

Monetary Policy and Business Cycles with Endogenous Entry and Product Variety

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Very insightful paper

- BGM allow for entry in a model with monopolistic competition and price rigidities: **study implications for monetary policy**
- The no-entry assumption in New Keynesian standard models is unappealing for (at least) two reasons
 - Given monopolistic competition and non-zero profits there is an incentive for new firms to enter the market
 - Entry is an empirically relevant phenomenon

Overview of discussion

- Review briefly four results of the paper
- Focus on how monetary policy is transmitted in BGM model

Summary of key points/results

Recall model features

- Monopolistic competition & price rigidities
 - Production requires only labor
 - Sunk costs of entry (in units of the consumption good): $w_t f_{E,t} / Z_t$
 - Free entry condition equalizes value of new firm with entry costs
 - Exit with probability δ
- ⇒ Number of firms represent capital which is varied along the extensive margin (in contrast to NK-benchmark)

Four Results

#1 Optimal to stabilize producer price inflation

- Flex price economy (with subsidies) efficient: externality of entry on profits is set-off by consumer's love for variety
 - Producer price inflation generates markup fluctuations, absent under flexible prices; hence, the result
- ⇒ Reminiscent of results from open economy literature, e.g. Corsetti and Pesenti (2005)

#2 New Keynesian Phillips curve

- Number of firms impact on markup (variety effect): variety lowers consumer price, such that relative producer price rises
- Implication for Phillips Curve

$$\pi_t = \beta(1 - \delta)E_t\pi_{t+1} + \lambda \underbrace{(w_t - Z_t)}_{mc_t} - \frac{1}{\theta - 1}N_t$$

$$N_t = (1 - \delta)N_{t-1} + \delta N_{E,t-1}$$

⇒ Number of firms enters PC (key state variable)

- Authors note that this should be taken into account in empirical exercises à la Galí and Gertler (1999)

Relevant for recent debate on extent of price rigidities; in Kuester, Müller and Stölting (2007) we ask: Is the New Keynesian Phillips curve flat?

- NK-DSGE model by Gali and Rabanal (2005) as DGP

$$\pi_t = \beta E_t \pi_{t+1} + \lambda(mc_t + u_t)$$

$$u_t = \tau u_{t-1} + \varepsilon_t$$

- Assess GMM estimates of degree of price rigidity
- Idea: if $\rho(mc_t, u_t) < 0$, estimate pass-through parameter λ biased downward: find too much price rigidity

⇒ We estimate average price durations of 11 quarters while true value used in simulation is 2 quarters ($\tau = 0.95$)

#3 Taylor principle restored

- Using a forward looking interest rate feedback rule, the Taylor principle holds

⇒ This is not the case with intensive variation in the capital stock, see Carlstrom and Fuerst (2005)

#4 Business Cycle properties

- Productivity shock, negative entry-cost-shock and monetary contraction (!?) induce a rise in number of firms
- Different monetary rules lead to outcomes similar to flex price allocation (BGM 2005, henceforth BGM-flex)
- Nominal rigidities have little effect on second moments (BGM close to BGM-flex)
- BGM fails to deliver the cross-correlation function for markup and output which characterizes the data and BGM-flex

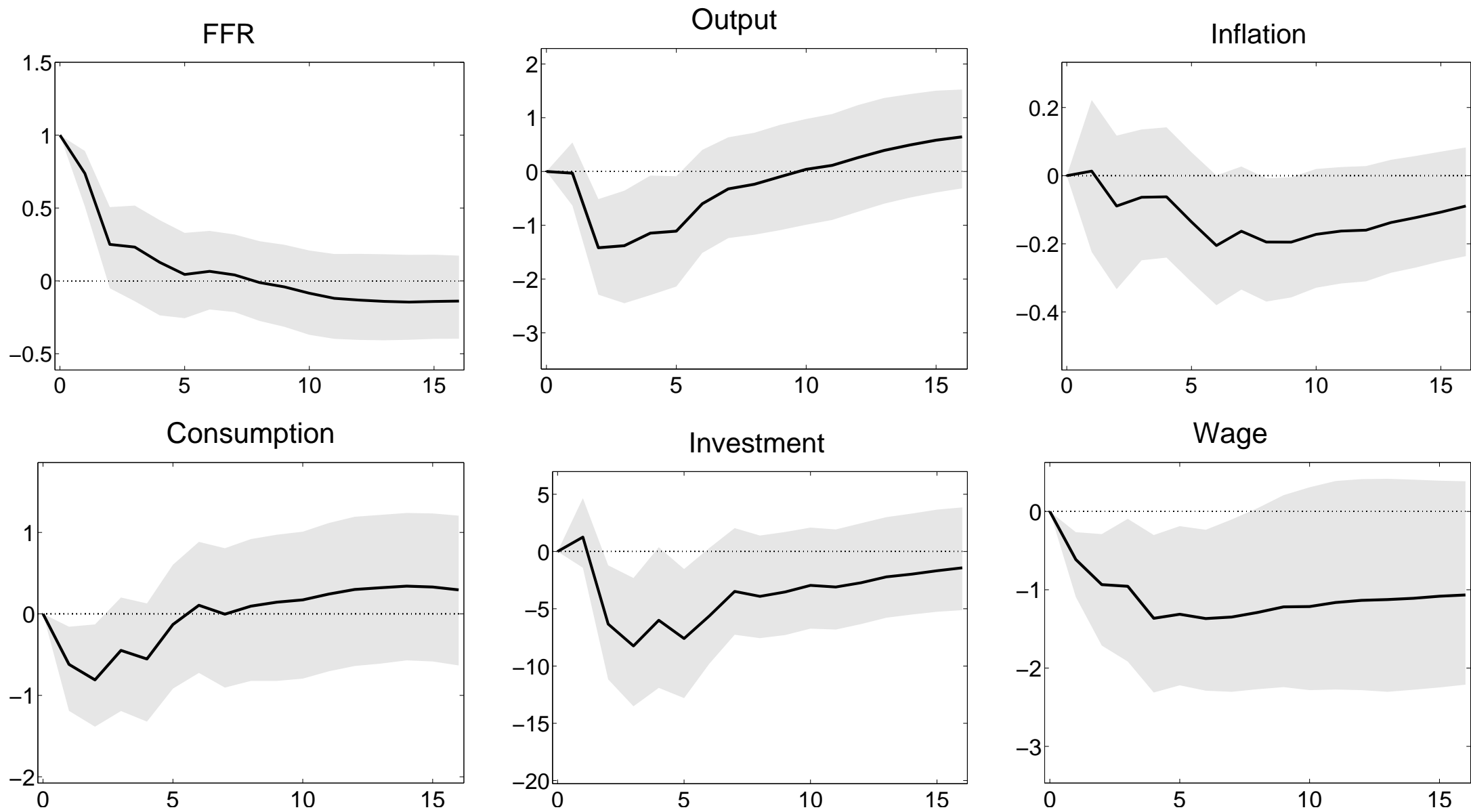
The monetary transmission mechanism

”Like the benchmark New Keynesian model with fixed product variety, the model of this paper has clear shortcomings from an empirical, quantitative perspective.” (BGM conclusion)

Make this more precise (focus on monetary transmission)

- Establish metric: impulse responses to monetary policy shock
- Horse race: BGM vs NK-benchmark with capital

Figure 1: Effects of monetary policy shock in US data 1979q4-2003q4
(Meier-Müller, 2006)



BGM and NK-benchmark modified for IR-matching

- Common features
 - Consistency with VAR identification: price, wages, consumption, investment decisions as well as asset prices predetermined
 - Allow for CRRA utility, price indexation and consumption habits; in NK-benchmark also investment adjustment costs
- Key differences
 - NK-Benchmark: no entry - capital stock owned households is used in production by monopolistic competitors
 - BGM: entry - number of firms is endogenous state; only labor used in production

Estimation/Calibration

- Following Rotemberg and Woodford (1997) & Christiano, Eichenbaum and Evans (2005)
- Parameters fixed: $\theta = 3.8$, $\delta = 0.025$
- Seek estimates for $\Lambda = \{\lambda, \sigma, \varphi, \gamma, \chi, \phi\}$
- Consider first 16 quarters after impact for the six variables
- Minimize distance, using repeated simulations of the model

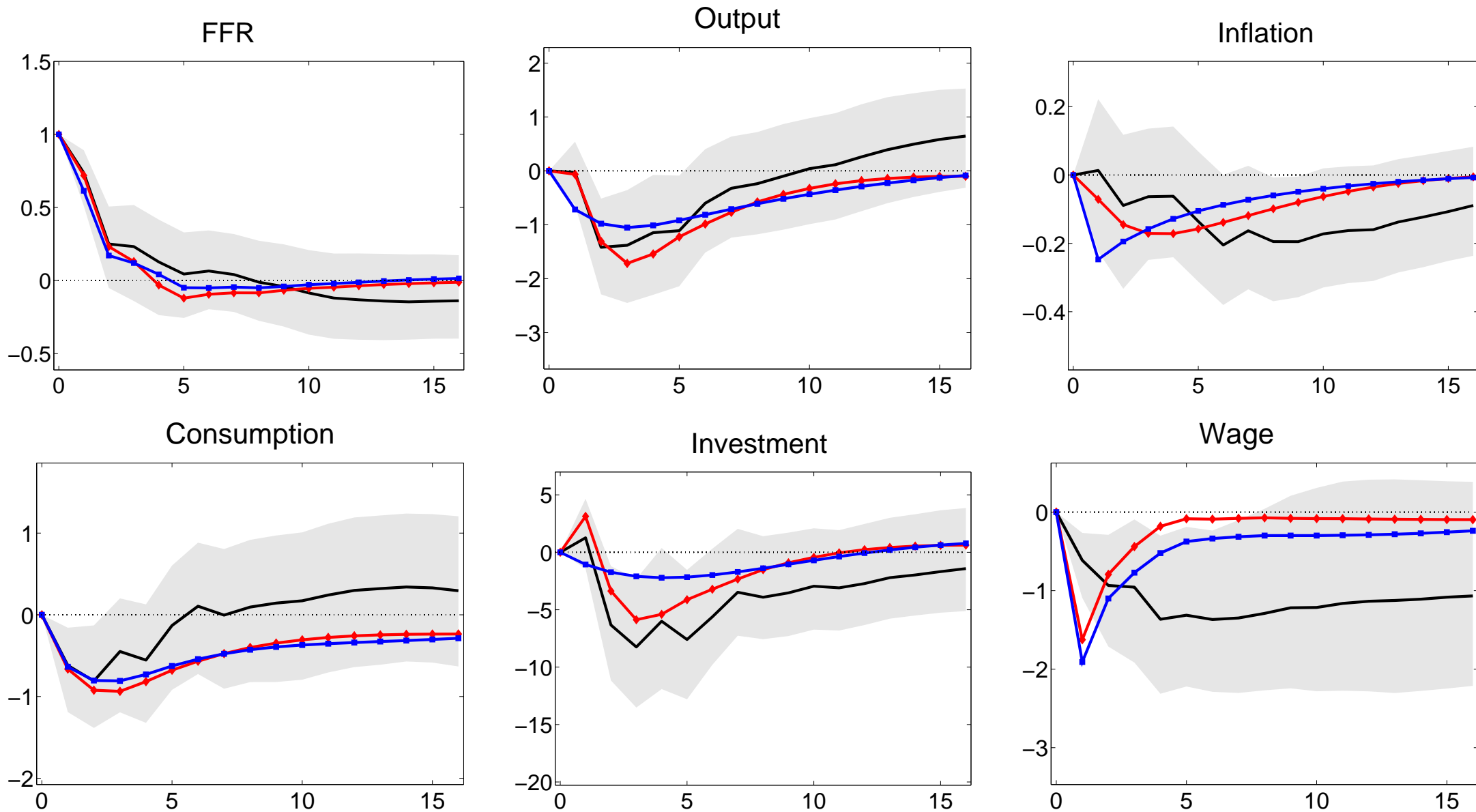
$$\hat{\Lambda} = \arg \min (\Psi^e - \Psi(\Lambda))' W (\Psi^e - \Psi(\Lambda))$$

Table 1: Estimated Model Parameters^b

Parameter		NKbaseline	BGM
λ	Slope PC	0.023 (0.026)	0.011 (0.009)
σ	CRRA	3.000 (2.102)	2.477 (1.662)
φ	Frisch	1805.085 (1991745.907)	22.758 (18.792)
γ	Indexation	0.000 (0.756)	1.000 (0.377)
χ	Habits	0.687 (0.410)	0.878 (0.105)
ϕ	Adj.Cost	0.961 (1.568)	<i>NaN</i> (<i>NaN</i>)
Loss :		120.4812	101.5789

^bStandard errors are reported in parentheses.

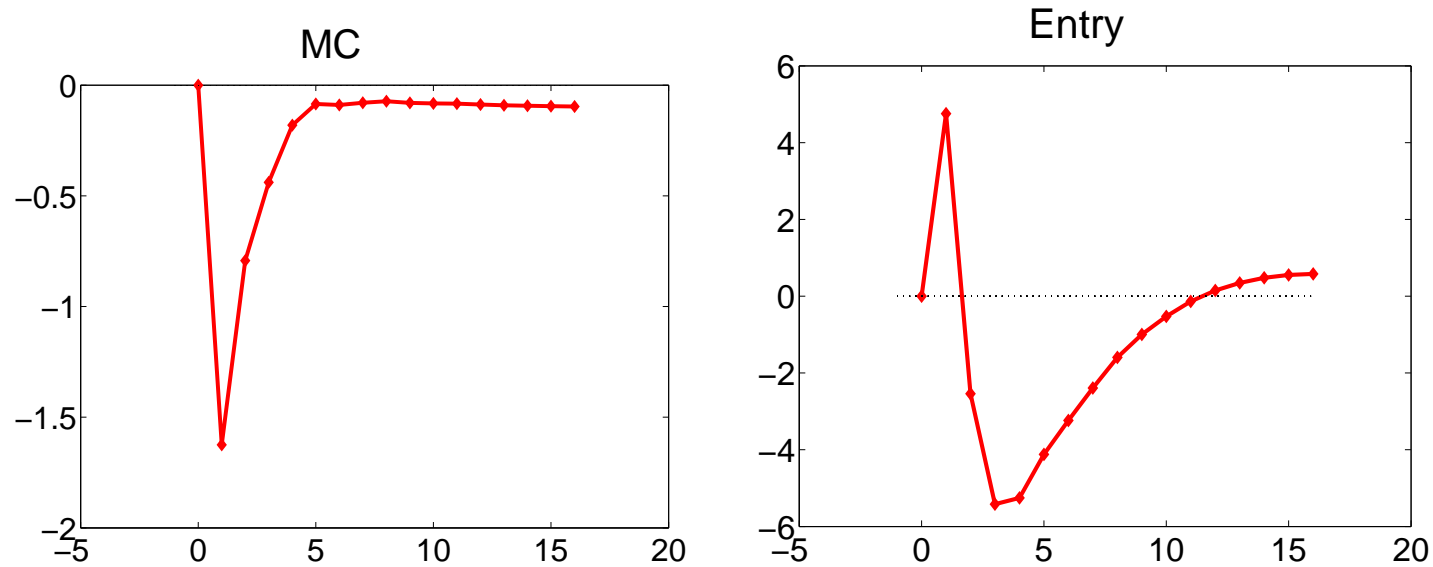
Figure 2: **BGM** vs VAR and **NK-benchmark**



Results

- Overall performance comparable: both models deliver IRF close to those obtained from VAR for more or less plausible parameter values
- BGM investment response is nicer! Fit is slightly better
- Estimated degree of price rigidity is high - slope of PC implies price durations between 7 and 10 quarters (Calvo) Why?
 - While monetary policy contraction lowers marginal costs it also crowds-in new firms!
 - Both effects induce downward pressure on inflation
 - Pass-through estimated to be low in order to match evidence

Figure 3: Negative conditional correlation of marginal costs and entry conditional on MP shock: estimated pass-through is low



$$\pi_t = \beta(1 - \delta)E_t\pi_{t+1} + \lambda(\underbrace{w_t - Z_t}_{mc_t} - \frac{1}{\theta - 1}N_t)$$

Why does monetary contraction crowd-in new firms?

- BGM stress role of asset prices for investment: as asset prices are low compared to the future, this channels resources into the financing of new firms
- Firm's perspective: profits and markup are rising in response to monetary contraction because inflation falls → entry

Result is counterfactual

- VAR evidence by Bergin and Corsetti (2006); acknowledged by BGM
- 'Disappointing' implications for estimated degree of price rigidity conditional on monetary policy shocks

Conclusion

- Many valuable insights regarding conduct of monetary policy in an environment with entry
- Ability to account for monetary transmission mechanism comparable to or better than NK-benchmark model featuring capital (intensive margin)
- Unappealing feature: monetary contraction crowds-in new firms