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 important ingredient in analysis of monetary policy.
- Little existing theory.

Jovanovic and Ueda (1997)

- 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:

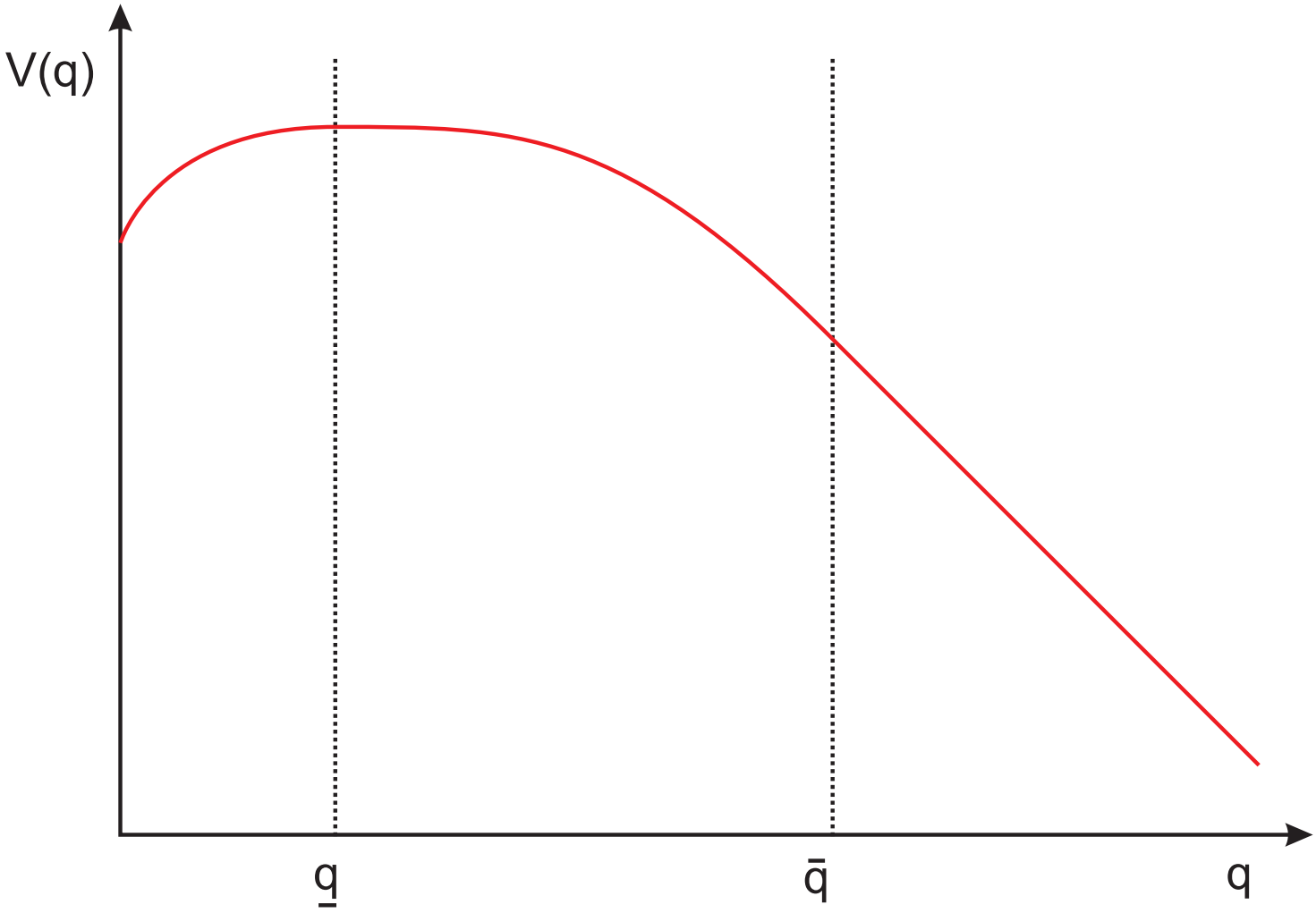
$$c' = c(z, p), \quad q' = h(z, p)$$

- Commitment solution:
  - Contract does not depend on p:

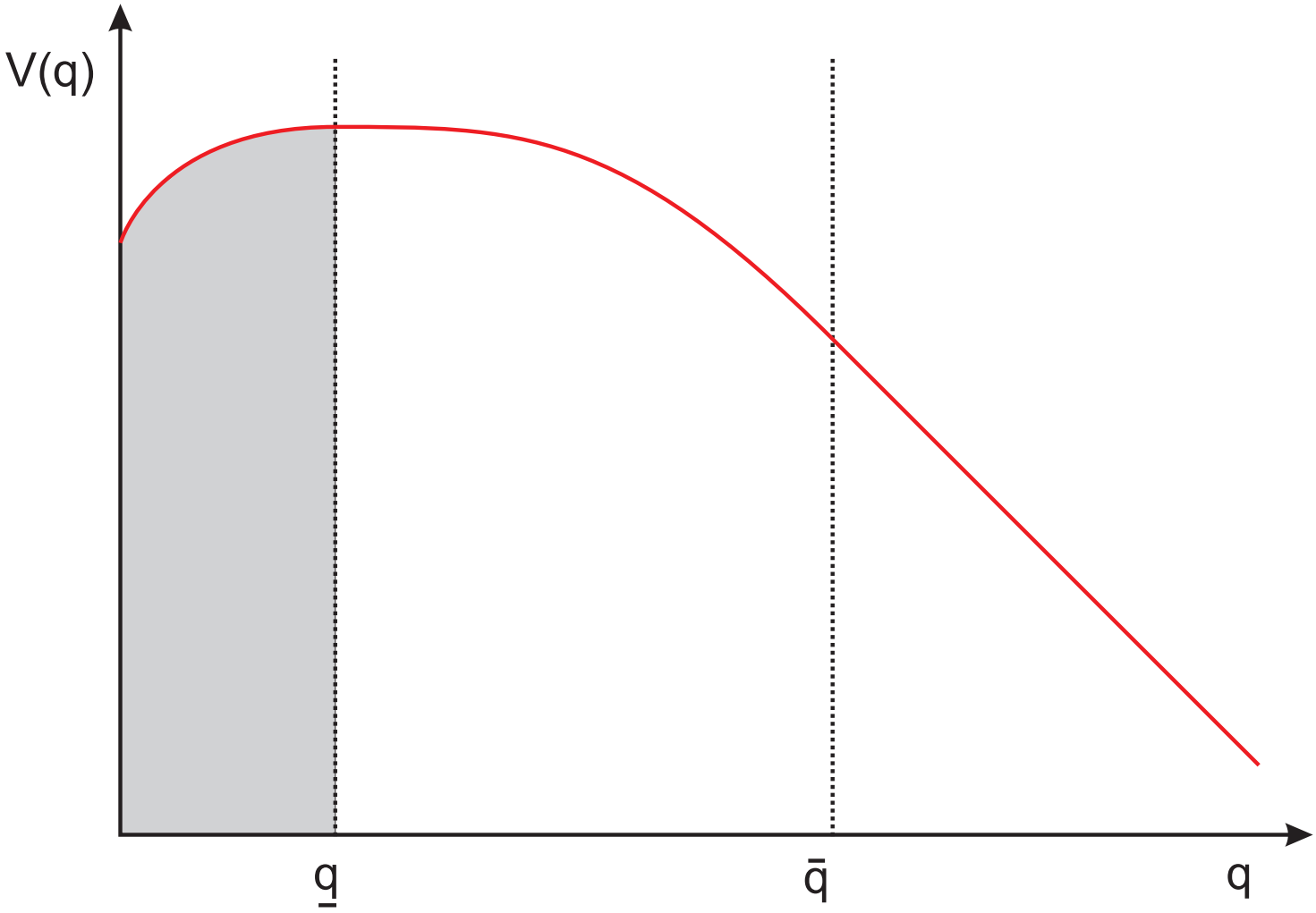
$$c' = c(z), \quad q' = h(z).$$

  - 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.

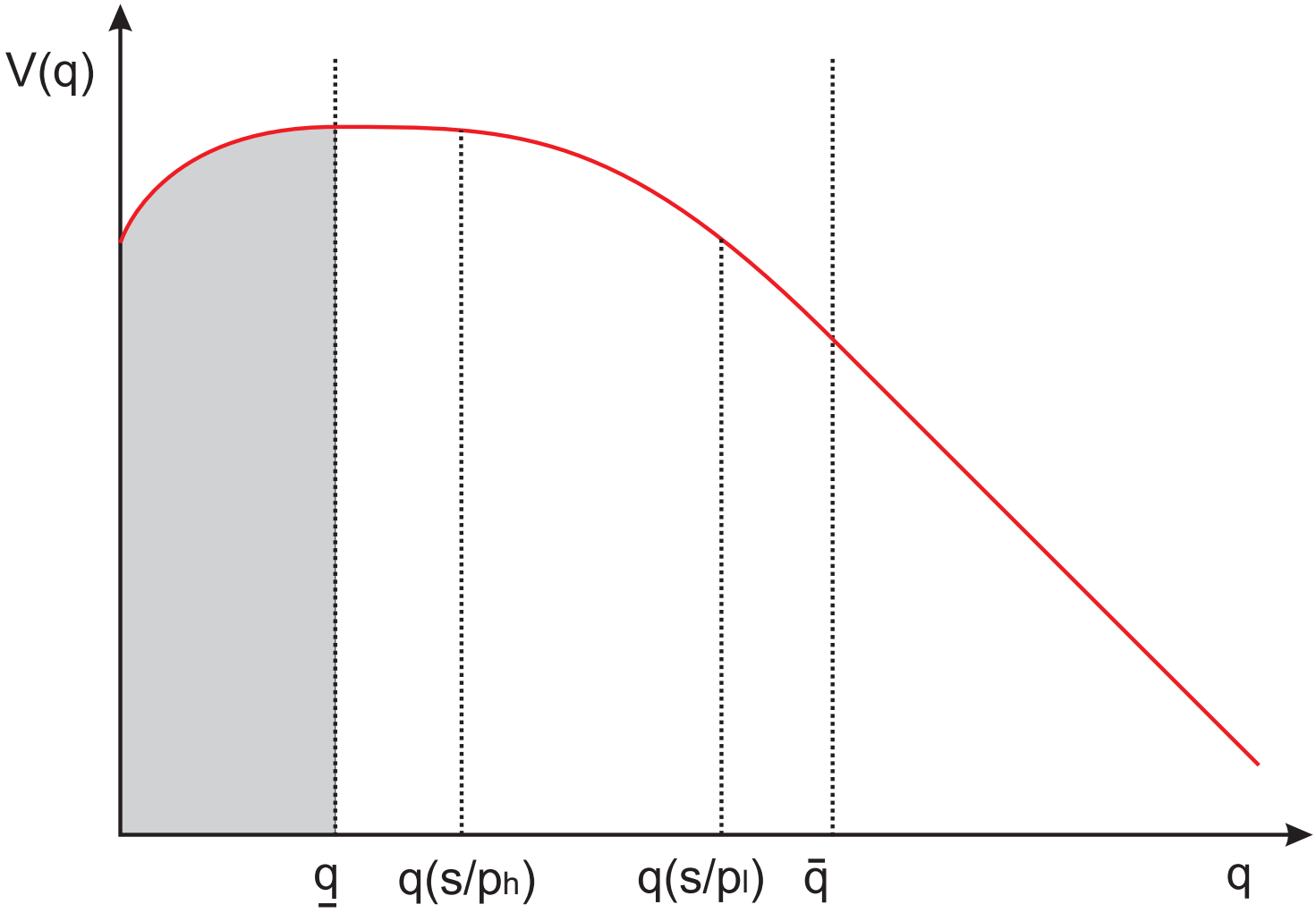
Value Function under Commitment



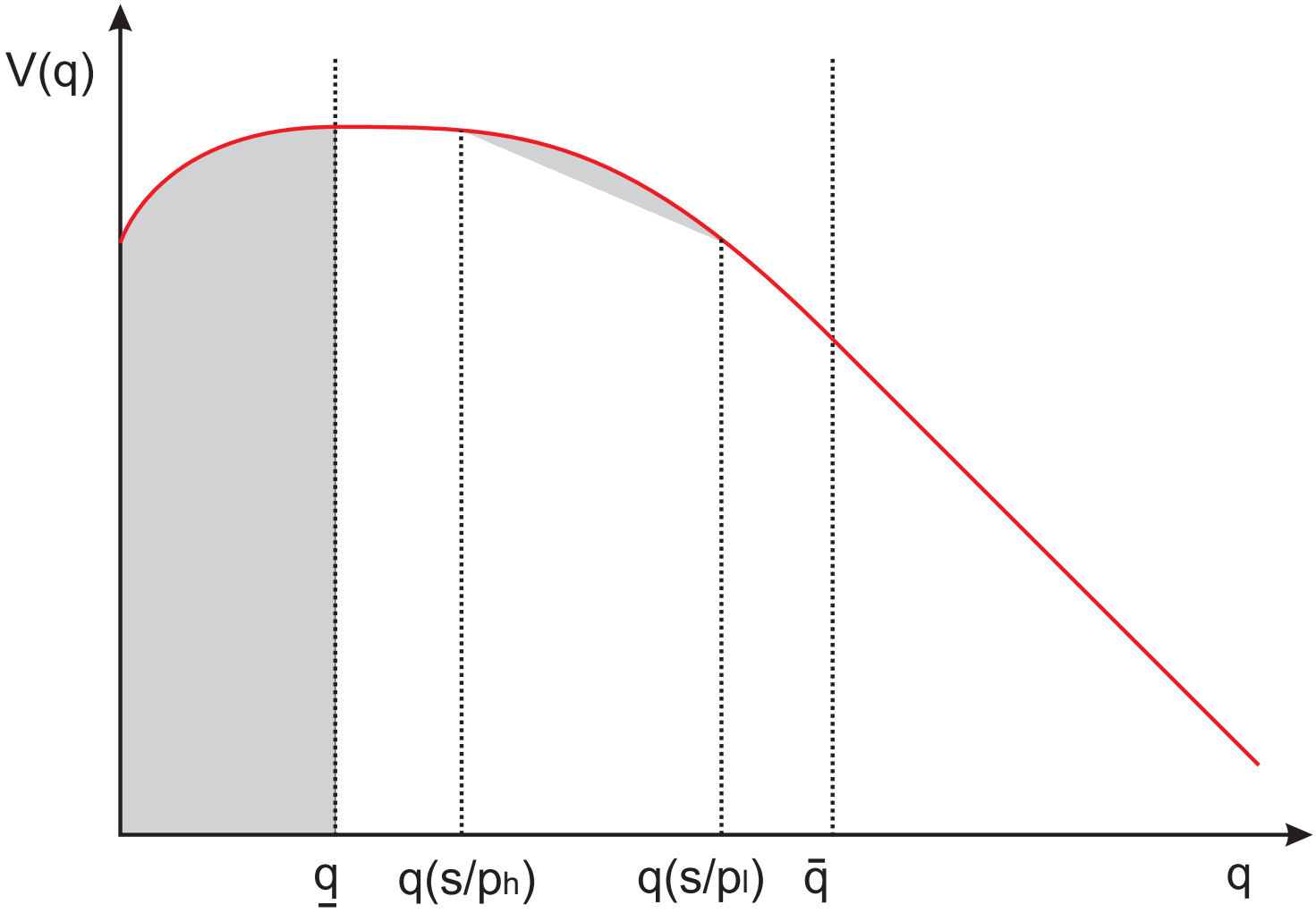
Value Function under Commitment



Value Function under Commitment



Value Function under Commitment



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

'Sophisticated' Monetary Policy

- 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:

$$s = pxzk^{\theta}, \qquad \text{where: } E(x) = 1.$$

- 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.