

# Discussion of "Equilibrium Price Dispersion and Rigidity: A New Monetarist Approach" by Head-Liu-Menzio-Wright

Oleksiy Kryvtsov  
Bank of Canada

Canadian Macro Study Group, 5 November 2010

# A theory of sticky prices based on search theory

- Goods market: Burdett-Judd'83, money market: Lagos-Wright'05
- Search in money market  $\rightarrow$  money demand
- Search in goods market  $\rightarrow$  sellers post different prices in eq-m
  - consumers can draw 0, 1 or 2 price quotes
- All prices from support of  $p$ -distribution yield same profits
- Non-degenerate equilibrium price dispersion
  - no ex-ante heterogeneity in preferences, technology or info
  - no frictions in price adjustment: prices are free to change

# Result 1: money neutrality

- Price distribution shifts to compensate changes in money
  - not surprising: nothing prevents nominal prices from adjusting
  - compare to Caplin-Spulber'87 or Golosov-Lucas'07:
    - similar "elevator" shift in price distribution after money shocks
    - different: prices adjust to a random level
- Relative price distribution invariant to money
  - testable if have a good measure of money shocks
  - price dispersion varies with inflation
    - Lach-Tsiddon (JPE 1992)

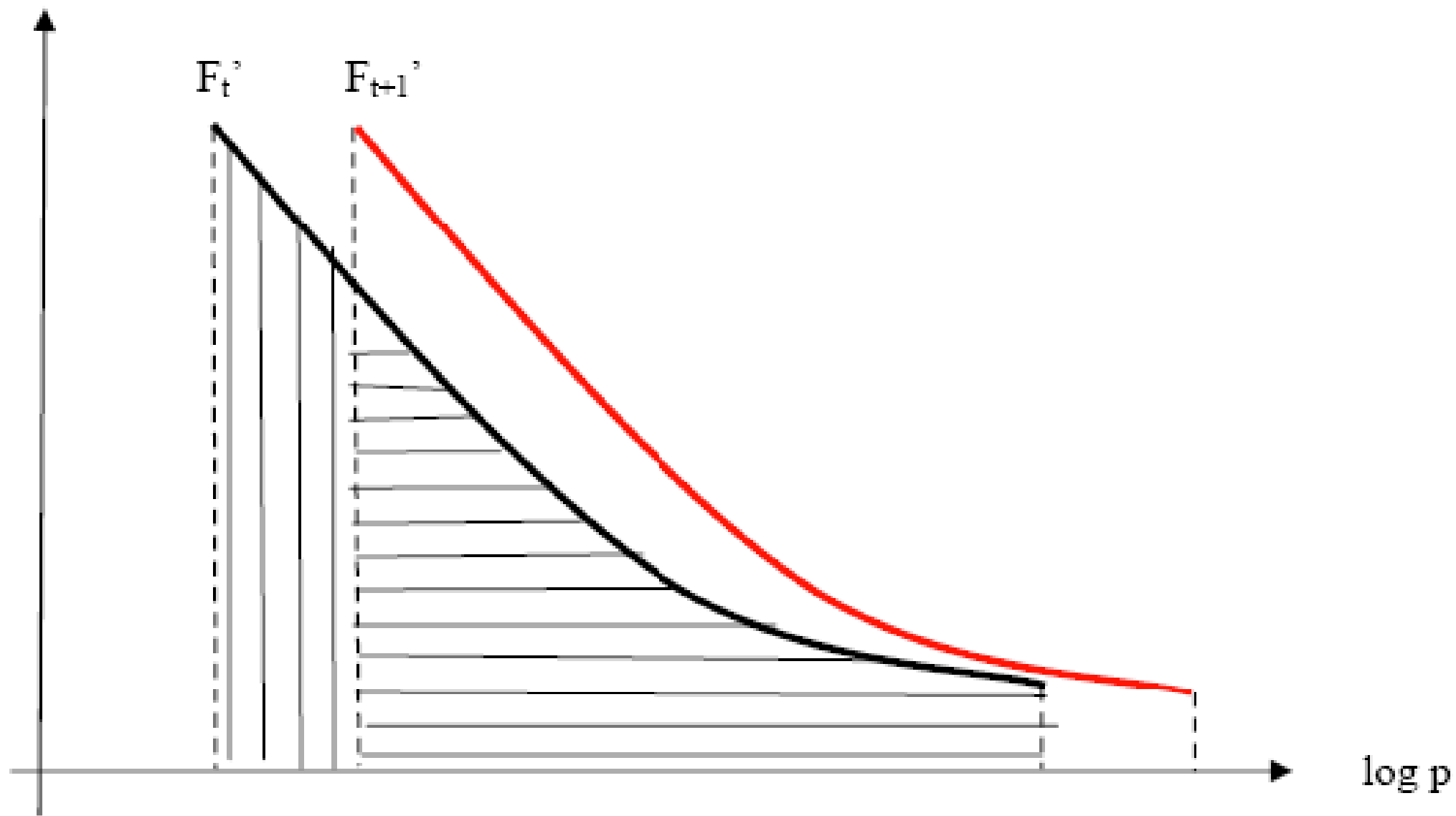


Figure IV: Equilibrium price distribution

# Result 1: money neutrality

- Price distribution shifts to compensate changes in money
  - not surprising: nothing prevents nominal prices from adjusting
  - compare to Caplin-Spulber'87 or Golosov-Lucas'07:
    - similar "elevator" shift in price distribution after money shocks
    - different: prices adjust to a random level
- Relative price distribution invariant to money
  - testable if have a good measure of money shocks
  - price dispersion varies with inflation
    - Lach-Tsiddon (JPE 1992)

# Result 1: money neutrality

- Price distribution shifts to compensate changes in money
  - not surprising: nothing prevents nominal prices from adjusting
  - compare to Caplin-Spulber'87 or Golosov-Lucas'07:
    - similar "elevator" shift in price distribution after money shocks
    - different: prices adjust to a random level
- Relative price distribution invariant to money
  - testable if have a good measure of money shocks
  - price dispersion varies with inflation
    - Lach-Tsiddon (JPE 1992)

## Result 2: price stickiness

- Menu cost: *strong* price stickiness
  - changing some prices decreases profits
  - prices are not always "free to change"
- This paper: *weak* price stickiness
  - changing some prices does not increase or decrease profits
  - prices are always "free to change"
- Equilibrium does not pin down individual prices
  - space of supportable price policy functions  $p_{t+1}^*(p)$
  - model based solely on search cannot make predictions about individual price behavior

# Matching micro facts with augmented model

- Assume an ad-hoc policy  $p_{t+1}^*(p, \rho)$ :
  - not in support: adjust to  $p'$
  - in support: adjust to  $p'$  w.prob.  $1 - \rho$ , do not adjust o.w.
  - $p'$  is random
- Results:
  - **theoretical:**  $A(\rho)$  (increasing),  $FR(\rho)$  (decreasing), incidence of price decreases
  - **quantitative:** price duration, distribution of price changes, average absolute size of price changes, hazard rate, size vs age, fraction/size vs inflation, price increases vs decreases
  - IMPRESSIVE!

# Matching micro facts with augmented model

- Assume an ad-hoc policy  $p_{t+1}^*(p, \rho)$ :
  - not in support: adjust to  $p'$
  - in support: adjust to  $p'$  w.prob.  $1 - \rho$ , do not adjust o.w.
  - $p'$  is random
- Results:
  - **theoretical:**  $A(\rho)$  (increasing),  $FR(\rho)$  (decreasing), incidence of price decreases
  - **quantitative:** price duration, distribution of price changes, average absolute size of price changes, hazard rate, size vs age, fraction/size vs inflation, price increases vs decreases
  - **IMPRESSIVE!**

# Satisfactory?

- Price policy  $p_{t+1}^*(p, \rho)$  has Calvo flare
- Nature of this policy function?
  - e.g., technology of price changes?
  - invariant to policy?
- How does it compare to other supportable policies?
  - results (theoretical and quantitative) depend on  $p_{t+1}^*(p, \rho)$ 
    - counterexample: exiting prices readjust to  $\underline{p}$
  - are there predictions that are robust across supportable policies?

# On Micro-Macro links

- Menu cost models:
  - matching to micro facts has macro implications
  - e.g., large size of price changes in Golosov-Lucas'07
- This paper:
  - micro facts have NO macro implications
  - then why need to match micro facts?

# Conclusion

- Search model can generate price dispersion without heterogeneity
- Some micro prices do not need to change (weak price stickiness)
- No frictions in price adjustment implies money neutrality
- By design model cannot predict individual price behaviour without further assumptions
- I would look for
  - testable predictions about micro price adjustment that are robust across supportable price policies
    - may be difficult
  - testable predictions about price distribution
    - price dispersion vs inflation (expected/unexpected)

# Conclusion

- Search model can generate price dispersion without heterogeneity
- Some micro prices do not need to change (weak price stickiness)
- No frictions in price adjustment implies money neutrality
- By design model cannot predict individual price behaviour without further assumptions
- I would look for
  - testable predictions about micro price adjustment that are robust across supportable price policies
    - may be difficult
  - testable predictions about price distribution
    - price dispersion vs inflation (expected/unexpected)