Financial sector origins of economic growth delusion

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Motivation I

- 2008 CBO Potential
- 2013 CBO Potential
- 2016 CBO Potential
- Measured GDP
Our research

Focus on the role of *ex-ante* incentives in the financial sector:

- Implicit subsidy can have strong effects on real economic activity
- Banks' proprietary trading activities can magnify the problem
- GDP delusion — the behavior of GDP in the run up to the crisis was not the normal level to which we should expect (and wish) to return.
- Pre-crisis trend in GDP may have been neither sustainable, nor desirable
- Empirically:
  - Consistent with many facts of the US economy
  - Role of our distortion could be substantial

Is the great recession a reversing of a great distortion?
Motivation II

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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

\[ Y = AK^\alpha N^{1-\alpha}, \]  

• 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 \emph{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:

$$\alpha \bar{A} (K_B)^{\alpha-1} = 1.$$
Equilibrium with government guarantees

**Result**

*In the economy with government guarantees, the bank only issues deposits in equilibrium.*

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*In the economy with government guarantees, in equilibrium, the bank fails in state $A_L$.***
Equilibrium with government guarantees

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In the economy with government guarantees, in equilibrium, the bank fails in state $A_L$.

\[
\max_{k \geq 0} \rho_H k - k.
\]

\[\Rightarrow \rho_H \leq 1\]
Equilibrium with government guarantees

Result

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

The relevant equilibrium conditions become.

\[
\begin{align*}
\alpha A_H (K^*)^{\alpha - 1} &= 1 \\
(1 - \alpha) A_H (K^*)^\alpha &= w^*
\end{align*}
\]

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

*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.*
Efficiency & Welfare

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Result

In the economy with guarantees, the increase in wage is more than offset by the expected increase in tax. It follows that welfare must be strictly lower than in the benchmark economy.
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In the economy with guarantees, the increase in wage is more than offset by the expected increase in tax. It follows that welfare must be strictly lower than in the benchmark economy.

- 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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The equilibrium trade is given by $l^* = -\rho_L k^*$ and $h^* = \frac{(1-p)\rho_L k^*}{p}$.
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- The bank lending decision: $\max \rho_H k - k + \frac{1-p}{p} \rho_L k$. 
Economy with Prop Trading

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- Cannot default on an Arrow security in equilibrium.
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The equilibrium trade is given by $l^\ast = -\rho_L k^\ast$ and $h^\ast = \frac{(1-p)\rho_L k^\ast}{p}$.

- The bank lending decision: $\max \rho_H k - k + \frac{1-p}{p} \rho_L k$.

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

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
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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 Relative Price of Capital Investment (Index, 1990=100)
US Lending Standards: Senior Loan Officer Opinion Survey

- Net % of Dom. Banks Tightening Standards: C&I (Large & Middle-Market Firms)
- Net % of Dom. Banks Tightening Standards: C&I Loans (Small Firms)
- Net % of Dom. Banks Increasing Loan Spreads (Large and Middle-Market Firms)
US Real Wages

Nonfarm Business Sector: Real Compensation Per Hour (2009=100)

Quantifying the magnitude of the distortion

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

\[ Y_{t,B} = A_t \left( \frac{\alpha \bar{A}_t}{\delta_t + r_t} \right)^{\frac{\alpha}{1-\alpha}} ; \quad Y_{t,FD} = A_t \left( \frac{\alpha A_t^+}{\delta_t + r_t} \right)^{\frac{\alpha}{1-\alpha}} \]
Counterfactual Exercise

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

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

1. Estimate \( \left( \frac{A_t^+}{A_t} \right) = \ln \left( \frac{K_{1,FD}}{Y_{1,FD}} \frac{Y_{1,FD}}{K_{0,B}} Y_{0,B} \right) \) + \( \ln \left( \frac{(\delta_1 + r_1)}{(\delta_0 + r_0)} \right) \) + \( \ln \left( \frac{A_1}{A_0} \right) \)

2. Measure relative effect of the distortion over time

3. Counterfactual path for GDP
   - Different trend extrapolation
   - Different deviations from trend
Rognlie (2015) real costs of funds (Scaled +5pp)
Fernald’s Cap-U Adjusted TFP: deviation from trend

Motivation Model Empirical Relevance Conclusion

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

Delusion ABFER Jan 2017 25
Counterfactual paths for US GDP

- Measured GDP
- Naïve adjustment
- $r$ (lin trend)
- $r$ (quadratic)
(Statistical) Trend Revision
Using Measured GDP

Trend (data to 2007)
Trend (data to 2013)
Measured GDP
(Statistical) Trend Revision

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:
Measured Real GDP
LogLinear Trend (1980-2007)
LogLinear Trend (1980-2014)
Spain

- Spain: Measured Real GDP
- LogLinear Trend (1980-2007)
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