Discussion of: Real Effects of Price Stability with Endogenous Nominal Indexation

- Monetary policy matters partially because of widespread use of nominal assets and contracts.
- Understanding why contracts are nominal and how indexation responds to economic conditions should be an important ingredient in analysis of monetary policy.
- Little existing theory.
One-period moral hazard problem:
- Risk-averse agent supplies effort $n$ and generates output $y$.
- Probability distribution of output is $\phi(y|n)$.
- Nominal output $s = py$ is observed first.
- Price level $p$ (and therefore output $y$) is observed with delay.

Commitment solution:
- Standard incentive contract; Agent’s consumption depends only on $y$:
  $$c = f(y).$$
- Money is neutral: $p$ does not affect real consumption.
- However, $p$ does matter conditional on $s$:
  $$c = f \left( \frac{s}{p} \right)$$
Jovanovic and Ueda (1997)

- Renegotiation-proof solution:
  - Principal and agent can renegotiate after $s$ is observed.
  - Since effort is sunk, full insurance possible at this stage.
  - Real consumption therefore only depends on $s$:
    \[ c = f(s) = f(py). \]
  - Price level $p$ does affect real allocation.

- Some properties:
  - Price level variability increases variability of consumption and lowers welfare.
  - Only surprise component of price level matters.
  - Real wage increasing in the price level: opposite of a sticky-wage model.
  - Realization of price level does not affect output: pure redistribution effect.
Meh-Quadrini-Terajima Environment

- Risk-neutral investors and entrepreneurs.
- Entrepreneur invests $k$, financed by investor.
- Project generates cash flow $s = pzk^\theta$, observed by the entrepreneur.
- $p$ (and therefore $z$) are observed with a delay.
- Entrepreneur can divert cash before $s$ and $p$ are observed.
Recursive Contract

- State variable: Utility promise to entrepreneur $q$.
- Contract chosen by planner:
  \[ c' = c(z, p), \quad q' = h(z, p) \]
- Commitment solution:
  - Contract does not depend on $p$:
    \[ c' = c(z), \quad q' = h(z). \]
  - Contract has property that $c' = 0$ until $q \geq \bar{q}$ and investment is unconstrained.
  - Utility promise $q'$ depends on $z$ to prevent diversion of cash.
Value Function under Commitment

The graph shows the value function $V(q)$ as a function of $q$. The function starts from a peak at $q = q_0$, decreases as $q$ increases, and approaches zero as $q$ approaches a value $\bar{q}$.
Value Function under Commitment
Value Function under Commitment

\[ V(q) \]

\[ q \quad q(s/p_h) \quad q(s/p_l) \quad \bar{q} \quad q \]
Value Function under Commitment

\[ V(q) \]

\[ q \]

\[ q(s/p_h) \]

\[ q(s/p_l) \]

\[ \bar{q} \]

\[ q \]
Renegotiation-Proof Contract

- Two additional constraints on the contracting problem:
  - Lower bound for continuation utility.
  - Continuation utility depends only on cash flow $s$.
- Implications:
  - Signal is more noisy: less investment can be supported.
  - Welfare decreasing in variability of price level.
Key Differences to Jovanovic and Ueda

- Lack of indexation has a more natural interpretation: Nominal debt contracts.
- Nominal shocks have real effects (with a lag): A version of the Phillips curve.
- Asymmetric effects on small and large firms.
‘Sophisticated’ Monetary Policy
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- In basic setup, monetary policy does not serve any purpose: just added noise.
- Can we think of sophisticated ways to use monetary policy with a purpose?
- Example: Additional aggregate shock.
‘Sophisticated’ Monetary Policy

- Output is subject to aggregate shock $x$:
  \[ s = pxzk^\theta, \quad \text{where: } E(x) = 1. \]
- Shock $x$ becomes public knowledge at the end of the period.
- However, monetary authority can observe $x$ before setting $p$. 
‘Sophisticated’ Monetary Policy

- Outcome under commitment:
  - Optimal contract conditions on $z$ only:
    \[ c' = c(z), \quad q' = h(z). \]

- Renegotiation-proof solution for a constant $p$:
  - Contract conditions on $s$:
    \[ c' = c(s), \quad q' = q(s). \]
  - Given that $p$ is constant, there is more noise, and welfare is lower.
‘Sophisticated’ Monetary Policy

A sophisticated policy:

- Monetary authority sets $p = 1/x$.
- We therefore have $s = zk^\theta$.
- Renegotiation-proof solution much closer to commitment solution.
Other Reasons for Lack of Indexation?

- Here, contracts have nominal features because of inability to commit not to renegotiate.
  - Implies that lack of indexation is relatively short term: Action is between realization of a nominal variable (cash flow) and the corresponding price level.
    - How can we explain long-term nominal contracts?
  - Here, commitment is always the best solution.
    - Under which conditions do nominal contracts improve over outcome with indexed contracts?
Other Reasons for Lack of Indexation?

- Key implication of nominal contracts: monetary shocks induce redistribution.
- Redistribution might be part of efficiency-enhancing insurance scheme between:
  - Government and taxpayers (Bohn).
  - Old and young people.
  - Entrepreneurs and investors.