A Note for Rubbo (R&R ECTA)

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Abstract

This note is a short summary of Rubbo (R& R ECTA): Networks, Phillips Curves, and Monetary Policy.

1. Model: NK + multi-sector + IO network
2. Phillips curve:
   (a) A unique measure, the divine coincidence index, has a slope independent of IO network and productivity fluctuations do not generate a residual.
      i. π_t^{DC} weights sectors according to sales share and discounts those with more flexible prices.
      ii. Intuition: Aggregate output gap is given by markup weighted by sale share. It requires discounting sector with more flexible price responses more given a shock and has less fluctuation of markup.
   (b) All other Phillips curves are misspecified: flatter slopes and endogenous time varying residuals.
      i. Slope:
         A. $\gamma + \varphi$ the elasticity of employment to real wage
         B. α impulse component of wage shock
         C. $(I - \Omega\Delta)^{-1}$ propagation and rigidity adjustment
         D. $1 - \overline{\delta}_{\beta}(\alpha)$ equilibrium feedback loop (an increase in real wage raises consumption price by $\overline{\delta}_{\beta}(\alpha)$, therefore nominal wages must increase more to sustain a given output)
      ii. Intuition: flatter since sectors rely on intermediate input since wage changes are partially absorbed by sticky price through the production change and thus inflation response is muted.
      iii. Divine coincidence: negative shock increase MC and prices (direct) and lower efficient real wage (indirect) do not counterbalance in multi-sector model.
   (c) Examples
      i. Roundabout economy: an overestimation if
         A. Intermediate producers have stickier price than final good producers
         B. Producers with more flexible prices use stickier intermediate input
         C. Sectors with large labor share have large labor shares have stickier prices
      ii. Vertical chain
      iii. Horizontal economy
      iv. Oil economy: sticky upstream labor sector + middle oil sector + downstream final good; Similar to downstream shock since oil shock are fully passed through final good producers, and increase consumer prices; the effect of final prices is proportional to wage rigidity
3. Welfare loss function:
   (a) Source of welfare loss: inefficient markups arising from pricing frictions, which distorts labor supply (factor suppression) and reduces labor productivity (misallocation)
      i. Within sector misallocation: more severe in stickier sectors and when elasticity of substitution is large (large quantity response to relative price distortions)
      ii. Cross-sector misallocation: dependent on how price distortions propagate through the input-output network and the amount of substitution that they induce across input and final goods
4. Optimal policy:
   (a) Minimize welfare loss subject to Phillips curve
   (b) Dynamic model:
      i. Forward looking term (policy today affects misallocation tomorrow)
      ii. Backward looking term (monetary policy can improve misallocation by influencing inflation expectations)
   (c) No divine coincidence in multi-sector, CB trade-off: closing output gap versus efficient relative price across firms and sectors

(d) Optimal: output gap stabilization by targeting divine coincidence index in the Taylor rule

(e) Monetary policy cannot replicate efficient equilibrium $\rightarrow$ greater welfare loss from misallocation

(f) Choice of which inflation index to target is non-trivial.

5. Quantitative result:

(a) One-sector and multi-sector models are quantitatively different

(b) Two potential mechanism of declining slope over time:

i. An increase in intermediate input flows (IO): explanatory for the pre-1980 decline

ii. A shift in consumption towards stickier sectors: contribute to the flattening after 1980

(c) Monetary non-neutrality due to IO linkage is confirmed by impulse response of consumer inflation.

(d) This framework reconciles that wage Phillips curve is steeper than the price Phillips curve, and has not flattened over time since δ_{wage} only captures the effect of changes in labor demand on wages, while $\overline{\delta}_{\beta}(\alpha)$ incorporates the pass-through wage into consumer prices.

(e) Endogenous cost-push shock is a significant driver of variation for consumption price inflation. Optimal monetary policy should allow for a small positive output gap even though this slightly raises inflation.

(f) Consumption equivalence (in exchange of eliminating price frictions) 2.9% when CB implements optimal policy (this paper)> 0.05% (Lucas). Targeting consumer inflation yields 3.8% welfare loss.

(g) Regression using divine coincidence index matches the empirical slope and has larger R^2 (Phillips curve is not affected by endogenous residuals).