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Income dispersion and counter-cyclical markups ☆

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ABSTRACT

Recent advances in measuring cyclical changes in the income distribution raise new questions: How might these distributional changes affect the business cycle itself? We show how counter-cyclical income dispersion can generate counter-cyclical markups in the goods market, without any preference shocks or price-setting frictions. In recessions, idiosyncratic labor productivity shocks raise income dispersion, lower the price elasticity of demand, and increase imperfectly competitive firms' optimal markups. The calibrated model explains not only many cyclical features of markups, but also cyclical and long-run patterns of standard business cycle aggregates.

1. Introduction

A long line of empirical research suggests that prices vary less over the business cycle than marginal costs. In other words, markups are counter-cyclical. The question is why. We argue that the cross-sectional dispersion of earnings might play a role. In recessions, when earnings are more dispersed, buyers' willingness to pay is also more dispersed. If sellers reduce prices in recessions, they attract few additional buyers (the small shaded area in the left panel of Fig. 1). This low elasticity makes the marginal benefit of lowering prices smaller and induces firms to keep prices high. Therefore when dispersion is high, prices stay high but profits are low. In contrast, in booms when dispersion is low, sellers who reduce prices attract many additional buyers (the larger shaded area in the right panel of Fig. 1). Therefore in booms, sellers keep prices low but earn high profits.

While there have been many previous explanations for counter-cyclical markups, our mechanism has two strengths: it is based on observables and it can be embedded in a simple dynamic equilibrium model.[1] The observable variable is

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[1] Seminal papers on counter-cyclical markups are Rotemberg and Saloner (1986) and Bils (1989). For a review, see Rotemberg and Woodford (1999). Recent work on the related phenomenon of real price rigidity includes Nakamura and Steinsson (2006) and Menzio (2007).

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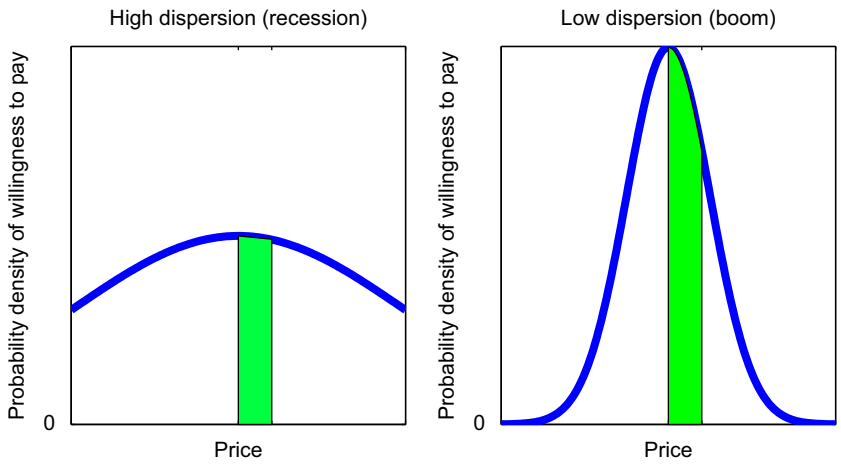

Fig. 1. Lowering price is more beneficial when dispersion is low. The shaded area represents the increase in the probability of trade from lowering the price, by an amount equal to the width of the shaded area. This higher probability, times the expected gains from trade, is the marginal benefit to reducing the price. In our model, willingness to pay is based on household earnings.

earnings dispersion. Embedding the earnings process estimated by Storesletten et al. (2004) in a production economy allows us to compare the model's predictions to business cycle aggregates. In particular, our mechanism delivers realistic pro-cyclical profit shares, a feature of the data that many models struggle with.

To illustrate our mechanism, Section 2 analyzes a static version of the model. There is a competitive sector where price equals marginal cost and an imperfectly competitive sector where prices are marked up. In both sectors, the only input is effective labor. Households choose how much to work and how much of each good to buy. Income dispersion arises because some households are more productive. The main result is that more dispersed idiosyncratic productivity results in higher markups and higher prices.

Theory alone cannot tell us if the variation in earnings dispersion is a plausible source of counter-cyclical markups. The problem is that changes in aggregate productivity are a force for pro-cyclical markups. Therefore Section 3 calibrates and simulates a dynamic version of the model. For reasonable parameter values, the earnings dispersion effect dominates the productivity effect. Since measured dispersion is counter-cyclical, markups are as well. Their correlation with GDP is almost as negative as in the data. The resulting prices look inflexible because they fluctuate less than marginal cost. Yet, there are no price-setting frictions.

One reason economists pay attention to counter-cyclical markups is because they can amplify the effects of other business cycle shocks. In this model, when aggregate productivity is low, high markups keep prices from falling much. Higher prices mean fewer goods are sold, amplifying the effect of the productivity shock. In our quantitative results, the effect of the productivity shock is amplified sevenfold relative to a standard real business cycle model. Section 3.5 compares the model's predictions for GDP, employment, real wages, and profits to their empirical counterparts. Importantly, the model's ability to explain markups does not come at the cost of undermining its ability to match macroeconomic aggregates.

To keep heterogeneous earnings tractable, our model abstracts from important issues in the literature on income heterogeneity in macroeconomics, such as risk sharing and capital accumulation (Krusell and Smith, 1998; Rios-Rull, 1996; Krueger and Perri, 2005). In Section 3.7 we show that our main results hold up if we re-calibrate idiosyncratic productivity to the level of consumption dispersion documented in Krueger and Perri (2005). Omitting capital hurts the performance of the model by making aggregates too correlated with GDP.

Other mechanisms can generate counter-cyclical markups. One possibility is that sticky prices and pro-cyclical marginal costs make the difference between price and cost, the markup, counter-cyclical. The problem with this explanation is that, without additional frictions, it implies counter-cyclical firm profits, strongly at odds with the data. Similarly, while firm entry and exit change the degree of market competition and thus the markup (Jaimovich and Floetotto, 2008), free entry implies zero profits. Our model delivers realistic pro-cyclical profits. Booms are times when markups are low but volume is high enough to compensate. Comin and Gertler (2006) reverse the causality: they use shocks to markups as a source of business cycles. Three closely related models also produce a cyclical elasticity of demand due to changing production technology (Kimball, 1995), changing demand composition (Gali, 1994), or changes in product variety (Bilbiie et al., 2006).

To argue that earnings dispersion is part of the reason for price variation, we look for other evidence that long-run changes and cross-sectional differences in earnings dispersion are correlated with differences in prices and profit shares as predicted by the model. Section 4 shows that the observed increase in earnings dispersion is consistent with the observed slowdown in real wage growth and the accompanying increase in profit shares. Section 4.2 documents additional facts from the empirical pricing literature that when the customer base has more dispersed earnings, prices tend to be higher.