Financial sector origins of economic growth delusion

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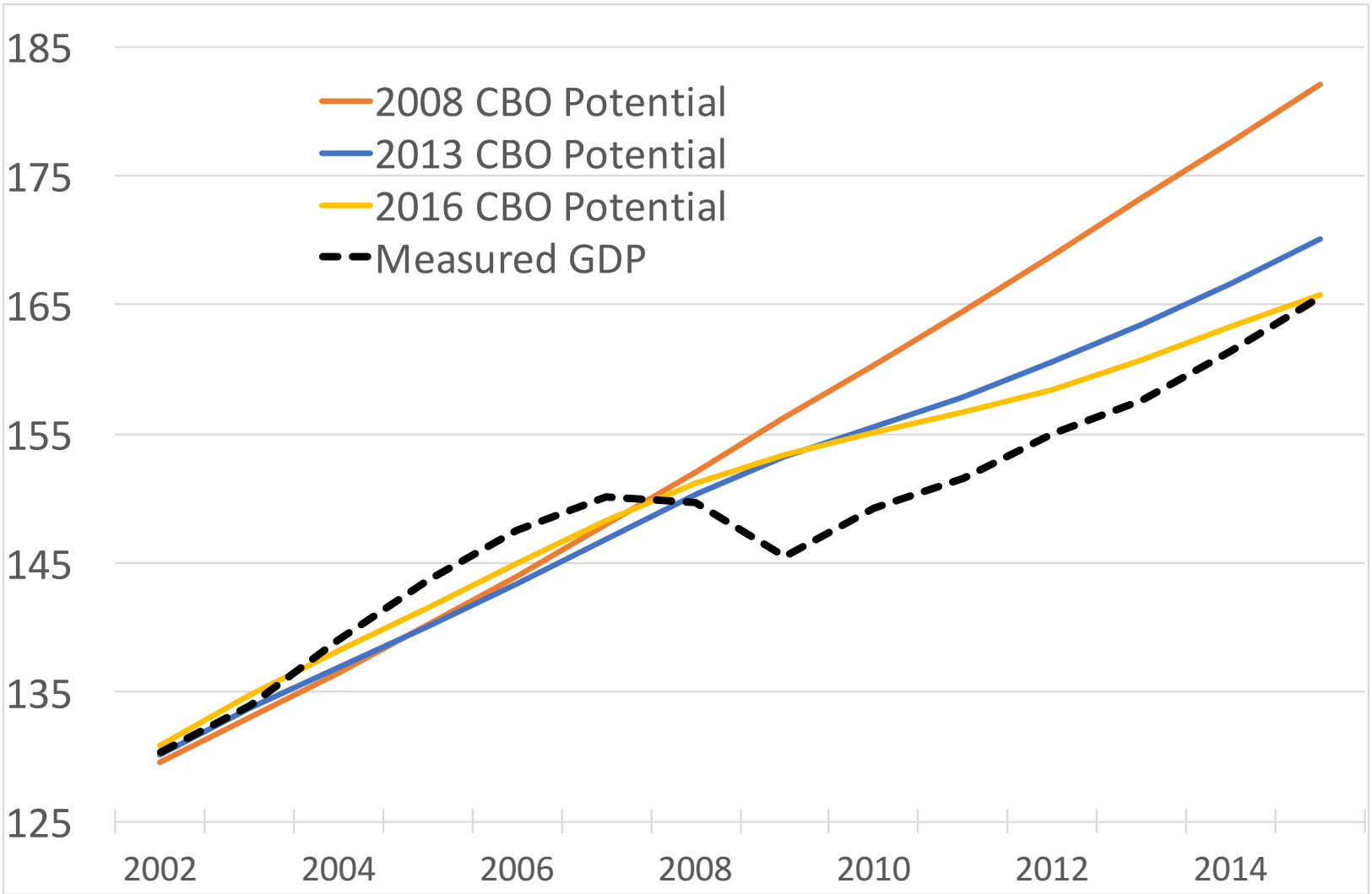
Motivation I



Motivation II

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Is the great recession a reversing of a great distortion?

Plan of Action

1. Outline the model(s)
   - Baseline model
   - Model with proprietary trading
   - Other extensions
2. Empirical relevance
   - Presence & exploitability of subsidy
   - Model predictions consisten with US time-series
   - Calculate a counterfactual GDP series
   - Other evidence

Model

Outline of Model

- Banking sector
  - Banks raise funds by issuing liabilities to HHs and RoW
  - Transform them, one to one, into capital which they provide to firms.
- Firm sector

$$Y = AK^{\alpha}N^{1-\alpha}, \tag{1}$$

  - A is an aggregate productivity shock; A_H w.p. p and A_L w.p. $(1-p)$
- Household supplies labor inelastically ($N = 1$)
- Rest of the world
  - risk-neutral agents
- All these agents act competitively.
- The government *can* guarantee the liabilities of the banking sector and finance any bailouts by lump-sum taxes

Timing

1. Financial market activity takes place: households, banks, and the rest of the world trade in securities. Banks produce capital & lend to firms.
2. Firms hire workers competitively, for a non-contingent wage.
3. A realizes, production takes place, factors are paid
4. Banks repay deposits (fully or pro-rata if they are insolvent)
5. Other financial claims settle.
6. The government compensates the depositors and taxes households.
7. Consumption takes place.

Benchmark: no guarantees

Result

The equilibrium level of capital is $K_B = \left(\alpha \bar{A}\right)^{\frac{1}{1-\alpha}}$, *where* $\bar{A} \equiv E[A]$.

The expected marginal cost of funds for the bank is 1. Banks compete to lend to firms. So the expected marginal cost of capital for firms is also 1:

$$\alpha \bar{A} \left(K_B\right)^{\alpha-1} = 1.$$

Equilibrium with government guarantees

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$$\max_{k \geq 0} \rho_H k - k.$$

$$\Rightarrow \rho_H \leq 1$$

Equilibrium with government guarantees

Result

In the economy with government guarantees, the equilibrium level of capital is $K^* = (\alpha A_H)^{\frac{1}{1-\alpha}} > K_B$.

The relevant equilibrium conditions become.

$$\begin{cases} \alpha A_H (K^*)^{\alpha-1} = 1 \\ (1-\alpha) A_H (K^*)^{\alpha} = w^* \end{cases},$$

where we use the superscript$*$ to denote equilibrium variables.

Efficiency & Welfare

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In the economy with guarantees, investment is inefficiently high. That is, while output is higher than in the benchmark economy, expected net output is lower.

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- NDP is a better indicator of welfare
- Current GDP trend is also unlikely to be a good indicator of the path for future GDP.

Economy with Prop Trading

- Bank repayments made to depositors are money left on the table
- Bank can trade in a set of Arrow securities denoted H and L
- Cannot default on an Arrow security in equilibrium.
  - Bank can at most credibly commit to repay in state L is $\rho_L k^*$.

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Result

In the economy with government guarantees, output is higher with proprietary trading but over-investment is worse, and welfare lower.

Extended Model

1. Introduce a second type of capital:

$$K = (Q^{\gamma} + S^{\gamma})^{\frac{1}{\gamma}},$$

2. Parametrize the world's interest rate (r) and capital depreciation.

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Compared to benchmark, the economy with guarantees exhibits:

- Higher GDP and lower expected NDP
- Inflated wage
- Inflated asset (i.e. structure) prices
- Over investment in capital (materializing through an increase in Q^*)
- A higher capital to output ratio

Empirical Relevance

Time-varying Exploitability

1984 Repos confirmed bankruptcy remote (mid-1990s & 2005)

1996 The Glass-Steagall Act reinterpreted: up to 25% of revenue from investment banking activities

1997 Bear Sterns securitizes first loans under the Community Reinvestment Act

1999 The Glass-Steagall Act is repealed

2000 FDIC grants safe harbor protection for securitization

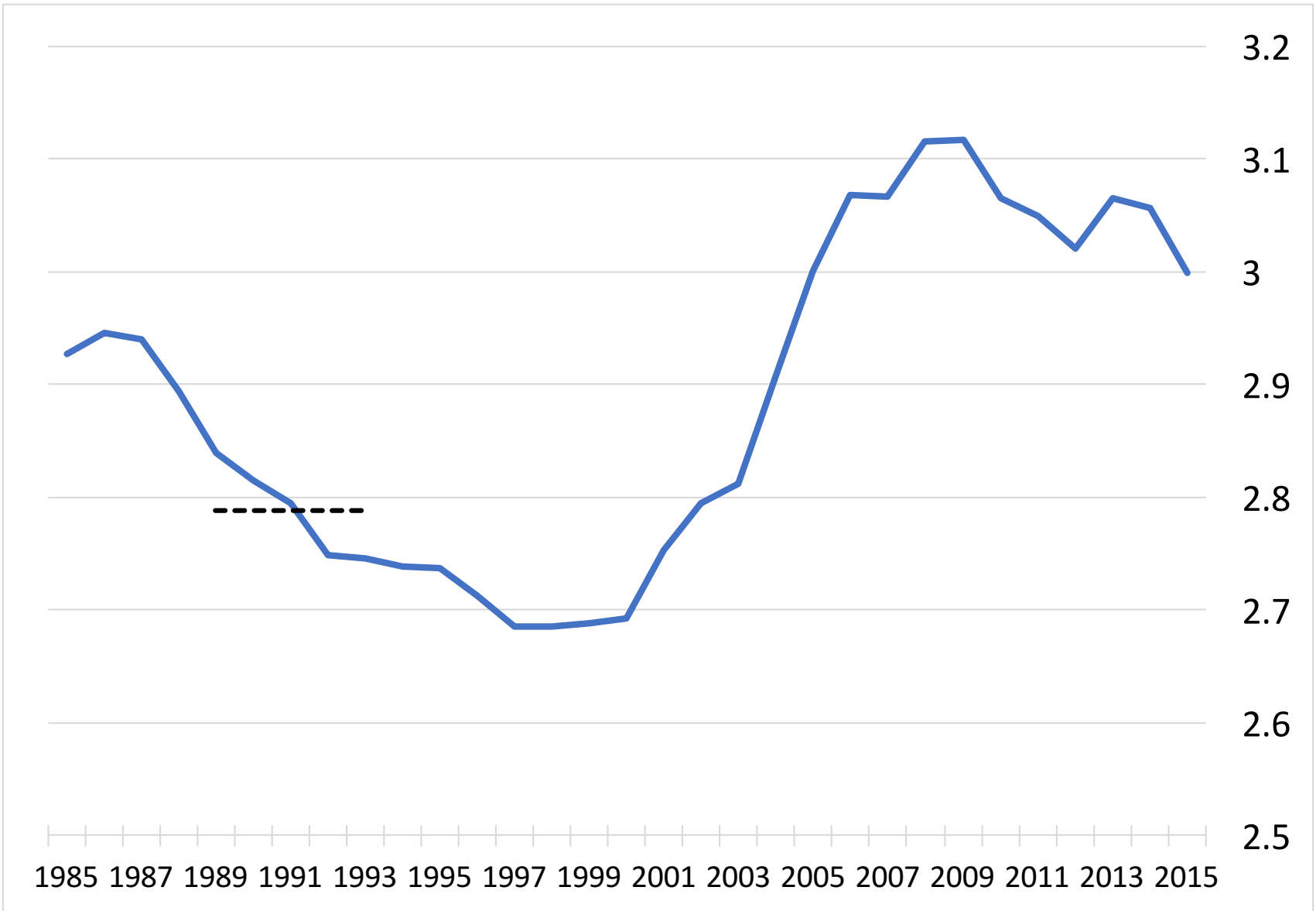
2004 SEC removes leverage restriction on investment banks

2004 OCC removes anti-predatory lending restrictions (nat. banks)

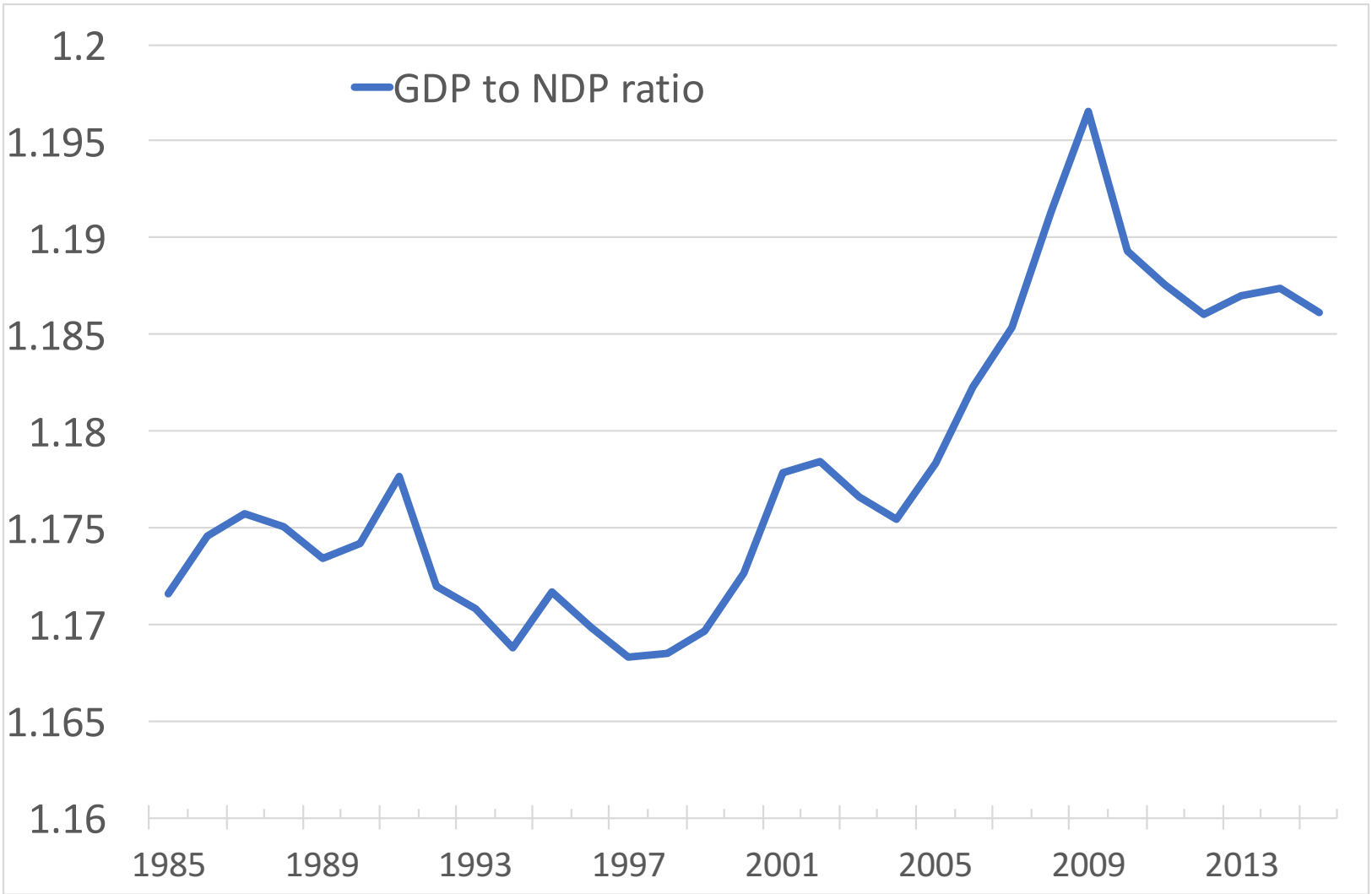
Post-crisis Volcker Rule limits proprietary trading;

Stress tests aim to ensure resilience.

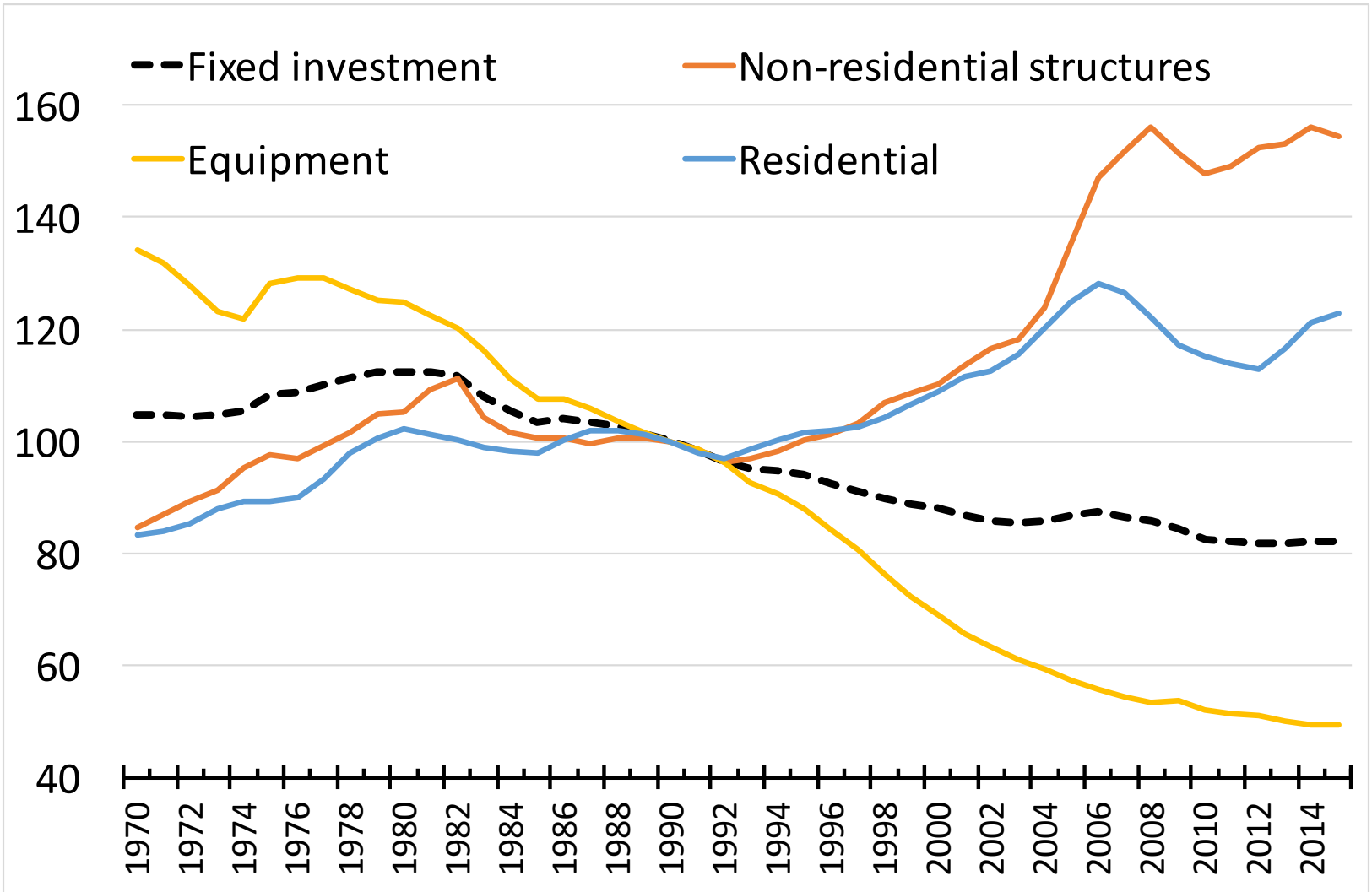
US Capital-Output Ratio



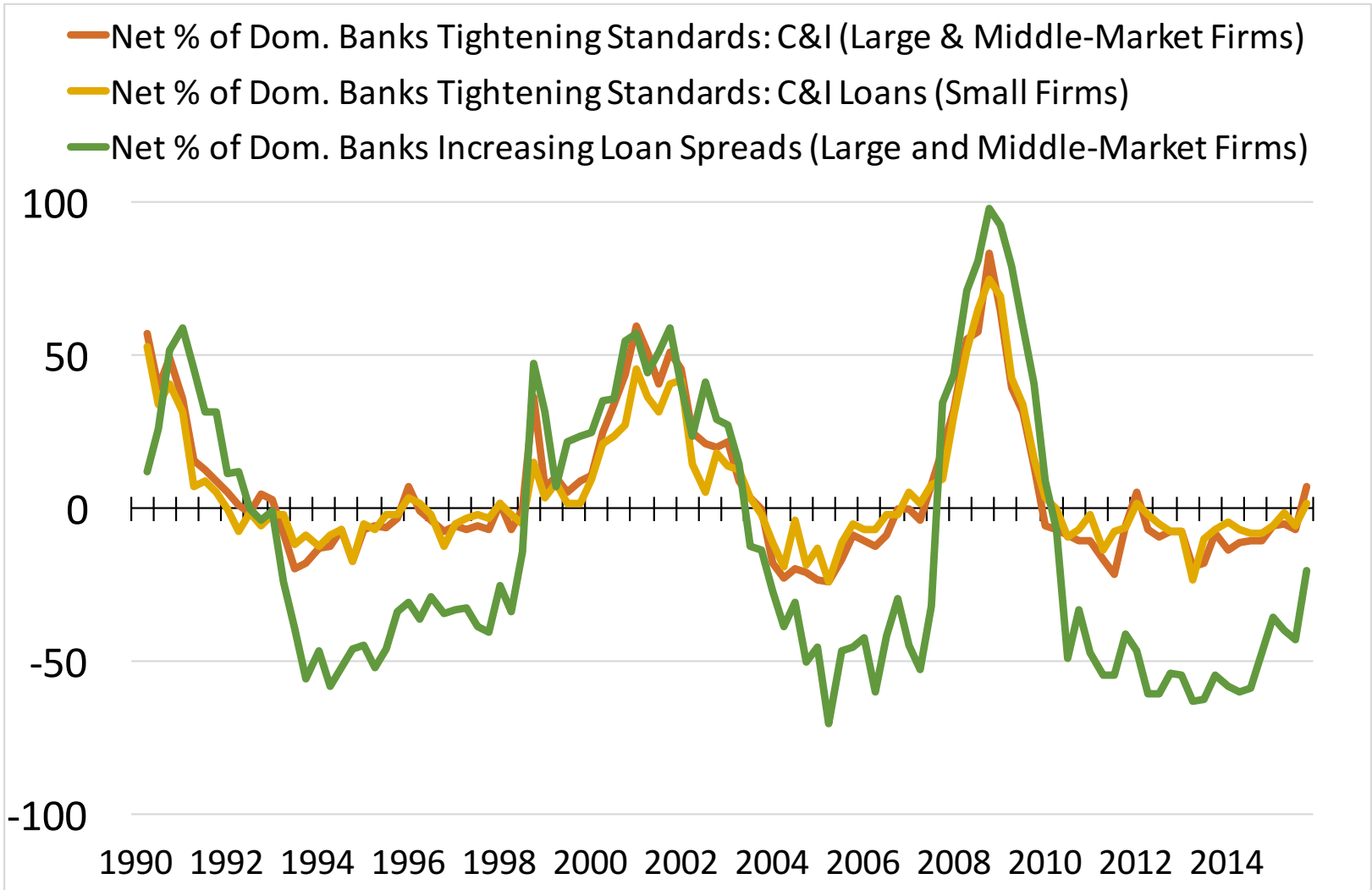
US GDP to NDP Ratio



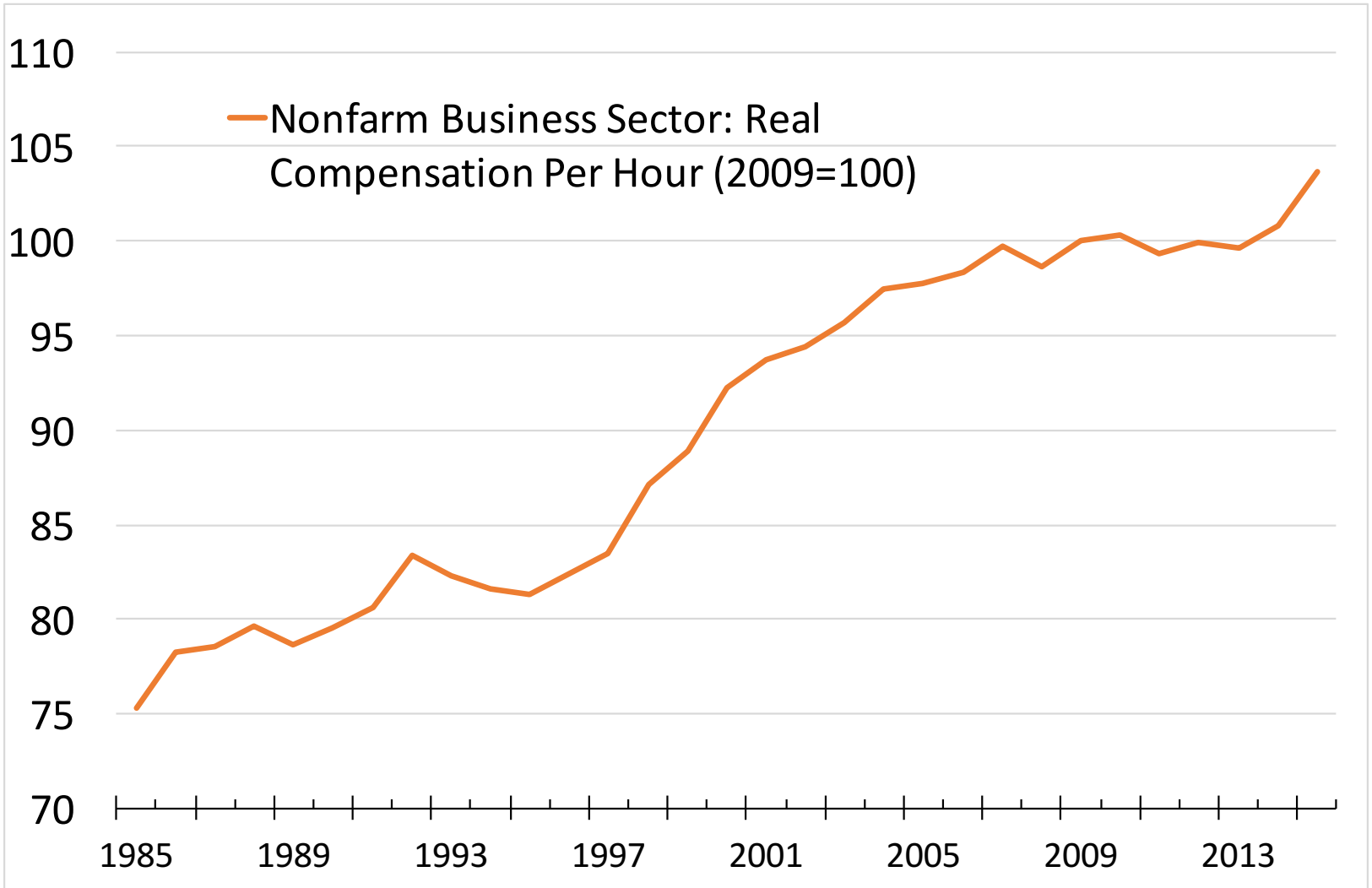
US Relative Price of Capital Investment (Index, 1990=100)



US Lending Standards: Senior Loan Officer Opinion Survey



US Real Wages



Quantifying the magnitude of the distortion

$$K_{t,B} = \left(\frac{\alpha \bar{A}_t}{\delta_t + r_t} \right)^{\frac{1}{1-\alpha}}; \qquad K_{t,FD} = \left(\frac{\alpha A_t^+}{\delta_t + r_t} \right)^{\frac{1}{1-\alpha}}$$

$$Y_{t,B} = A_t \left(\frac{\alpha \bar{A}_t}{\delta_t + r_t} \right)^{\frac{\alpha}{1-\alpha}}; \qquad Y_{t,FD} = A_t \left(\frac{\alpha A^+}{\delta_t + r_t} \right)^{\frac{\alpha}{1-\alpha}}$$

Counterfactual Exercise

$$\frac{\frac{K_{1,FD}}{Y_{1,FD}}}{\frac{K_{0,B}}{Y_{0,B}}} = \frac{\frac{\alpha}{(\delta_1+r_1)}\frac{A_1^+}{A_1}}{\frac{\alpha}{(\delta_0+r_0)}\frac{\bar{A}_0}{A_0}} = \frac{(\delta_0+r_0)}{(\delta_1+r_1)}\left(\frac{A_0}{A_1}\right)\left(\frac{A_1^+}{\bar{A}_0}\right)$$

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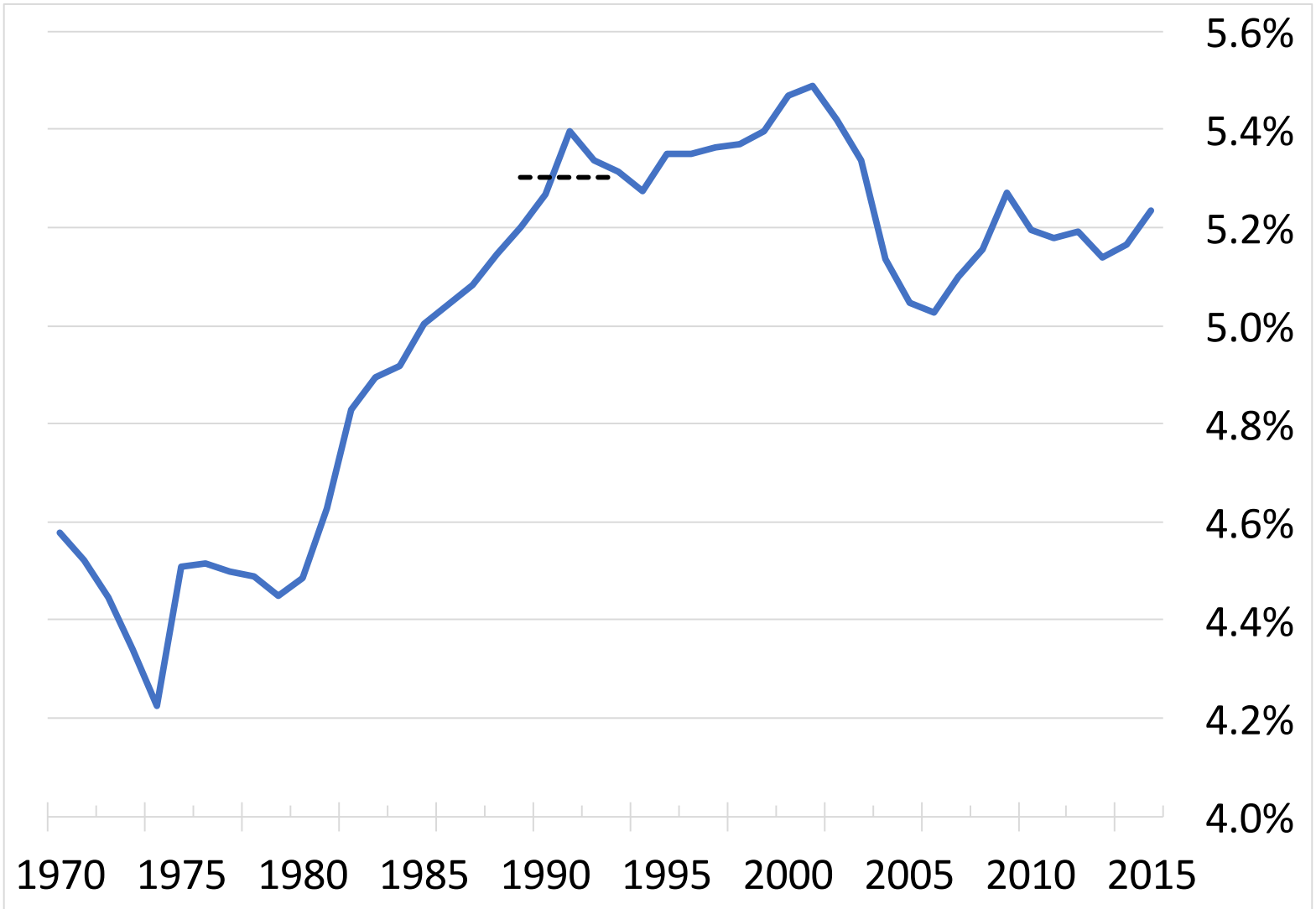
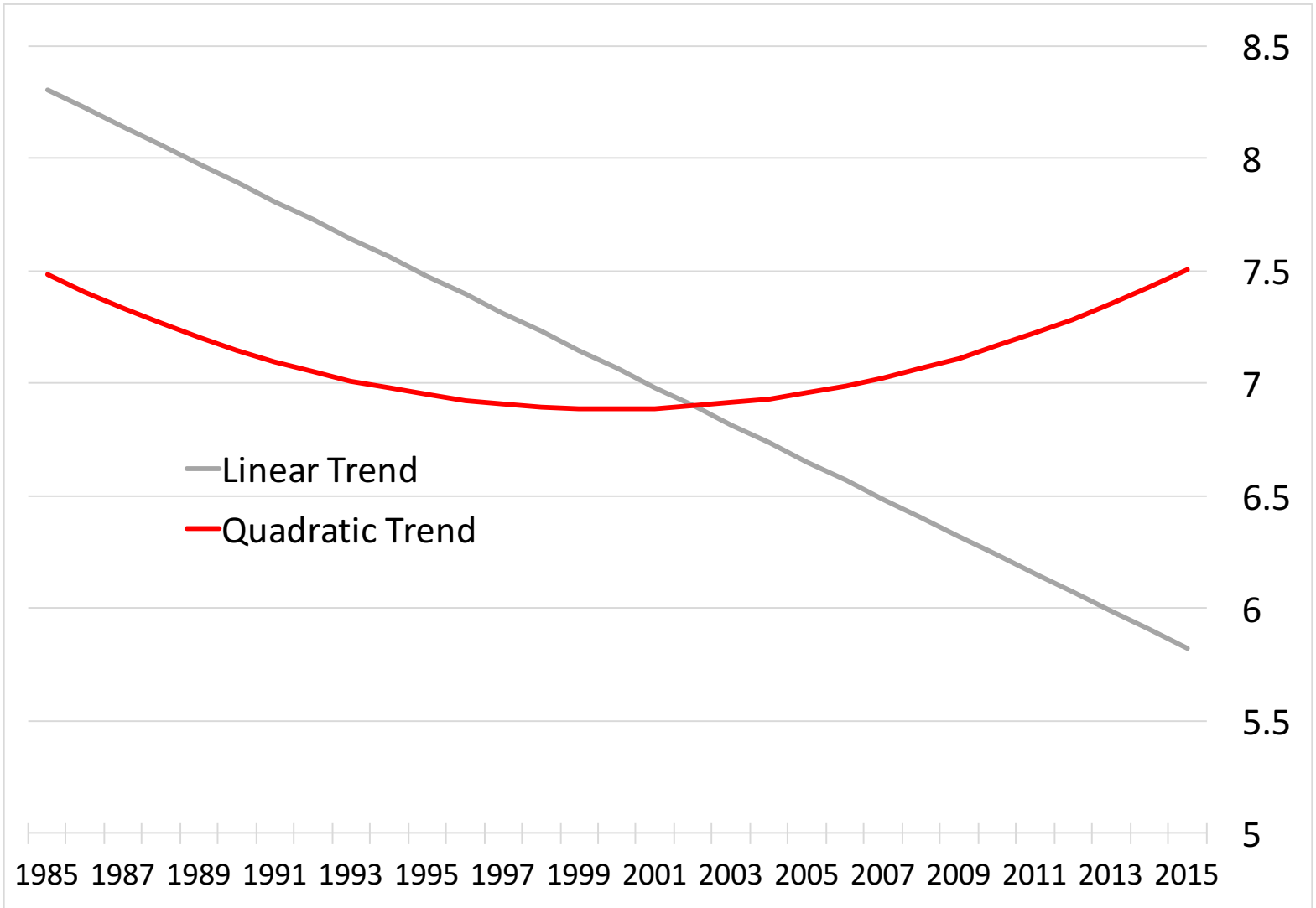
1. Estimate $\left(\frac{A_t^+}{\bar{A}_t}\right) = ln\left(\frac{\frac{K_{1,FD}}{Y_{1,FD}}}{\frac{K_{0,B}}{Y_{0,B}}}\right) + ln\left(\frac{(\delta_1+r_1)}{(\delta_0+r_0)}\right) + ln\left(\frac{A_1}{A_0}\right)$
2. Measure relative effect of the distortion over time
3. Counterfactual path for GDP
   - Different trend extrapolation
   - Different deviations from trend

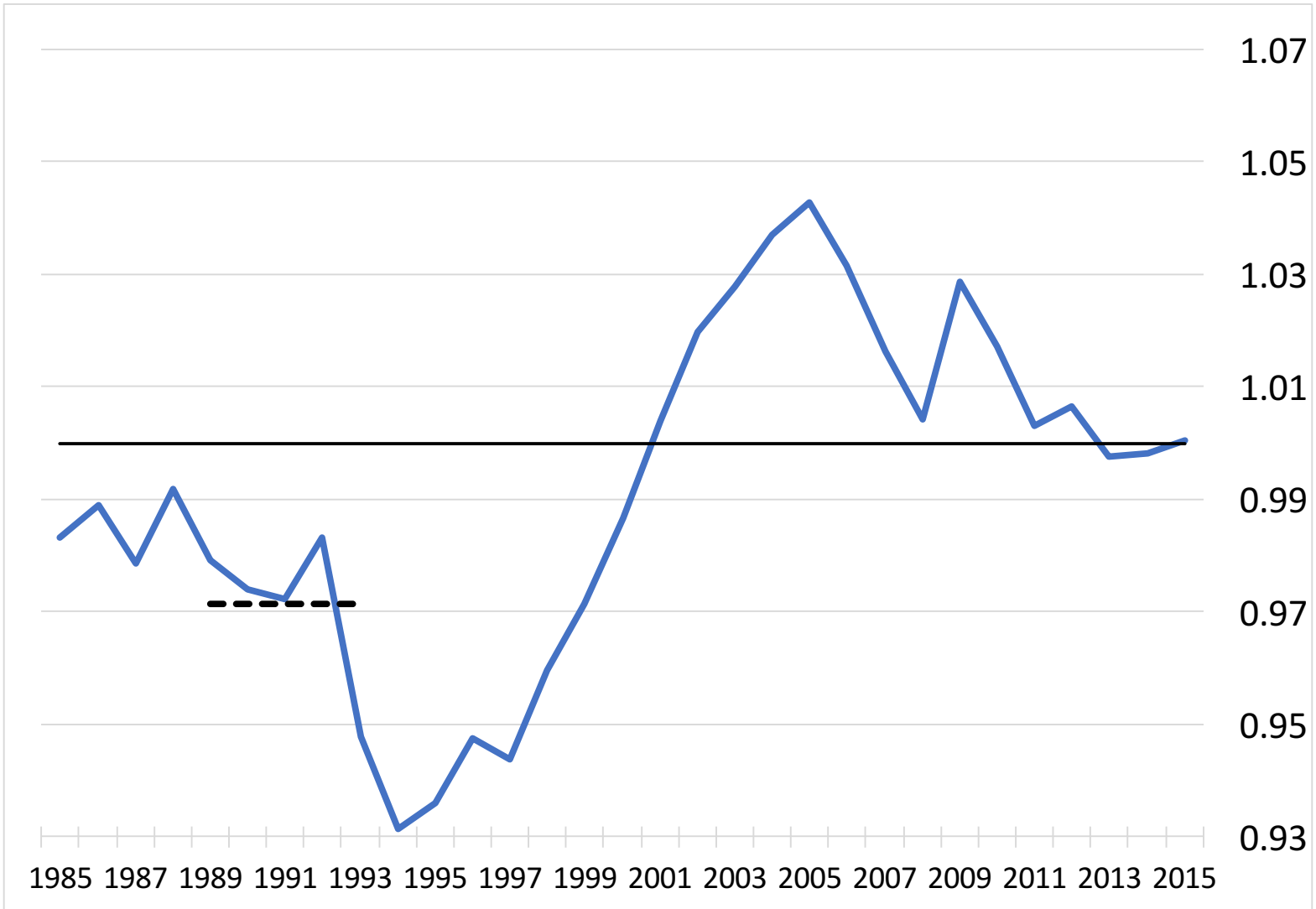
δ_t


5.6%
5.4%
5.2%
5.0%
4.8%
4.6%
4.4%
4.2%
4.0%
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015

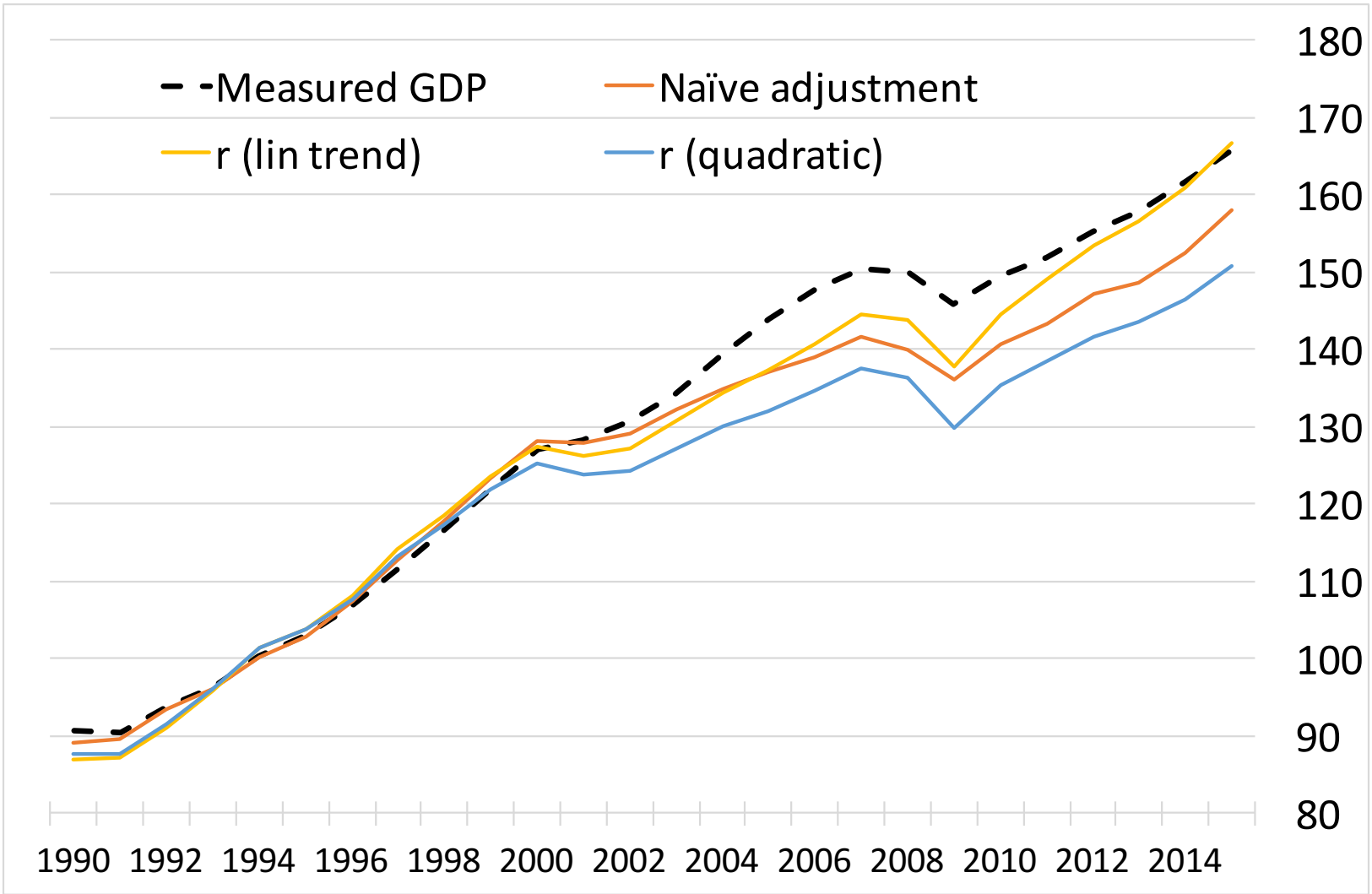
Rognlie (2015) real costs of funds (Scaled +5pp)



Fernald's Cap-U Adjusted TFP: deviation from trend

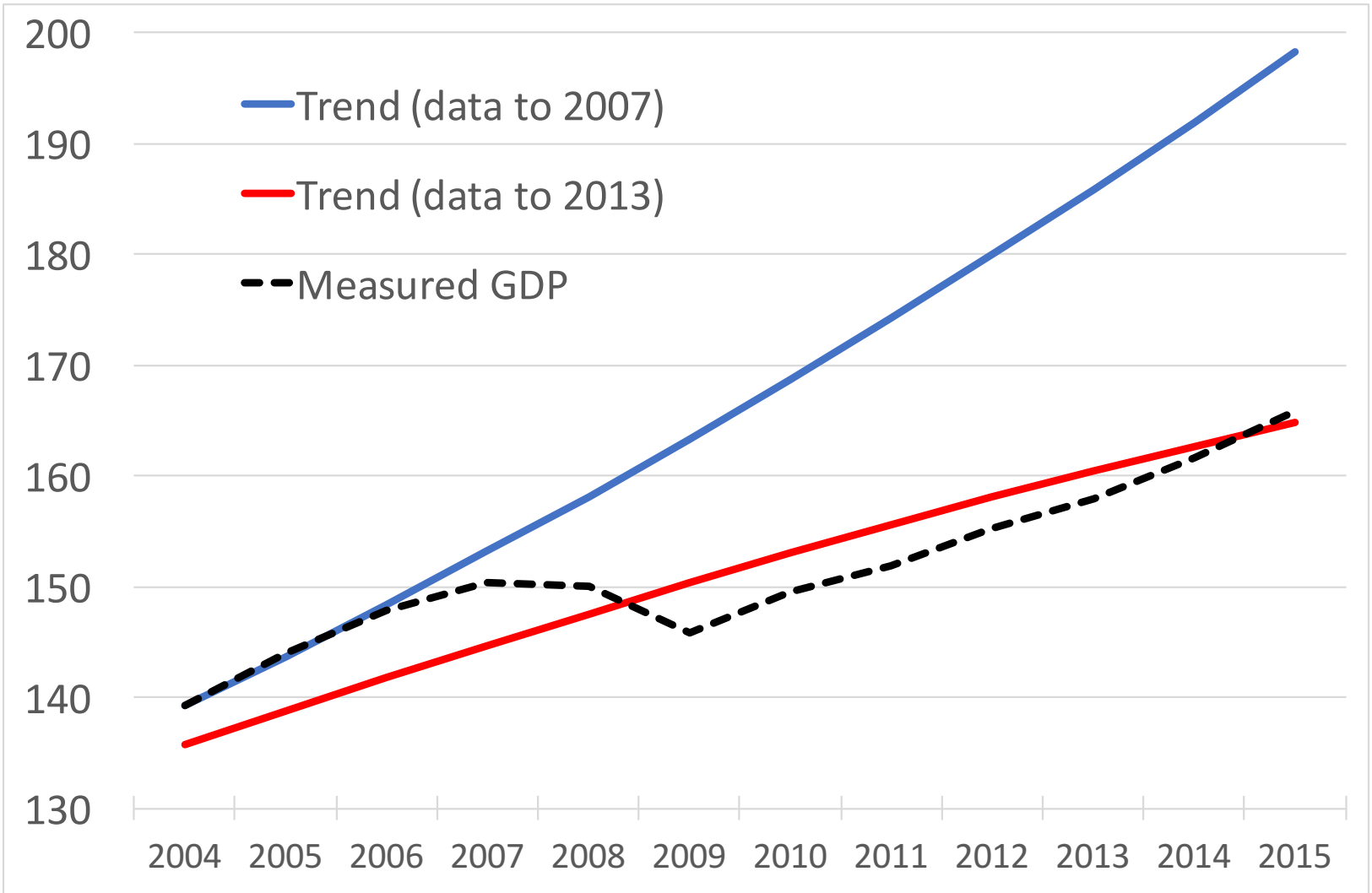


Counterfactual paths for US GDP



(Statistical) Trend Revision

Using Measured GDP



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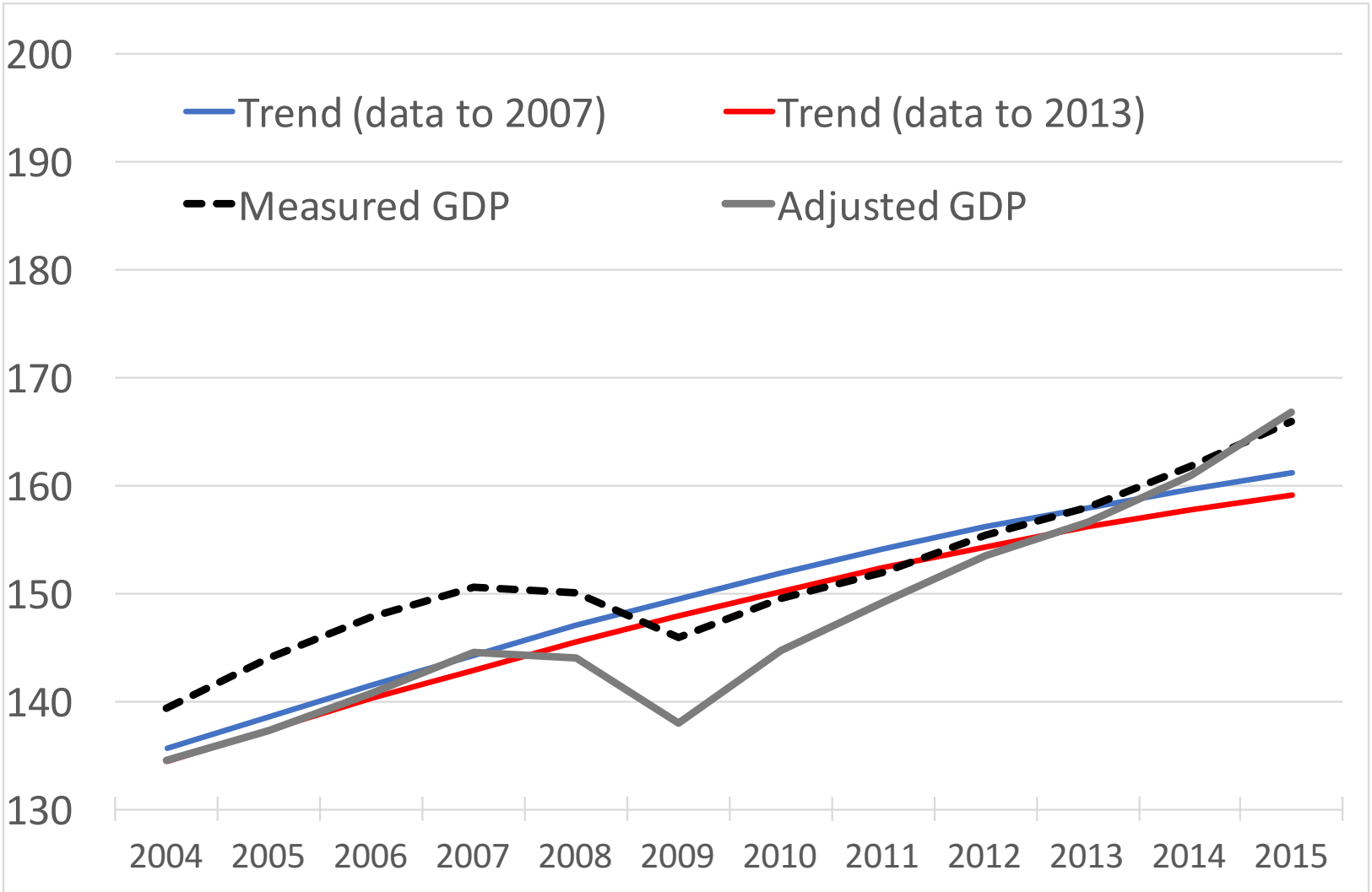
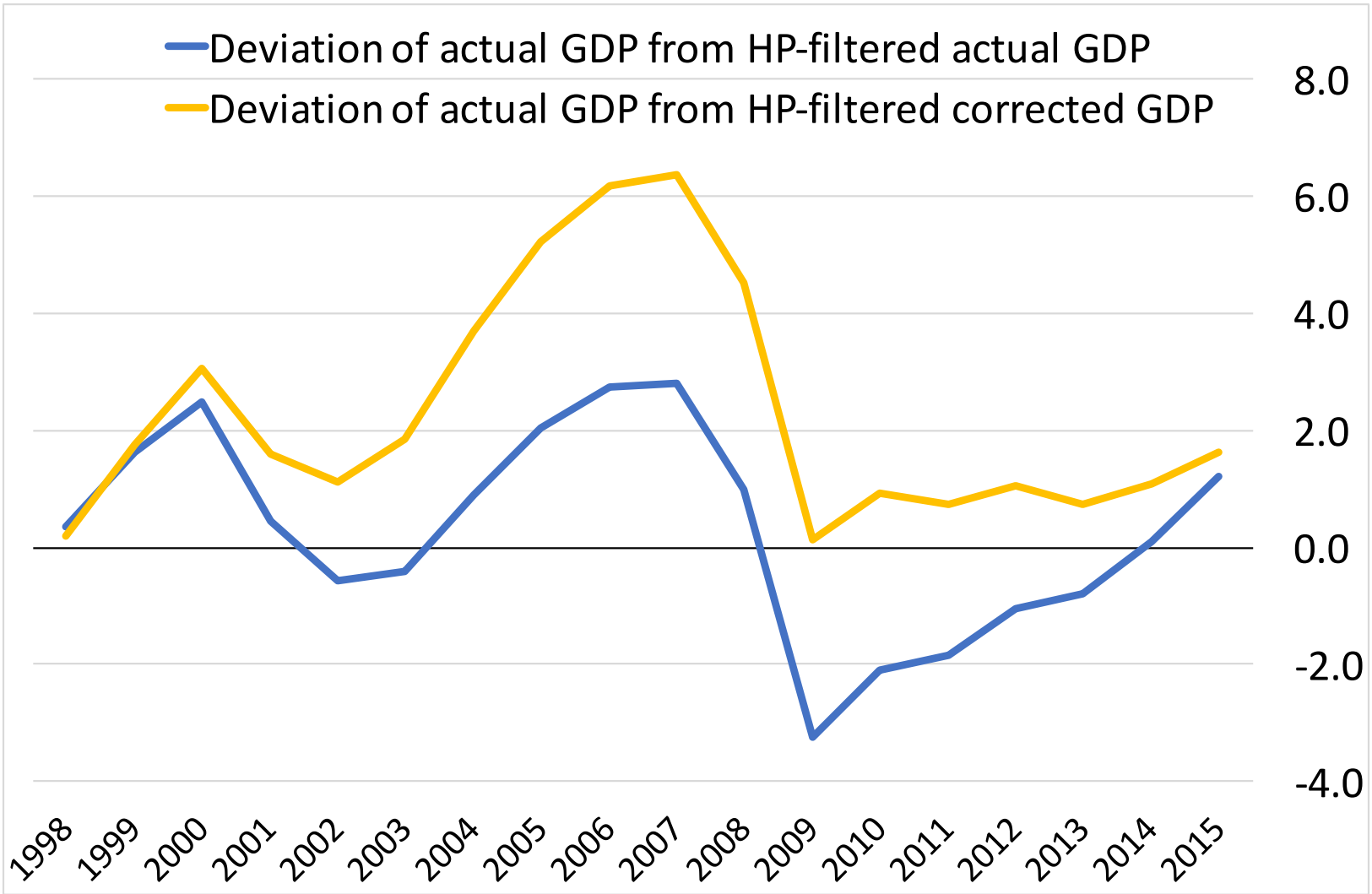
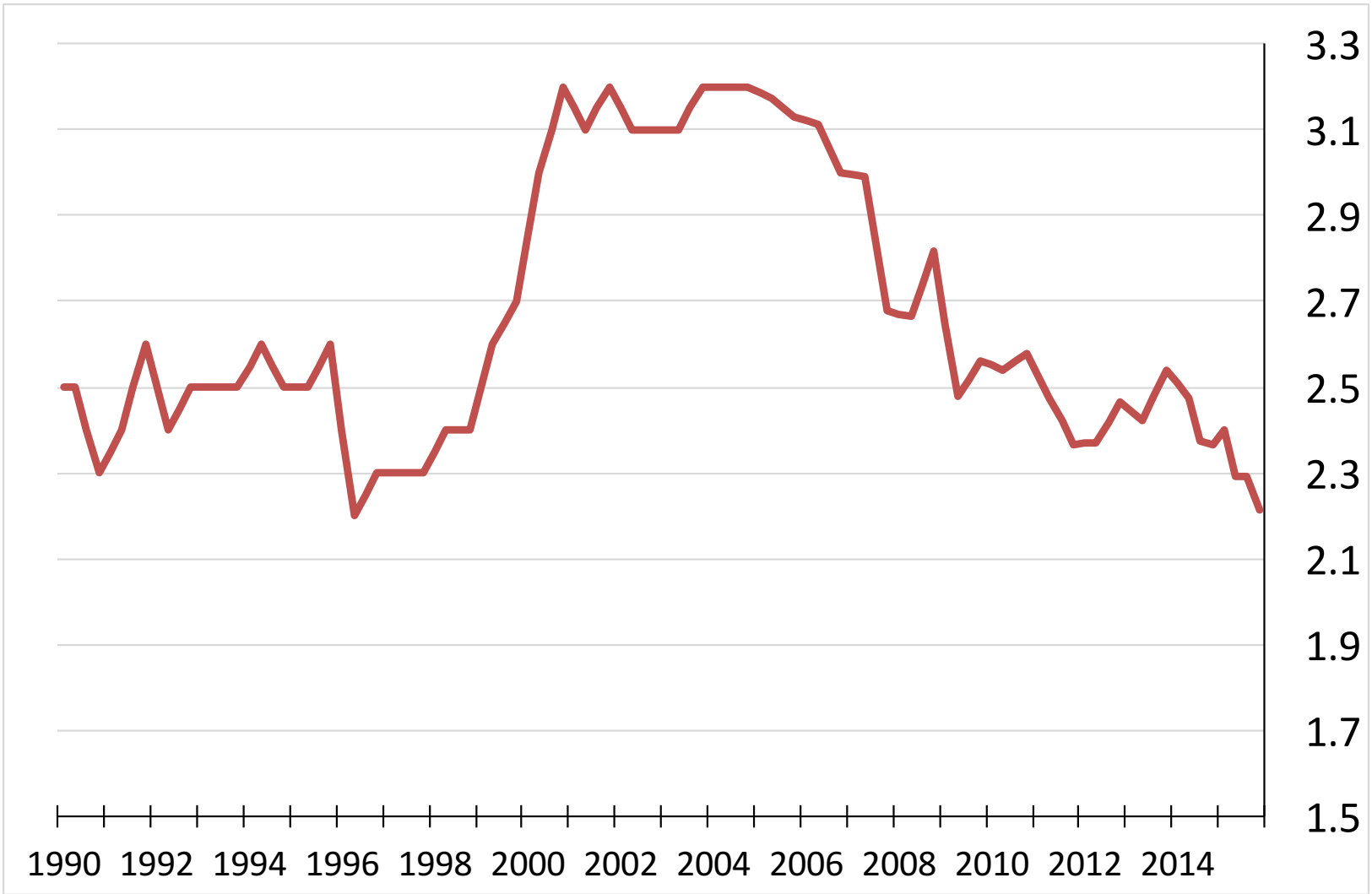
Using Adjusted GDP



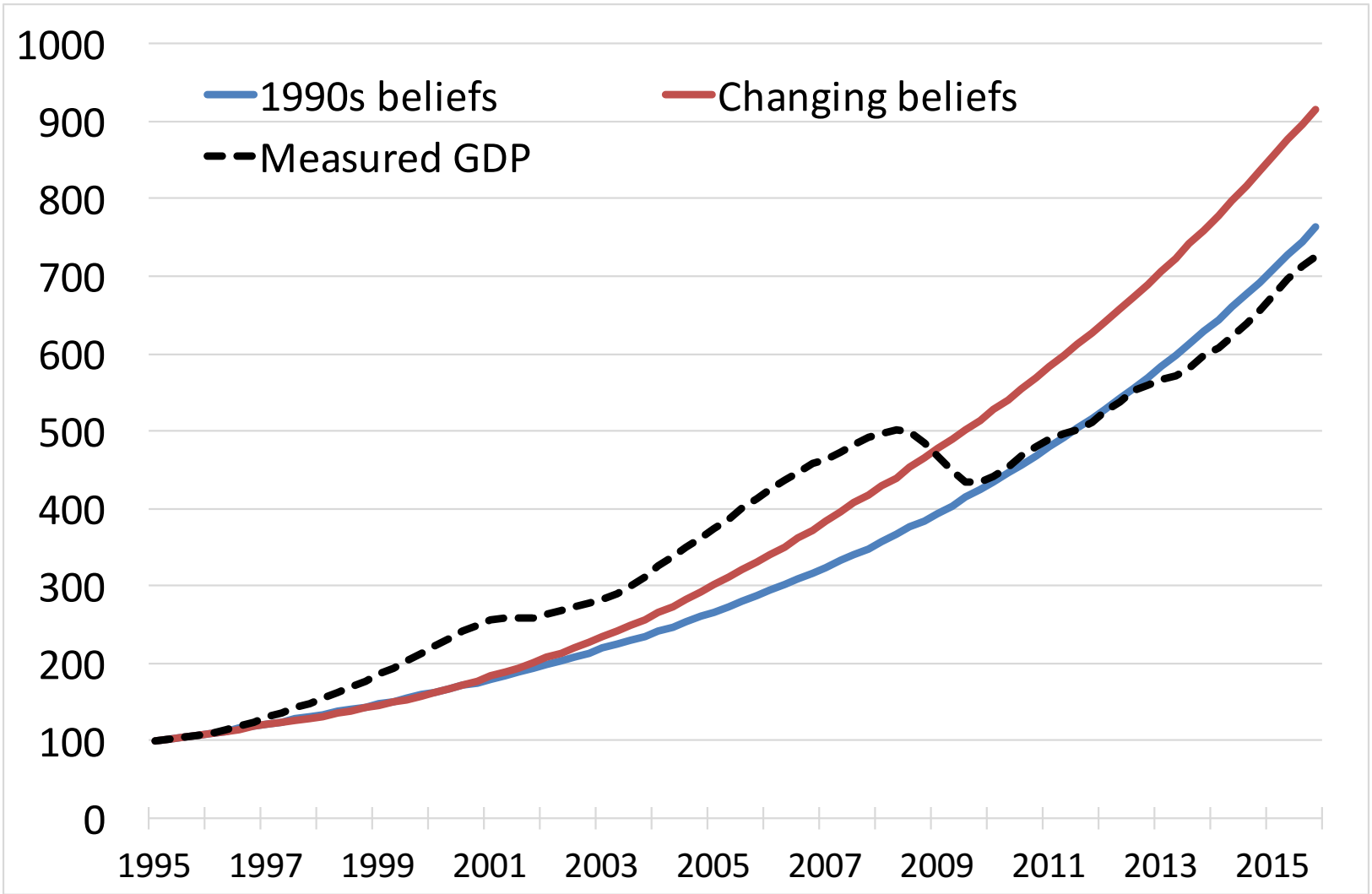
Differing views emerge when adjusted GDP is used



Consensus Long-Term growth expectations



What if trend GDP growth didn't increase?



Conclusion

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Appendix

Other existing evidence

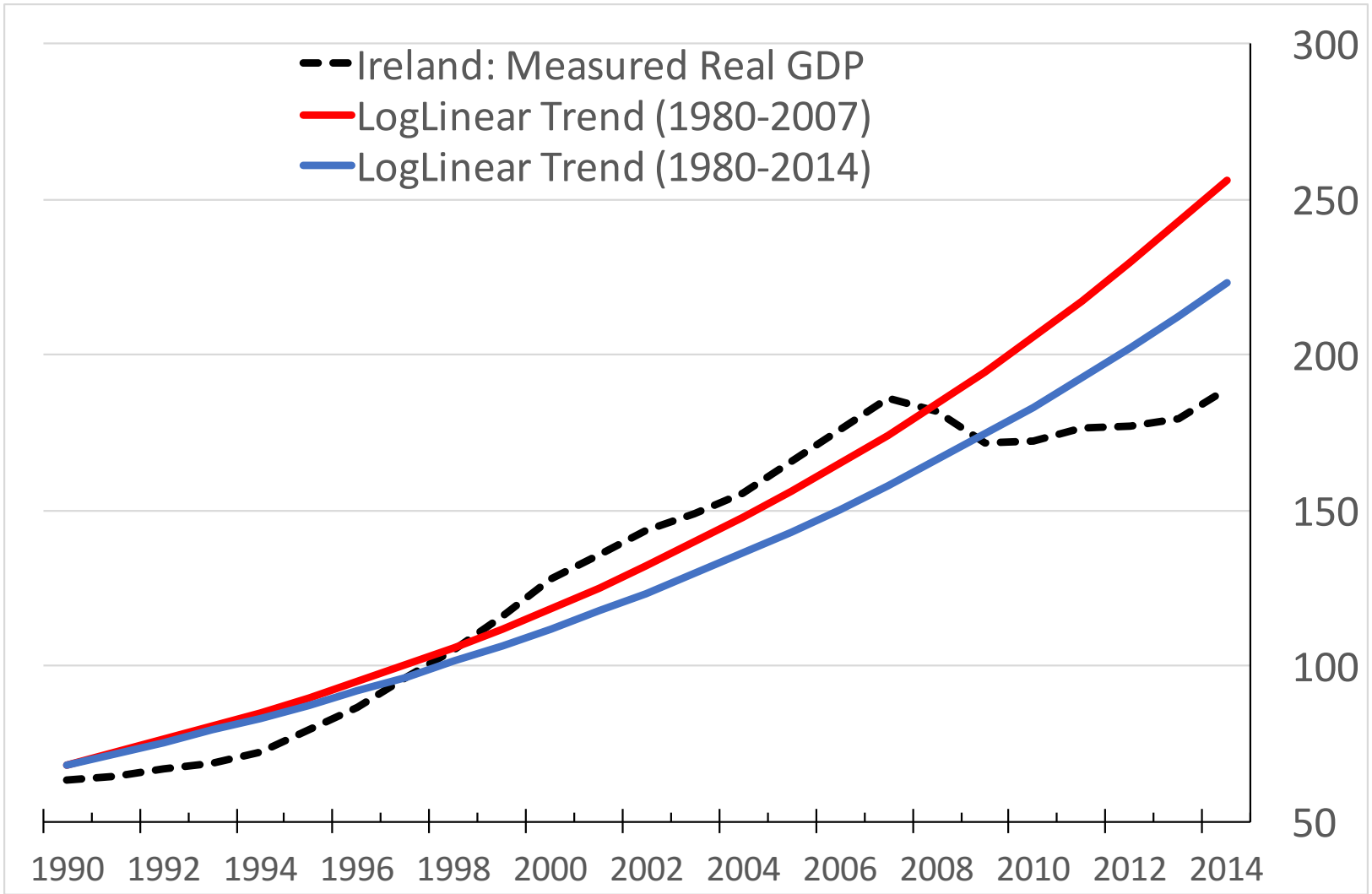
US

- Effects of deregulation-induced credit shocks (Di Maggio and Kermani, 2016)
- Effects of credit-supply shocks (Bassett, et al, 2014)

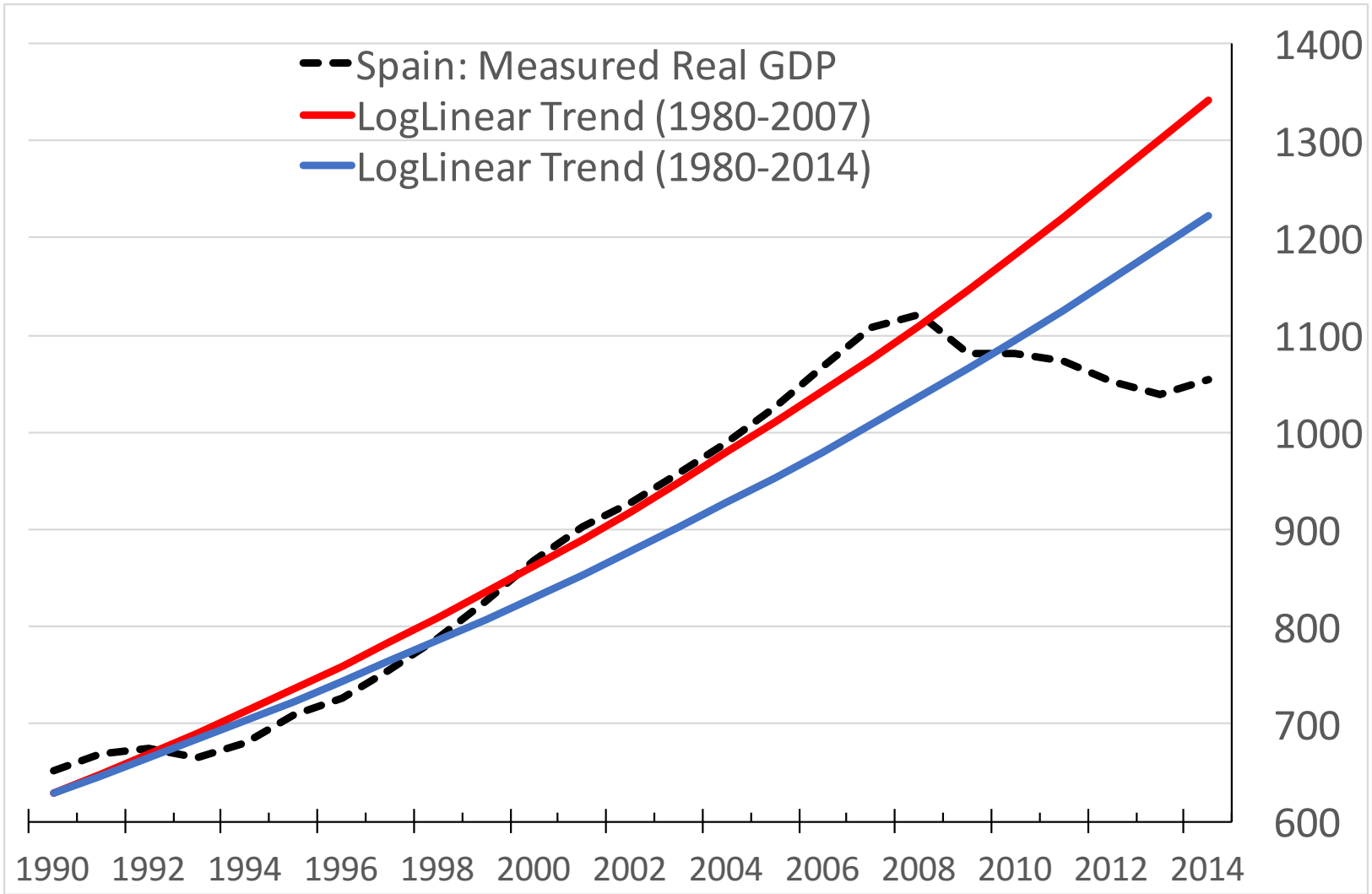
More widely

- Reinhart and Rogoff (2014)
- Ball (2014)
- Blanchard, Cerutti, and Summers (2015)
- Jorda, Schularick, and Taylor (2013)

Ireland


Ireland: Measured Real GDP
LogLinear Trend (1980-2007)
LogLinear Trend (1980-2014)
300
250
200
150
100
50
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014

Spain


Spain: Measured Real GDP
LogLinear Trend (1980-2007)
LogLinear Trend (1980-2014)
1400
1300
1200
1100
1000
900
800
700
600
1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014