Markup Polarization and Missing Inflation & Disinflation : A Tale of Two Firms

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Motivation

How would the rising market power of firms affect inflation? The literature has documented the changes in price-cost markups to shed light on the declining market competition (see Basu 2019, Dıez, Fan, and Villegas-Sánchez 2021, among many others). This paper focuses on the ramification of such changes in markups on inflation. I assume that there is polarization on price-cost markups, i.e., high- vs. low-markup firms and develop an extension of a basic New Keynesian model. The polarization on price-cost markups has a jamming effect on the price aggregator. Therefore, inflation is subdued compared with a homogeneous markup model.

Literature

Andrés, Arce, and Burriel 2021 discuss the effect of superstar firms on the slowdown of inflation. In their model, if the firms with large market shares try raising their prices, their market shares shrink so that inflationary pressure dissipates. By contrast, this paper is open to the possibility that firms with small market shares charge high markups while firms with large market share charge low markups: If there is polarized price-cost markups, inflation can be subdued.

This paper shares the spirit of Kimball 1995 and Eichenbaum and Fisher 2007 to relax the assumption of the constant elasticity of substitution in production function. However, the specific construction is differentiated. Kimball 1995 constructs the elasticity of substitution as a function of a firm's market share and discusses how to theoretically combine the ideas of sticky prices and the real business cycles rather than examining the consequences on inflation. Eichenbaum and Fisher 2007 constructs the elasticity of substitution as a function of prices: When prices rise, the elasticity increases. The construction of elasticity in this paper allows a small niche market business with a small market share to be able to charge high-markup, earning consumer's loyalty and a low elasticity of substitution.

Model

I extend a basic New Keynesian model resembling Galı 2015, Chap. 3 to have two types of firms. Since labor is provided to two types of firms, a representative household is assumed to have two components related to labor disutility, Z_t^h and Z_t^l, as follows:

$$\max_{C_t, B_t \widehat{N}_t^l, \widehat{N}_t^h} E_0 \sum_0^\infty \beta^t \left[\log C_t - Z_t^l \cdot \frac{(\widehat{N}_t^l)^{1+\varphi}}{1+\varphi} - Z_t^h \cdot \frac{(\widehat{N}_t^h)^{1+\varphi}}{1+\varphi} \right] \tag{1}$$

$$\text{s.t. } \mathbb{P}_t \cdot C_t + Q_t \cdot B_t \le W_t^l \cdot \widehat{N}_t^l + W_t^h \cdot \widehat{N}_t^h + D_t^l + D_t^h + B_{t-1}.$$

Z_t^h and Z_t^l are labor disutility parameters for workers who work for the high- and for the low-markup firms respectively. The production function of firm i in a sector k is given by $y_t(i_k) = A_t^k N_t(i_k)^{1-\alpha}$ where $k \in \{h, l\}$. Firm i in a sector k can reset its price at time t to optimizes

$$\max_{P_t^{k\#}(i_k)} \mathbb{E}_t \sum_{s=0}^\infty (\beta\phi)^s \frac{C_{t+s}^{-\sigma}}{C_t^{-\sigma}} \left[\frac{P_t^{k\#}(i_k)}{P_{t+s}^k} y_{t+s}(i_k) - \frac{W_{t+s}^k}{\mathbb{P}_{t+s}} N_{t+s}(i_k) \right], \tag{2}$$

where $P_t^{h\#}$ denotes the reset price and ϕ is the probability of price stickiness. Note that firm i_k is a price-taker for the relative wage $\frac{W_{t+s}^k}{\mathbb{P}_{t+s}}$ in the labor market. I assume that consumers substitute their consumption within-sector: For example, those who purchase high-markup products consider only other high-markup products as substitutes.

Results

Recall that the monetary policy rule is given by $i_t = \frac{1}{\beta} \cdot \left(\frac{\Pi_t}{\Pi}\right)^{\phi_\pi} \cdot \left(\frac{Y_t}{Y_{Ss}}\right)^{\phi_y} \cdot \exp(\upsilon_t)$, where $\upsilon_t = \rho_\upsilon \cdot \upsilon_{t-1} - \epsilon_\upsilon$. An expansionary monetary policy shock (100 b.p. cut in the annualized nominal interest rate) induces subdued inflation response in the polarized markup model (see the blue line in Figure 1) compared with the conventional basic New Keynesian model (the black dashed line). The initial response in inflation is reduced by 34% in the polarized markup model. The initial response in output is boosted by 29%. These changes help the nominal interest rate become lower in the polarized markup model after the expansionary monetary policy shock.

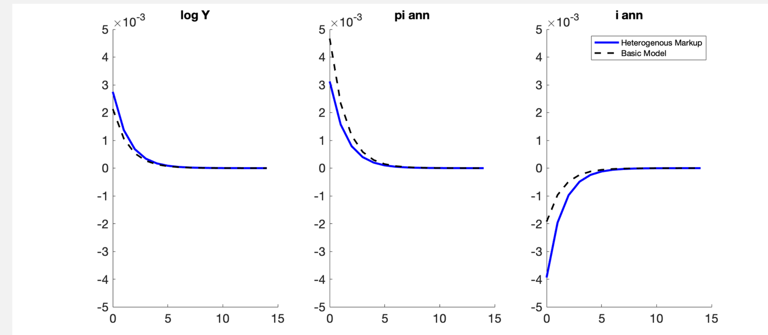

Fig. 1: Effects on Output, Inflation, and Nominal Interest Rate after an Expansionary Monetary Shock

In order to consider the productivity shock that affect both high- and low-markup production concurrently, in this experiment, I modify the production functions for high- and low-markup to share the same productivity A_t, i.e., $Y_t^k = A_t (N_t^k)^{1-\alpha}$ where $k \in \{h, l\}$. Given the law of motion for the TFP, $\log A_t = \rho_a \log A_{t-1} - \epsilon_a$, Figure 2 shows the comparison after 1%p fall in TFP. The initial response in output is reduced less than that of the basic New Keynesian model by 11%. Also, there is 11% reduction in the initial response in inflation. The response of the nominal interest rate is also subdued as the output and inflation responses are relatively contained.

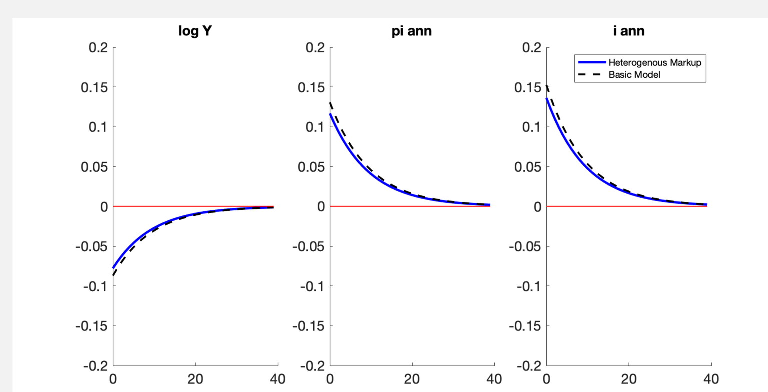

Fig. 2: Effects on Output, Inflation, and Nominal Interest Rate after an Adverse Tech Shock in the Heterogeneous Markup Model

Consider the periodic utility function of the representative household is given by $\log C_t - Z_t \cdot \frac{(\widehat{N}_t^l)^{1+\varphi}}{1+\varphi} - Z_t \cdot \frac{(\widehat{N}_t^h)^{1+\varphi}}{1+\varphi}$: That is, workers of the high- and low- markup firms share the same level of the labor disutility. Given the law of motion for the labor disutility $\log Z_t = \rho_z \log Z_{t-1} + \epsilon_z$. Figure 3 shows 40% reduction in the initial response in inflation. Output decreases 40% less in the initial response. Hence, the nominal interest rate also responds 40% less than it is in a basic New Keynesian model.

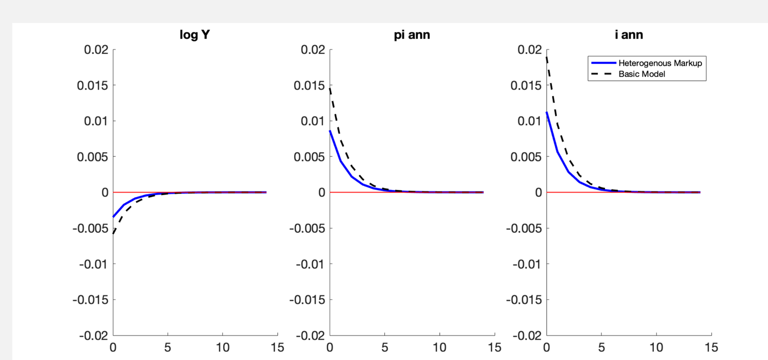

Fig. 3: Effects on Output, Inflation, and Nominal Interest Rate after an Adverse Labor Disutility Shock in the Heterogeneous Markup Model

Parameters

Parameter values follow Galı 2015, Chap. 3, p. 52. The benchmark number of high-markup firms to the total number of firms θ is set as 10% to match the construction of "high-markup sector" in Dıez, Fan, and Villegas-Sánchez 2021. The elasticity parameters of ϵ_h and ϵ_l are set to match the latest markups in Dıez, Fan, and Villegas-Sánchez 2021, that are 2.8 and 1.1.

Parameters							
α	0.25	β	0.99	ρ_a^l	0.9	ρ_a^h	0.9
ρ_z^l	0.5	ρ_z^h	0.5	ρ_υ	0.5	φ	5
ϕ_π	1.5	ϕ_y	0.125	θ	0.1^*		
ϵ_h	1.55	ϵ_l	9.19				
Steady State Vaues							
$A^l \& A^h$	1	$Z^l \& Z^h$	1	R	$1/\beta$	Π	1

Remarks

In this paper, I extend a basic New Keynesian model to have two production sectors. These production sectors feature polarized price-cost markups. With the extended model with polarized markup, I observe the effect of such polarized markups on aggregate output and inflation. Compared with a basic New Keynesian model with a single markup, inflation responses are always subdued when the economy is hit by an expansionary monetary policy shock, an adverse TFP shock common to both sectors, and a labor disutility shock common to both sectors. If the shocks' signs are reversed, then IRFs show missing disinflation.

In an economy with such polarized markups, the monetary policy tool of adjusting the nominal interest rate to control inflation is not as powerful as the one in a basic New Keynesian model. Given the empirical finding of Dıez, Fan, and Villegas-Sánchez 2021, a central bank might want to move aggressively or combine the traditional monetary policy tool with unconventional policy tools.

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