2)

\[ J = \begin{bmatrix} \alpha_1 & \alpha_2 \\ \beta_1 & \beta_2 \end{bmatrix} \]  \hspace{1cm} (3)

- Cycles occur if the eigenvalues of (3) are complex conjugates
- Requires \( Tr(J)^2 - 4Det(J) < 0 \)
- Necessary condition for oscillations: \( \alpha_2 \beta_1 < 0 \)
- Moreover, complex eigenvalues (\( \lambda = h \pm \Omega i \)) of the VARs yield the implied cycle length (L):

\[ L = \frac{2\pi}{\arccos\left( \frac{h}{\sqrt{h^2 + \Omega^2}} \right)} \]  \hspace{1cm} (8)
Testing real-financial interaction cycles

<table>
<thead>
<tr>
<th>Expected signs and the two necessary conditions hold</th>
<th>Avg cycle length</th>
<th>notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest rate</td>
<td>4 of 7</td>
<td>5.5 yrs</td>
</tr>
<tr>
<td>NFCD</td>
<td>6 of 7</td>
<td>11 yrs (based on 5)</td>
</tr>
<tr>
<td>HHD</td>
<td>0 of 7</td>
<td>Results not robust; in baseline 4 anti-Minsky cycles</td>
</tr>
</tbody>
</table>
Findings on real-financial interaction cycles

- Strongest evidence for NFCD
- Empirical support for cycle models with interaction between real economy and business debt (Asada 2001; Fazzari et al. 2008)
- Partial empirical support for models with interaction between real economy and interest rates (Foley 1987; Jarsulic 1989; Fazzari et al. 2008)
- No contradiction, but different frequencies
- No evidence for HHD – GDP cycles
- Implication for research on financial cycles: aggregate debt measures may conceal different cycle frequencies
- Note: don’t test asset price interaction cycles
Inequality and household debt

• Argument that rising inequality has been a main cause of rising household debt (van Treeck 2014, Kapeller and Schutz 2014, Kumhof et al 2015, Stockhammer 2015),
• (at least) two mechanisms:
• Consumption cascades: upward-looking consumption norms, the middle classes and poor copy the behaviour of the rich,
• Poor driven into debt as they try to maintain living standards in the face of falling real wages
• Note: both regard rising debt as driven by consumption behaviour
• In models: $\Delta HHD = C - YD$
What drives Household debt?

increasing interest in household debt (D) since financial crisis
most research about effects of D, much less on determinants
arguments in the literature:

1. income inequality and expenditure cascades (Frank et al. 2014).
   Prominent in recent hetecon macro (Behringer and van Treeck 2013, Kapeller and Schütz 2014)
2. real estate prices: Minskyian households (Bezemer et al 2014, Ryoo 2015)
3. low interest rates: deviations from ‘sound’ monetary policy (Taylor)
4. financial deregulation

Table 1. Hypotheses on debt determinants

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Theoretical Argument</th>
<th>Predicted signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 expenditure cascades hypothesis (ECH)</td>
<td>Households make consumption decisions with respect to richer peers. Consumption decisions drive debt</td>
<td>$\frac{\partial D}{\partial Q} &gt; 0$</td>
</tr>
<tr>
<td>2 housing boom hypothesis (HBH)</td>
<td>Debt is driven by asset transactions. Rising asset prices lead to higher debt due to re-enforcing optimism about future price increases.</td>
<td>$\frac{\partial D}{\partial PP} &gt; 0$</td>
</tr>
<tr>
<td>3 financial deregulation hypothesis (FDH)</td>
<td>Deregulation of the financial industry lifts lending restrictions and allows households to take on more debt.</td>
<td>$\frac{\partial D}{\partial CRED} &gt; 0$</td>
</tr>
<tr>
<td>4 low interest rate hypothesis (LIH)</td>
<td>Loose monetary policy in the form of low interest rates encourages household borrowing.</td>
<td>$\frac{\partial D}{\partial R} &lt; 0$</td>
</tr>
</tbody>
</table>

$D$ is household debt, $Q$ is a measure of income inequality, $CRED$ stands for credit regulation, $R$ is a real interest rate and $PP$ indicates property prices.
Table 4: Household debt, baseline specifications

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DFE</td>
<td>PMG</td>
<td>DFE</td>
<td>PMG</td>
</tr>
<tr>
<td>$y^D$</td>
<td>0.984***</td>
<td>0.888***</td>
<td>0.954***</td>
<td>0.687***</td>
</tr>
<tr>
<td></td>
<td>(0.22)</td>
<td>(0.11)</td>
<td>(0.23)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>pp</td>
<td>0.414***</td>
<td>0.570***</td>
<td>0.426***</td>
<td>0.622***</td>
</tr>
<tr>
<td></td>
<td>(0.14)</td>
<td>(0.07)</td>
<td>(0.15)</td>
<td>(0.04)</td>
</tr>
<tr>
<td>Top1</td>
<td>-0.674</td>
<td>0.454</td>
<td>-0.169</td>
<td>3.438***</td>
</tr>
<tr>
<td></td>
<td>(1.89)</td>
<td>(0.75)</td>
<td>(1.07)</td>
<td>(0.49)</td>
</tr>
<tr>
<td>Gini</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>-3.712**</td>
<td>-0.601</td>
<td>-3.703**</td>
<td>-0.421</td>
</tr>
<tr>
<td></td>
<td>(1.50)</td>
<td>(0.58)</td>
<td>(1.49)</td>
<td>(0.40)</td>
</tr>
<tr>
<td>OLD</td>
<td>0.34</td>
<td>0.977</td>
<td>0.27</td>
<td>5.996***</td>
</tr>
<tr>
<td></td>
<td>(1.74)</td>
<td>(1.31)</td>
<td>(1.88)</td>
<td>(1.01)</td>
</tr>
<tr>
<td>cred</td>
<td>0.790***</td>
<td>0.710***</td>
<td>0.780***</td>
<td>0.439***</td>
</tr>
<tr>
<td></td>
<td>(0.28)</td>
<td>(0.16)</td>
<td>(0.28)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>SR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>error</td>
<td>-0.061***</td>
<td>-0.066***</td>
<td>-0.059***</td>
<td>-0.075**</td>
</tr>
<tr>
<td>correction</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>N</td>
<td>362</td>
<td>374</td>
<td>371</td>
<td>374</td>
</tr>
<tr>
<td>H0: res=I(1)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>H0: $y^D=1$</td>
<td>0.94</td>
<td>0.32</td>
<td>0.84</td>
<td>0.00</td>
</tr>
<tr>
<td>H0: PP=1</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Error correction models estimated with Pooled Mean Group (PMG) and Dynamic Fixed Effects (DFE) estimators.

Dependent variable: $\Delta \log(D_{it})$.

Stars indicate statistical significance: * $p<0.1$, ** $p<0.05$, *** $p<0.01$. Standard errors in brackets.

The bottom three lines of the report p-values of hypothesis $H_0: r = I(1)$ is the hypothesis that the residuals contain a unit root.

and $H_0: \beta_{yD} = 1$ and $H_0: \beta_{PP}$ are the hypotheses that the long-run elasticities for disposable income and property prices are equal to 1.
Findings

- support for housing boom hypothesis
  - positive and statistically highly significant effect of PP on D
  - highly robust across specifications
  - Effect larger in countries with more developed financial sector (split sample according to priv credit/GDP)
- no support for expenditure cascades hypothesis
  - Negative effect of Top1 on D
  - (modest) effects of interest rate and financial regulation
  - property prices key for household debt dynamics. Debt is asset transaction-driven, not consumption driven
Consumption cascades. A critique

- Upward-looking status comparisons popular in recent PKE
- Attractive: behavioural econ elements
- Micro evidence for other regarding spending behaviour
- But focuses on demand for credit; downplays banks’ lending decision
- Problem: regards increase in HH debt as driven by consumption.
- That misses that most debt is mortgage debt
- Alternative: debt as asset transaction driven
- Criticism of consumption cascades as a macroeconomic story of the pre-crisis period, not of behavioural story
- Implication for political economy of crisis: middle class lending rather than the poor
The NAIRU and Hysteresis

• In mainstream a topic in 1980s (Blanchard and Summers 1986), then went out of fashion
• Some empirical studies, but most of them test for a unit root in unemployment e.g. Stanley 2004
• Returned after crisis Blanchard et al 2015, Blanchard 2018; Cerra and Saxena (2008)
• One important long-term effect of the NAIRU debates is that EC, OECD, IMF rountinely publish NAIRU estimates
• These are bases for potential output estimates and thus the ‘structural deficit’
• These are based on the assumption of an exogenous NAIRU = no hysteresis.
U_t = UN_t + UC_t
UN_t = \mu_{t-1} + UN_{t-1} + \varepsilon_t^N
\mu_t = \mu_{t-1} + \varepsilon_t^\mu
UC_t = \phi_1 UC_{t-1} + \phi_2 UC_{t-2} + \varepsilon_t^C
w_t = f(tot, pr, ws, UC_t)

The natural rate is a unit root process with a time varying drift
• cyclical rate follows an exogenous autoregressive process
• augmented with a wage Phillips curve, These vary by country

U_t ... unemployment rate, UC_t ... cyclical unemployment rate, UN_t^N ... NAIRU, w... wages, tot... terms of trade, pr... lab pdy, ws... wage share
Building on Jaeger and Parkinson (1994):

\[ U_t = UN_t + UC_t \]

\[ UC_t = \phi_1 UC_{t-1} + \phi_2 UC_{t-2} + \varepsilon_t^C \]

\[ UN_t = UN_{t-1} + \alpha UC_{t-1} + \varepsilon_t^N \]

\[ \Delta p_t = \beta UC_t + \varepsilon_t^p \]

\( U_t \) ... unemployment rate, \( UC_t \) ... cyclical unemployment rate, \( UN_t \) ... NAIRU, \( p \) ... CPI

• (1) estimate the model an unobserved components model using a Kalman filter: point estimates for hysteresis \( >> 0 \), but large confidence intervals

• (2) estimate an unobserved components model using Bayesian maximum likelihood

• Estimation period 1960-2017, data: AMECO
Results for $\alpha$

<table>
<thead>
<tr>
<th></th>
<th>Prior mean</th>
<th>Posterior mean</th>
<th>90% highest posterior density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>0.3</td>
<td>0.44</td>
<td>[0.00 0.71]</td>
</tr>
<tr>
<td>France</td>
<td>0.3</td>
<td>0.73</td>
<td>[0.11 1.33]</td>
</tr>
<tr>
<td>UK</td>
<td>0.3</td>
<td>0.72</td>
<td>[0.12 1.32]</td>
</tr>
</tbody>
</table>

- Calvert Jump and Stockhammer (in progress)
- estimate a unobserved components model using Bayesian maximum likelihood
- Estimation period 1960-2017, data: AMECO
- prior density of alpha skewed towards 0
Figure 1: Prior densities for $\alpha$, $\beta$, $A$, $\omega$, and the shock standard deviations.
Hysteresis, path dependence

- Strong evidence that demand shocks/recession have impact on growth path (Blanchard et al 2016)
- Much of this is about endogeneous productivity growth
- Strong implications for economic policy
- NAIRU is endogeneous. Need to calculate NAIRU allowing for hysteresis
Concluding: PK and NK

- PKs is intellectually established, but effectively marginalised. We need to reach out (other hetecons, other social sciences, policy makers, mainstream econ)
- Depressing that Global Financial Crisis has changed little in the marginalisation of PK (and other hetecons)
- NK has re-invented several PK wheels (credit rationing, endogenous money, debt cycles, NAIRU, hysteresis); the lack of acknowledgement may be unpleasant, but knowledge is public good ... *what can we learn from them?*
- NK has accepted the microfounded terrain of neoclassical econ, which has resulted in a fertile research program
- DSGE is not the most attractive part of NK research
- PKs should confront their implicit micro assumptions -> heterogeneous agents and incomplete markets -> ABM, de Grauwe and Macchiarelli 2015
Outlook

• **The strength of weak ties**: cooperate with (and cite!) other hetecons (ABM, Ecol Econ, Fem Econ ...)

• Let’s **Revive ‘Political Economy’** - engage with social sciences
  • When and why do PKs switch from Political Economy to PKE?
  • What do PKs analytically say about the state and govt intervention
  • Attempt to define a new field: Political Economy

• **Long Live Sisyphos!** - have to try to talk to mainstream econ, even if they don’t listen.
  • Need for empirical analysis

• **Economists have hitherto only interpreted [modelled] the world differently** ... - have to be relevant for economic policy (=for states and govt) and for social movements
PK vision

- Heterogeneous agents: class and other social groups (workers vs capital owners, fundamentalists vs momentum traders, different investment strategies)
- Independent investment function; demand shocks are primarily investment shocks
- Endogenous instability of financial markets
- Labour market: wage bargaining with endogenous NAIRU => hysteresis
PK current research areas

• 1950-60s growth theory, capital controversies
• 1970s shift to monetary issues: endogenous money; financial instability; medium term growth models
• wage-led/profit-led growth;
• balance of payment constraint growth models
• Financial instability and Minsky models
• Stock-flow consistent (SFC) modelling (large scale macro model with fully specified financial balances and stocks)
• Interaction with other hetecon streams: social sciences; ABM; complexity theory; ecological econ
### Interest rate-GDP cycles

<table>
<thead>
<tr>
<th>Country</th>
<th>Sample</th>
<th>$\alpha_2/\beta_1 &lt; 0$?</th>
<th>Cycle length</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUS</td>
<td>1973-2014</td>
<td>yes</td>
<td>4 yrs</td>
</tr>
<tr>
<td>CAN</td>
<td>1973-2015</td>
<td>yes</td>
<td>-</td>
</tr>
<tr>
<td>DEU</td>
<td>1973-2015</td>
<td>yes</td>
<td>4 1/2 yrs</td>
</tr>
<tr>
<td>FIN</td>
<td>1972-2015</td>
<td>no</td>
<td>-</td>
</tr>
<tr>
<td>FRA</td>
<td>1973-2015</td>
<td>yes</td>
<td>-</td>
</tr>
<tr>
<td>GBR</td>
<td>1981-2015</td>
<td>yes</td>
<td>6 yrs</td>
</tr>
<tr>
<td>USA</td>
<td>1973-2014</td>
<td>yes</td>
<td>7 yrs</td>
</tr>
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</table>

Average cycle length: 5 1/2 yrs
## Non-financial corporate debt-GDP cycles

<table>
<thead>
<tr>
<th>Country</th>
<th>Sample</th>
<th>$\alpha_2\beta_1 &lt; 0$ ?</th>
<th>Cycle length</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUS</td>
<td>1979-2014</td>
<td>yes</td>
<td>15 yrs</td>
</tr>
<tr>
<td>CAN</td>
<td>1972-2015</td>
<td>yes</td>
<td>13 yrs</td>
</tr>
<tr>
<td>DEU</td>
<td>1973-2015</td>
<td>yes</td>
<td>7 yrs</td>
</tr>
<tr>
<td>FIN</td>
<td>1972-2015</td>
<td>no</td>
<td>13 yrs</td>
</tr>
<tr>
<td>FRA</td>
<td>1979-2015</td>
<td>yes</td>
<td>181 yrs</td>
</tr>
<tr>
<td>GBR</td>
<td>1978-2015</td>
<td>yes</td>
<td>9 yrs</td>
</tr>
<tr>
<td>USA</td>
<td>1973-2014</td>
<td>yes</td>
<td>9 yrs</td>
</tr>
</tbody>
</table>

Average cycle length (excl. FRA): 11 yrs
### Household debt-GDP cycles

<table>
<thead>
<tr>
<th>Country</th>
<th>Sample</th>
<th>$\alpha_2\beta_1 &lt; 0$?</th>
<th>Cycle length</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUS</td>
<td>1979-2014</td>
<td>no</td>
<td>-</td>
</tr>
<tr>
<td>CAN</td>
<td>1973-2015</td>
<td>yes (anti-Minsky)</td>
<td>18 yrs</td>
</tr>
<tr>
<td>DEU</td>
<td>1972-2015</td>
<td>yes (anti-Minsky)</td>
<td>49 yrs</td>
</tr>
<tr>
<td>FIN</td>
<td>1974-2015</td>
<td>yes (anti-Minsky)</td>
<td>26 yrs</td>
</tr>
<tr>
<td>FRA</td>
<td>1980-2015</td>
<td>yes (anti-Minsky)</td>
<td>26 yrs</td>
</tr>
<tr>
<td>GBR</td>
<td>1974-2015</td>
<td>no</td>
<td>18 yrs</td>
</tr>
<tr>
<td>USA</td>
<td>1974-2014</td>
<td>no</td>
<td>19 yrs</td>
</tr>
</tbody>
</table>

Average cycle length: 26 yrs