

From Instability to Deflation

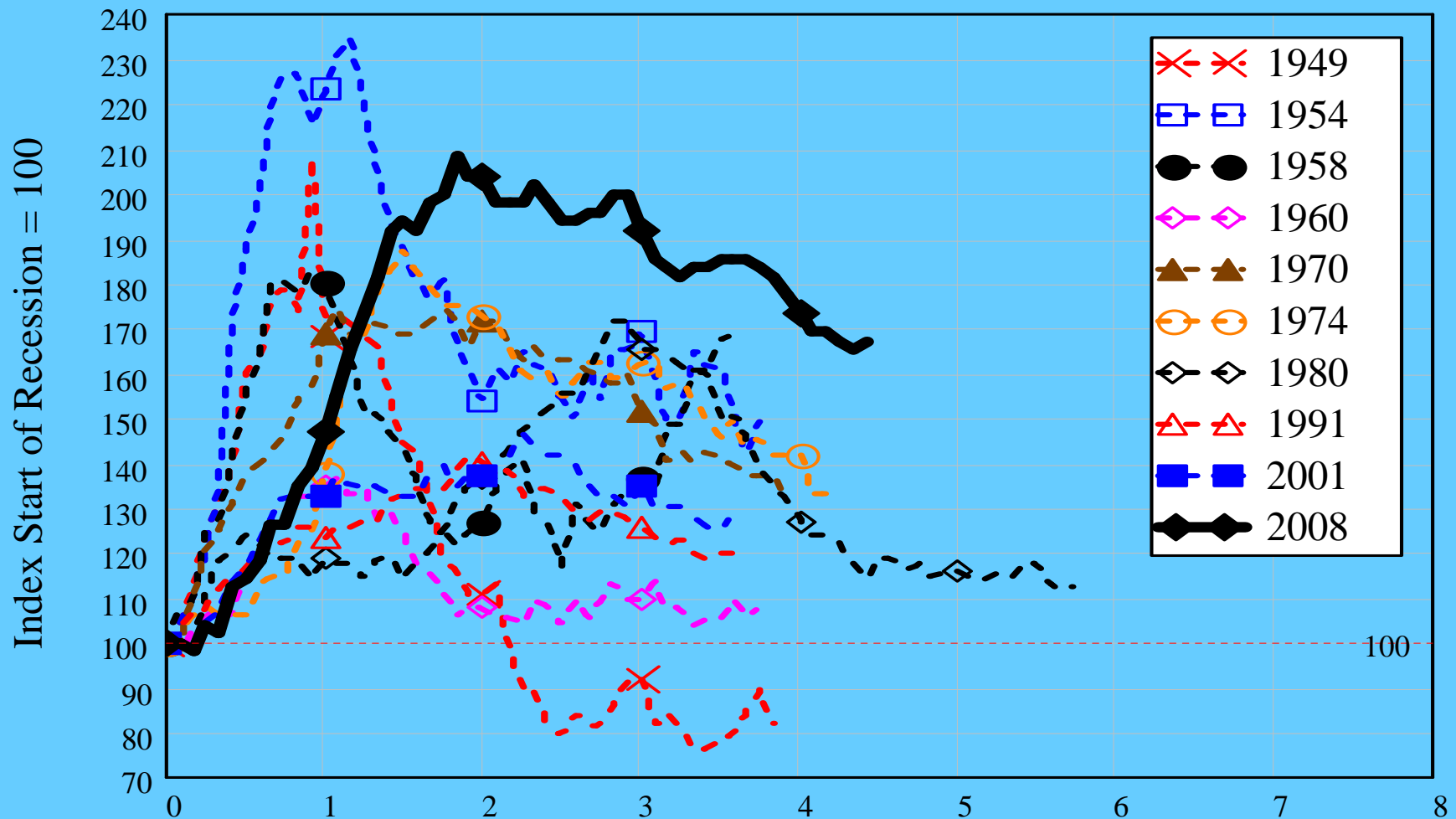
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www.debtdeflation.com/blogs

The permanent crisis?

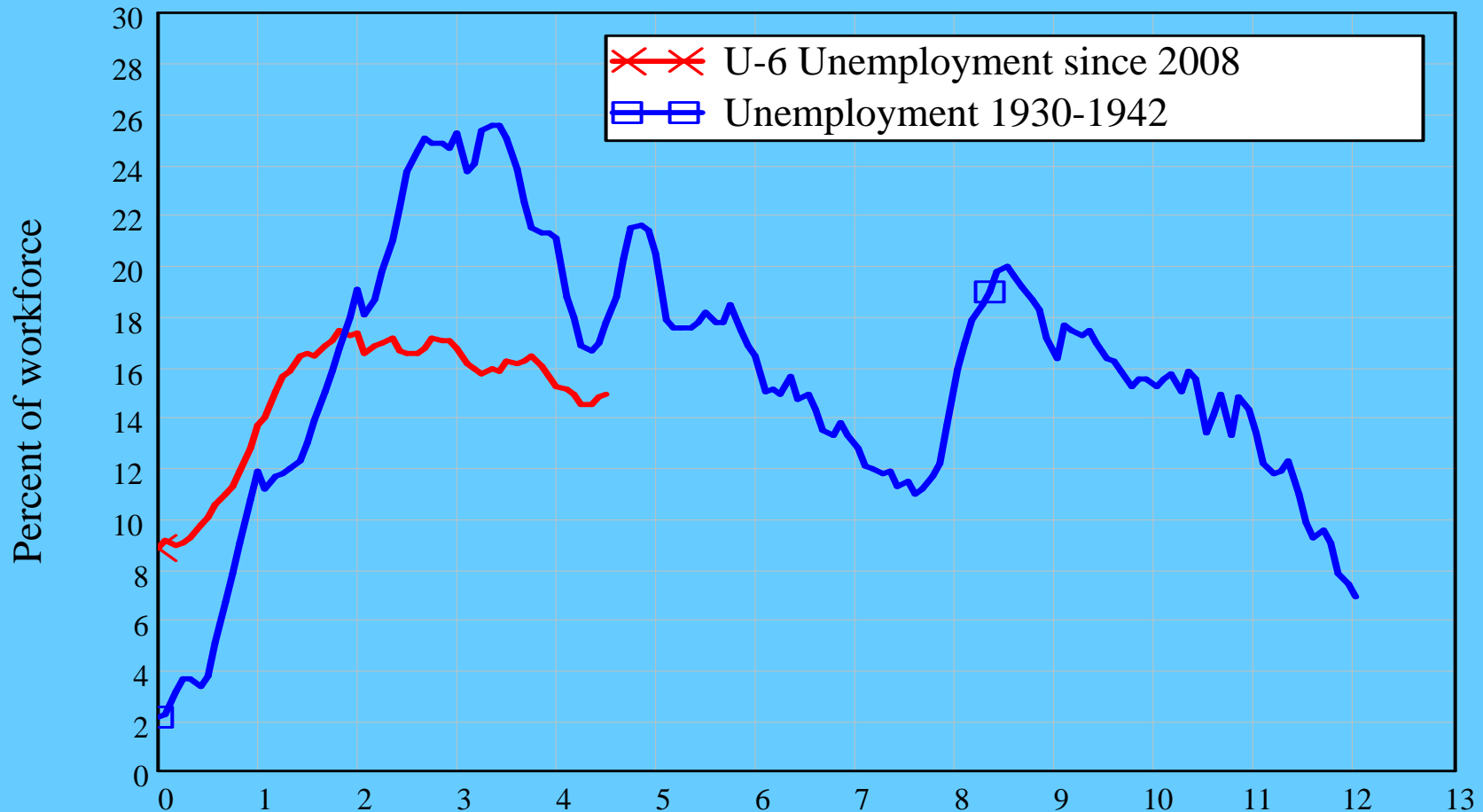
- Longest downturn since WWII
- Rise in Unemployment during Recession



The permanent crisis?

- The Great Depression and the Lesser Depression:

Unemployment: Great Depression and Today



The Financial Instability Hypothesis

- Economy in **historical time**
- Debt-induced recession in recent past
- Firms and banks conservative re debt/equity, assets
- Only conservative projects are funded
 - Recovery means most projects succeed
- Firms and banks revise risk premiums
 - Accepted debt/equity ratio rises
 - Assets revalued upwards...
- “Stability is destabilising”
 - Period of tranquility causes expectations to rise...
- Self-fulfilling expectations
 - Decline in risk aversion causes increase in investment
 - Investment expansion causes economy to grow faster
- Rising expectations leads to “The Euphoric Economy”...

The Financial Instability Hypothesis

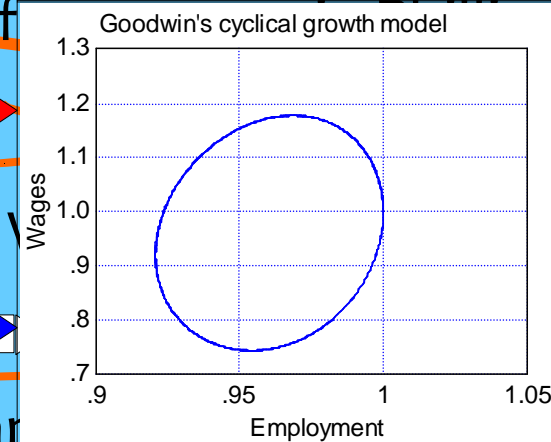
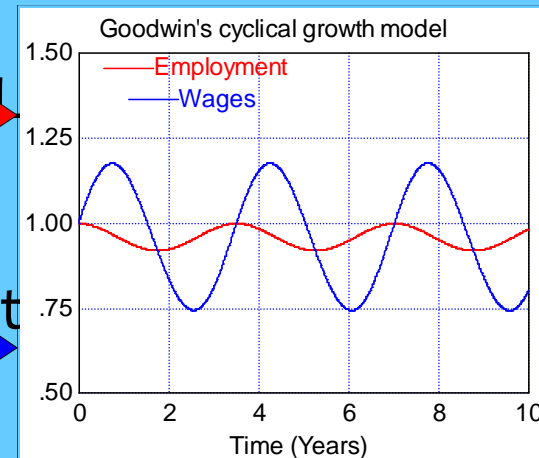
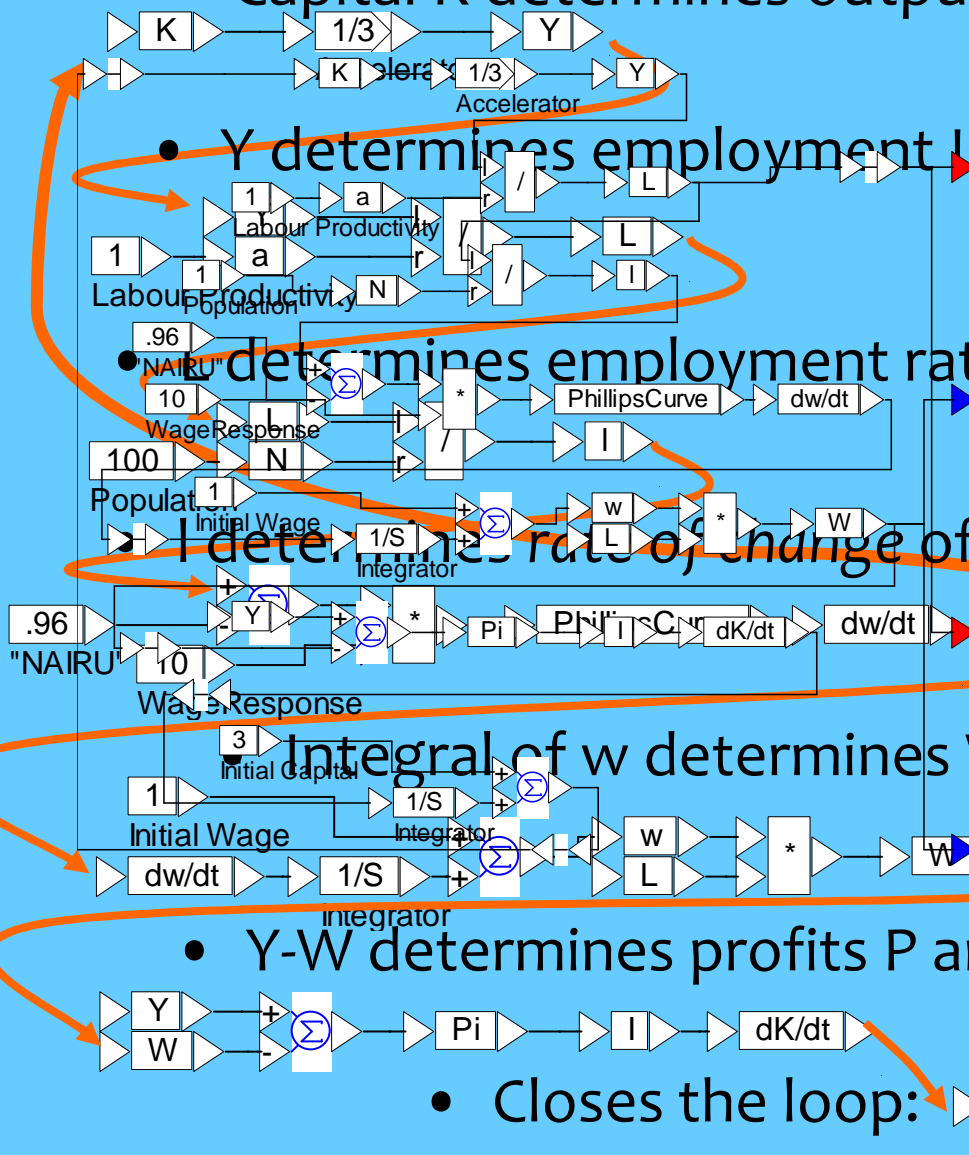
- Asset prices rise: speculation on assets profitable
- Increased willingness to lend increases money supply
 - Money supply endogenous, not controlled by CB
 - Riskier investments enabled, asset speculation rises
- The emergence of “Ponzi” financiers
 - Cash flow less than debt servicing costs
 - Profit by selling assets on rising market
 - Interest-rate insensitive demand for finance
- Rising debt levels & interest rates lead to crisis
 - Rising rates make conservative projects speculative
 - Non-Ponzi investors sell assets to service debts
 - Entry of new sellers floods asset markets
 - Rising trend of asset prices falters or reverses

The Financial Instability Hypothesis

- Boom turns to bust
- Ponzi financiers first to go bankrupt
 - Can no longer sell assets for a profit
 - Debt servicing on assets far exceeds cash flows
- Asset prices collapse, increasing debt/equity ratios
- Endogenous expansion of money supply reverses
- Investment evaporates; economic growth slows
- Economy enters a debt-induced recession
 - Back where we started...
- Process repeats once debt levels fall
 - But starts from higher debt to GDP level
- Final crisis where debt burden overwhelms economy
 - Modeling Minsky...

Keen 1995 Model Foundations: Nonlinear dynamics

- Growth Cycle model (Goodwin 1967, Blatt 1983)
 - Capital K determines output Y via the accelerator:



Phillips Curve

...

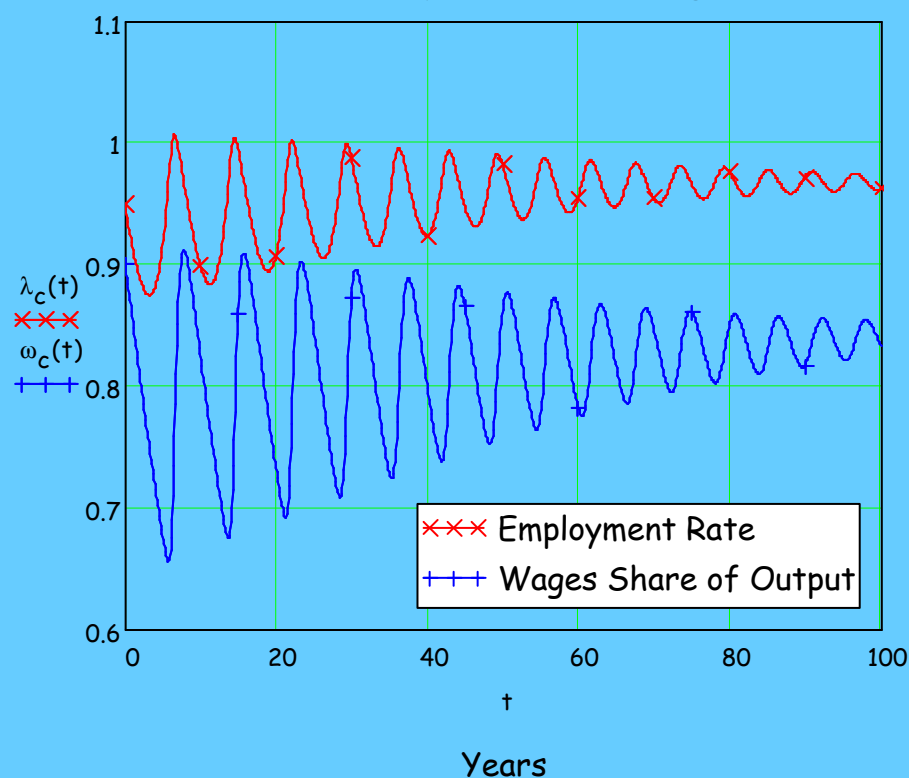
Modelling Depressions as “Black Holes”

- Goodwin model: No role for debt
- Debt essential element to introduce Minsky
- For debt, essential that capitalists wish to invest more than they earn
 - “Debt seems to be the residual variable in financing decisions. Investment increases debt, and higher earnings tend to reduce debt.” (Fama & French 1997)
 - “The source of financing most correlated with investment is long-term debt... These correlations confirm the impression that debt plays a key role in accommodating year-by-year variation in investment.” (Fama & French 1998)
- In words, ***change in debt equals investment minus profits***
- As an equation:
$$\frac{d}{dt} D = I - \Pi$$

Sensitive dependence on initial conditions..

- Two equilibria: “good” with positive employment, incomes
- Which one depends on initial conditions:
 - Close to good equilibrium, convergence
 - Close to bag equilibrium, convergence too: a “Black Hole”
 - “Event Horizon” boundary: many initial combinations can lead to Depression outcome

Basic Minsky Model: Convergence

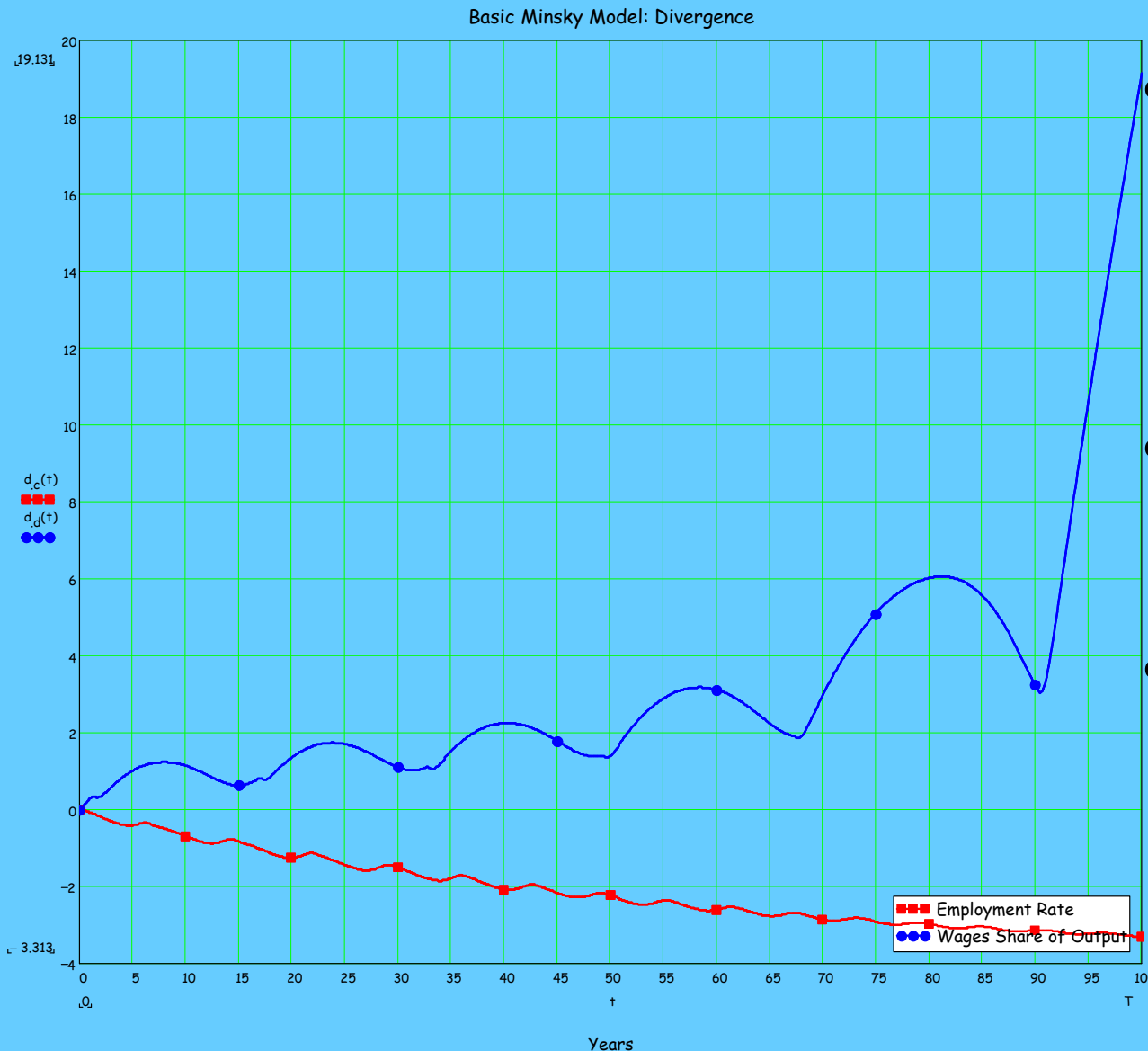


Basic Minsky Model: Divergence



Sensitive dependence on initial conditions..

- Debt dynamics behind very different outcomes:



- No price dynamics in this model
- Strictly monetary model of capitalism developed to explore price dynamics
- Outcome: deflation arises from falling wages
- Dynamic price equation derived from financial flows

$$\frac{dP}{dt} = -\frac{1}{\tau_p} \cdot \left(P - \frac{W}{a \cdot (1-s)} \right)$$

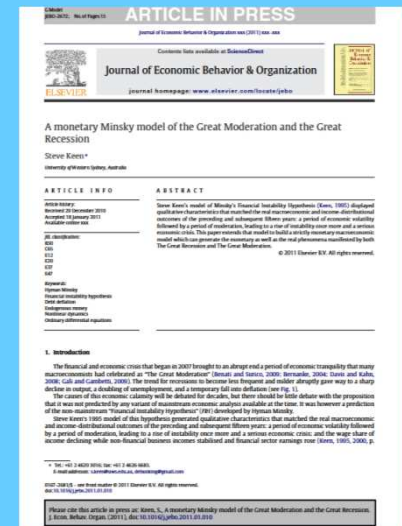
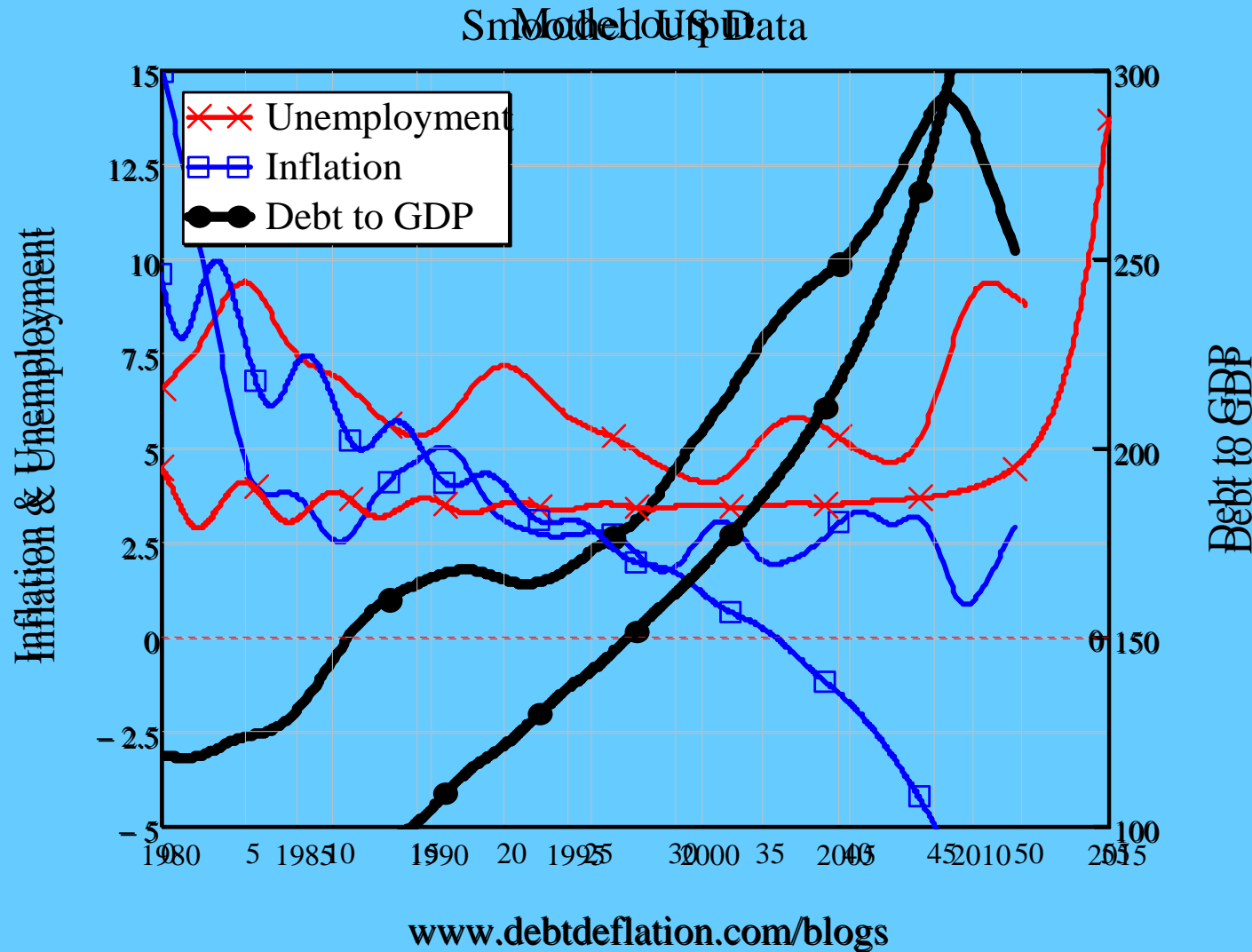
Explicitly Monetary Minsky Model

- Monetary macroeconomic models devised from accounting table:
- Model generates system of coupled ODEs for analysis, simulation

S _{P3} :=	Given		$\frac{d}{dt} B_P(t) = \frac{F_L(t)}{\tau_R \text{Liab}} - \frac{B_E(t)}{\tau_L}$		$B_P(0) = \text{Eq}_{\text{Init}}$	
	"Priv. Bank"	A _T	$\frac{d}{dt} A_T$	Liab	Liab	Equity
	"Account"	"Loans"	"Bk Reserves"	"Firms"	"Workers"	"Capitalists"
	"Value"	Init _{Loan}	$\frac{d}{dt} F_L(t) = \frac{B_E(t)}{\tau_L \text{Init}_{\text{Loan}}} - \frac{F_L(t)}{\tau_R}$	0	$F_L(0) = 0$	0
	"Symbol"	F _L (t)	$\frac{d}{dt} B_V(t) = 0$	F _D (t)	W _D (t)	C _D (t)
	"Gov Spend"	0	Gov	0	-Gov	0
	"Tax"	0	-Tax	0	0	Tax
	"Make Loan"	Loan	$\frac{d}{dt} F_D(t) = \frac{B_E(t)}{\tau_L \text{Loan}} - \frac{F_L(t)}{\tau_R}$	0	$F_D(0) = 0$	0
	"Repay"	-Repay	0	Repay	0	0
	"Wages"	0	$\frac{d}{dt} W_D(t) = 0$	Wage	-Wage	W _D (0) = 0
	"Dividends"	0	0	Div	0	-Div
	"Charge Interest"	Int	$\frac{d}{dt} C_D(t) = 0$	0	0	C _D (0) = 0
	"Pay Interest"	-Int	0	0	0	0
	"Consume"	0	$\frac{d}{dt} B_E(t) = \frac{F_L(t)}{\tau_R \text{Cons}_W} - \frac{B_E(t)}{\tau_L}$	Cons _W	$B_E(0) = \text{Eq}_{\text{Init}}$	0
	"Consume"	0	0	-Cons _C	0	Cons _C
	"Consume"	0	$\frac{d}{dt} B_R(t) = 0$	-Cons _B	0	B _R (0) = 0

Explicitly Monetary Minsky Model

- Monetary macroeconomics model reproduces stylized facts of crisis

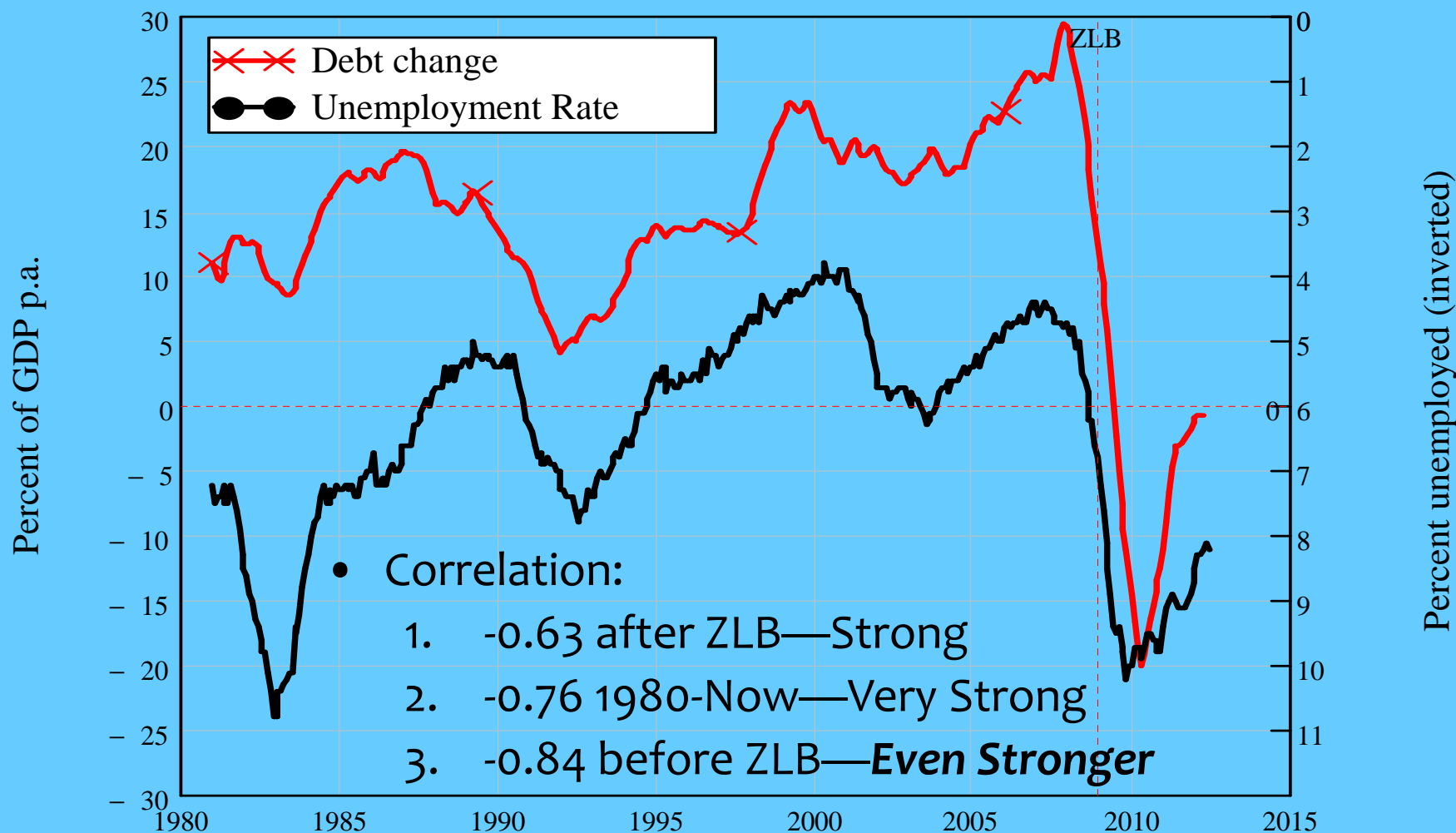


Aggregate debt overview

- Monetary macroeconomics redefines aggregate demand & supply
 - Necessary consequence of endogenous money
 - Debt not a “zero sum game” but net addition to demand
 - Change in debt finances investment & speculation
- Theoretical Outcome
 - AD is income plus change in debt;
 - [Mathematically proven here \(pp. 15-16; 23-25\)](#)
 - AS is goods & services plus asset sales
- Empirical consequences
 - Strong causal (with feedback) relations between
 - Change in debt & macroeconomic performance
 - Hypothesis: ***macroeconomic effect at all times***
 - Acceleration in debt & change in asset prices
 - Hypothesis: ***drives change in growth, asset prices***

Aggregate demand, income & debt

- Hypothesis: **change in debt has macroeconomic effect at all times**
Debt contribution to demand & unemployment

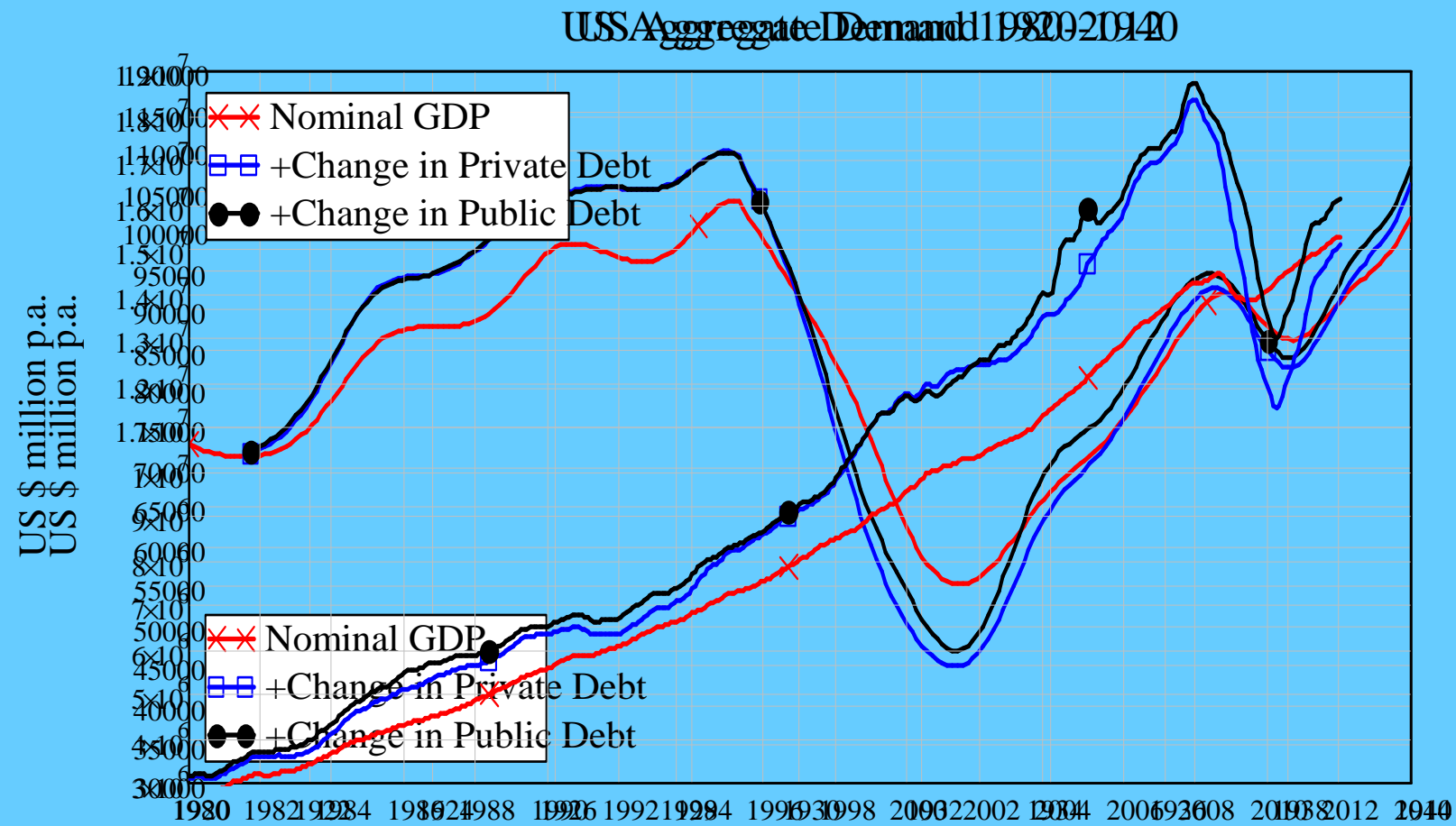


Sources: As for Figure 3 plus BEA GDP

Change in Debt & Aggregate Demand

- Today—compared to Then

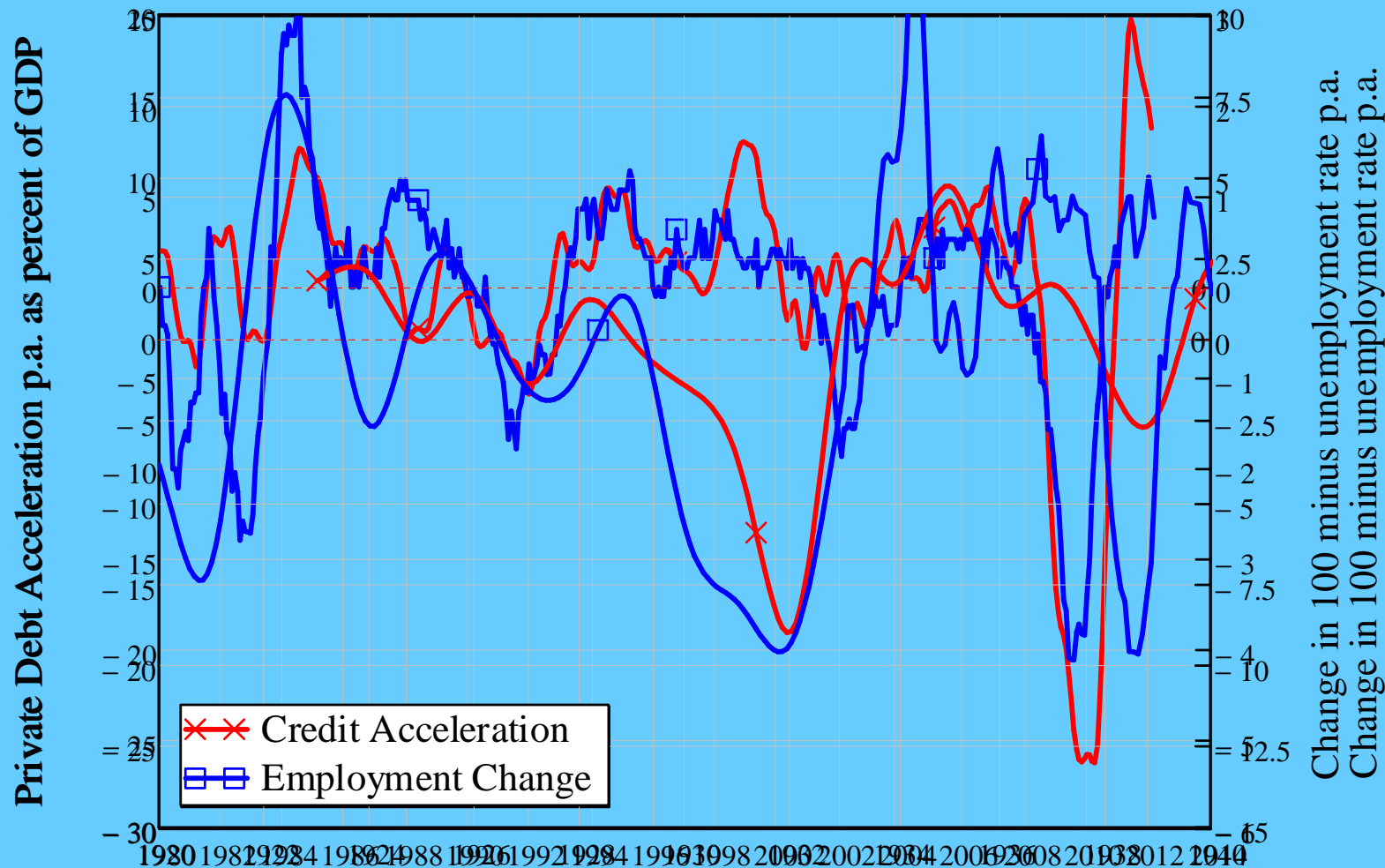
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Acceleration in Debt & Change in Employment

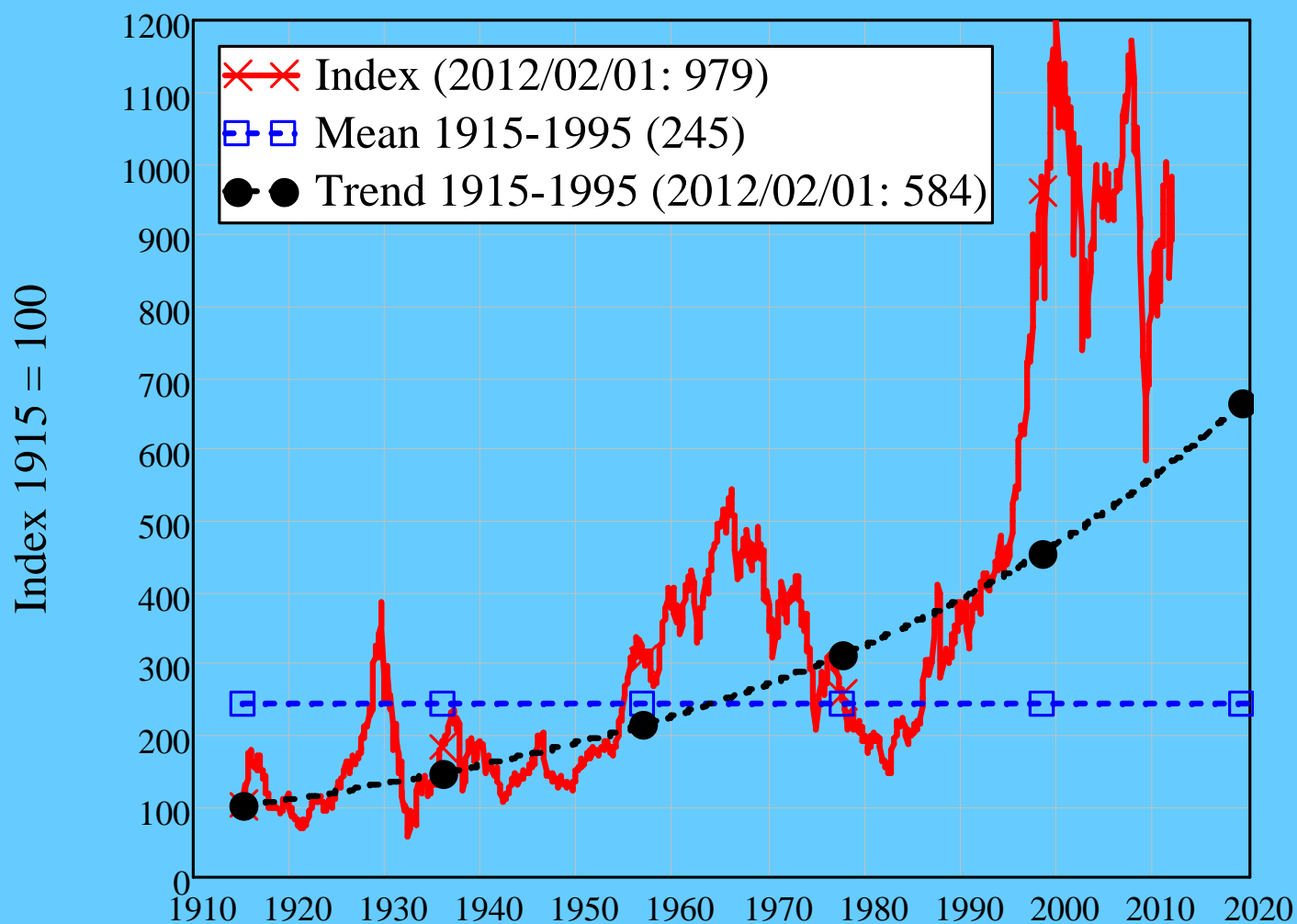
- Now (compared to then)

Credit Acceleration & Employment Change (Corr=0.79)

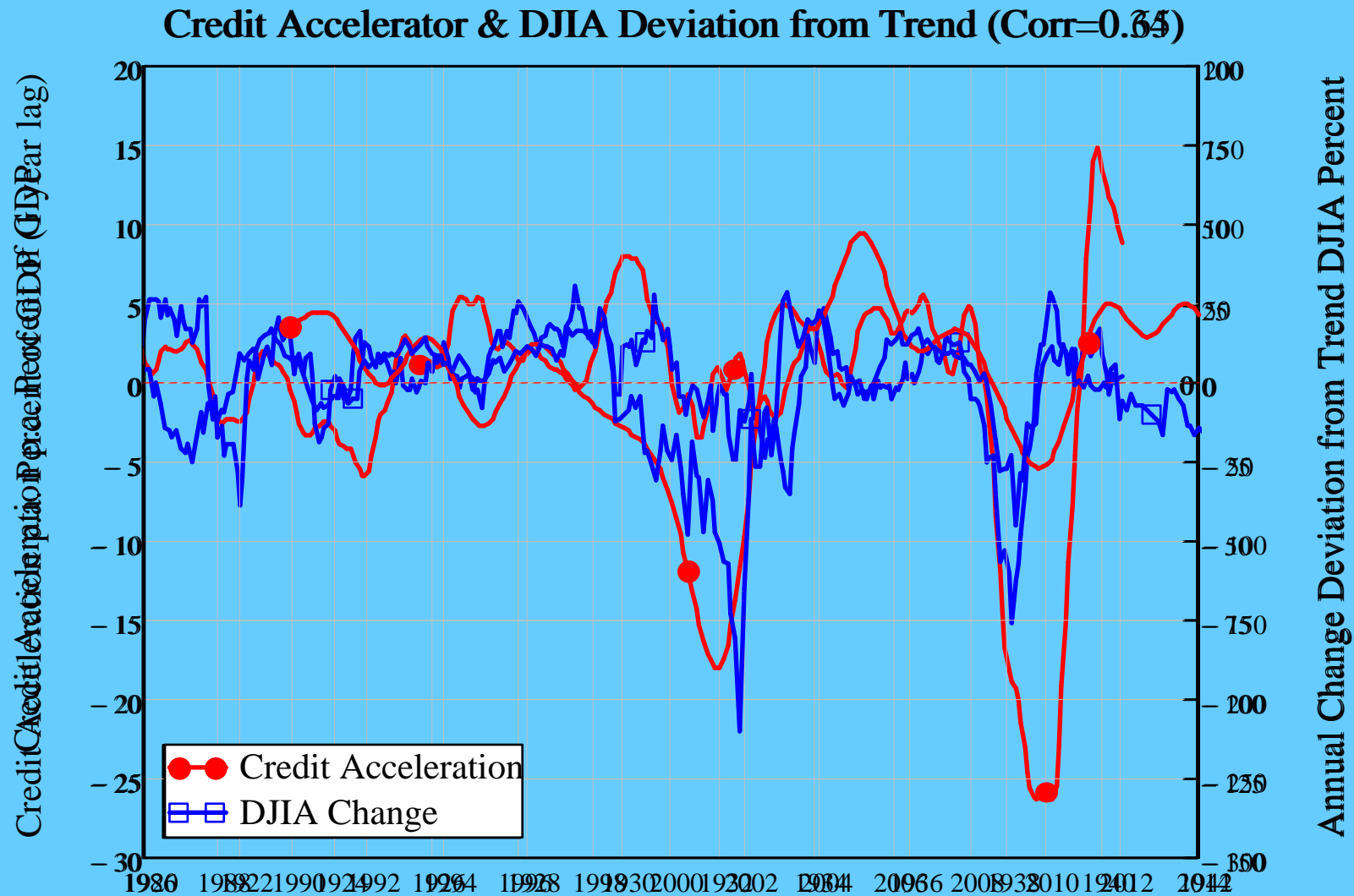


Share Prices—the long view

- Dow Jones deflated by the CPI
DJIA deflated by the CPI



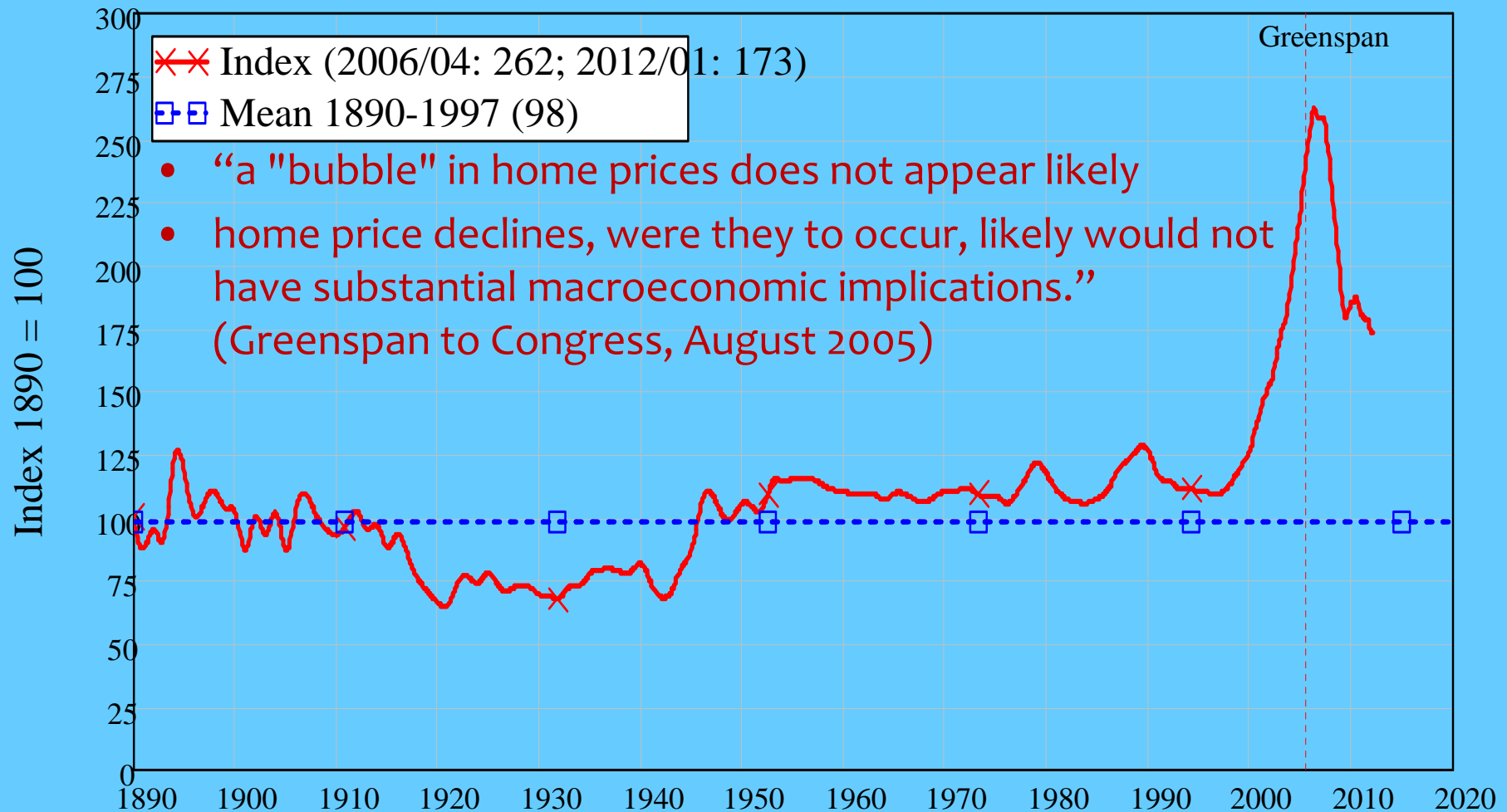
Acceleration in Debt & Change in Dow Jones



House Prices deflated by CPI—the long view

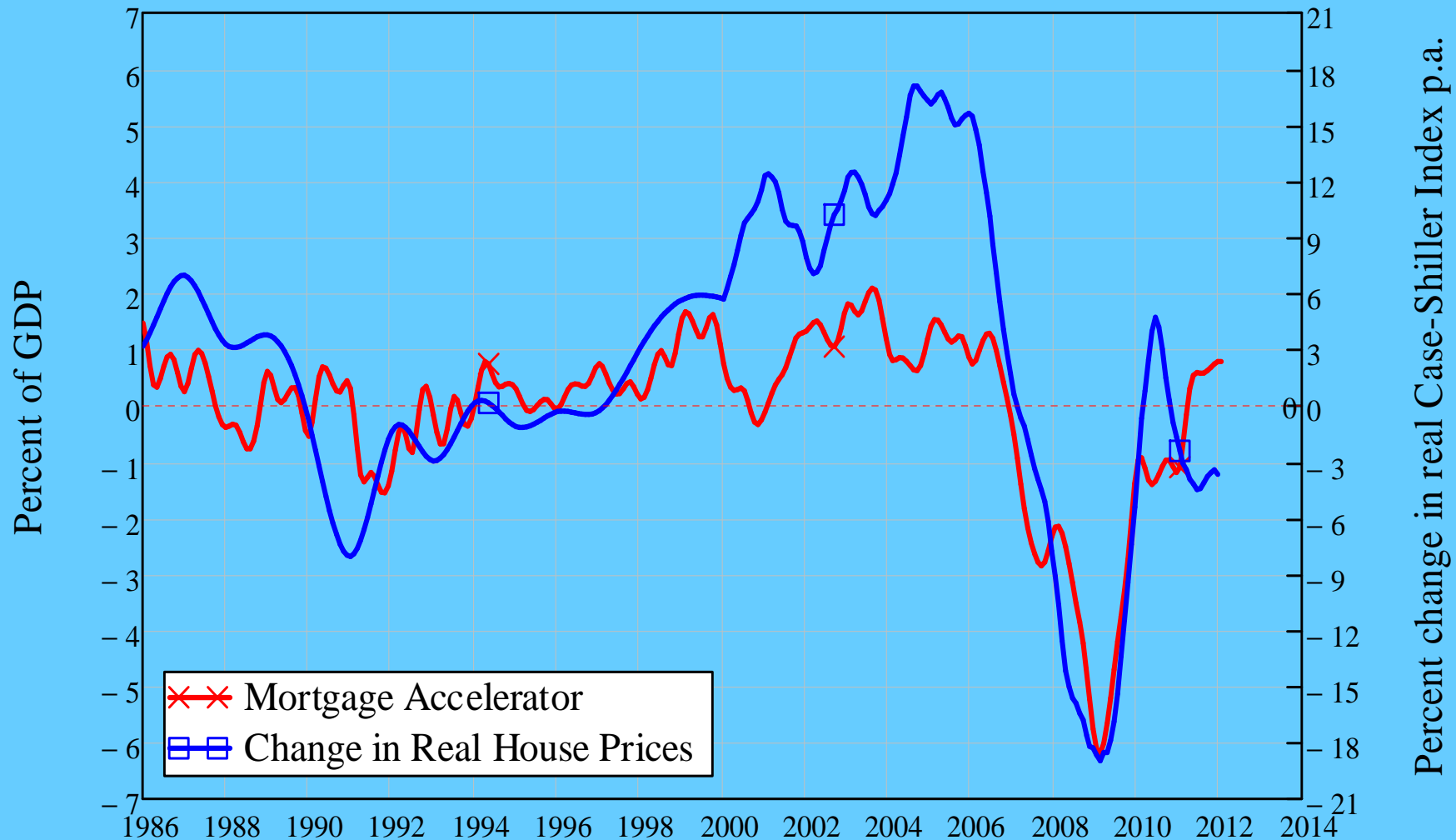
- NO trend; long term average 98

Real House Price Index



Acceleration in Mortgages & Change in House Prices

Mortgage Acceleration & House Price Movements (Corr=0.78)



How long to recovery?

- On historical trend, could be 15 years...

USA Private Debt to GDP

