

The Cyclicalities of Gross Margins

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Extended Abstract

How does the margin of price over costs vary across firms and products? How does the price margin vary over the business cycle? Do firms adjust their mark-ups or other dimensions of production in response to different types of aggregate shocks? Answering these questions is crucial for distinguishing between different macro models of firm dynamics, and for understanding the nature of business cycles and employment dynamics.

Despite the importance of understanding the dynamics of markups, there is very little direct evidence of markups and marginal costs. Measuring the cyclicalities of markups is challenging and is typically inferred using indirect evidence. These approaches rely on assumptions about the firms' production function and market structure to derive optimality conditions. The optimality conditions are then used to infer the cyclicalities of mark-ups from variations in input shares. The literature is divided in its conclusions about the cyclicalities of markups, and often differs depending on their assumptions and approach taken to infer the markups.¹ In this paper, we provide direct evidence on the cross-sectional distribution and cyclicalities of price margins, rather than relying on parametric assumptions on production functions and demand systems. We use a unique data source of prices and marginal costs from a large U.S. retailer, as well as firm-level data on gross margins and profits for large firms in the retail sector. We focus on the retail sector because the predominant variable cost comes from the cost of goods sold, which can be clearly measured.

First, we provide a set of key moments on price margins and operating profits of firms. We examine the unconditional cyclicalities of margins over time and spatially across markets, and estimate the conditional elasticity of price margins following demand and supply shocks. We compare the cyclicalities of price margins and marginal costs with the variation of other

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¹See Nekarda and Ramey (2013) for a detailed summary of studies that find counter-cyclical markups, and others that infer pro- or acyclical markups.

expenses which typically have a fixed component. These expenses include rental costs and overhead labor, and expenses associated with store opening and closings. Second, we then show that the empirical moments are consistent with predictions from standard trade and geography models on margins and firm entry and exit dynamics. We discuss the implications these models have for regional variations in the impact of aggregate shocks, and the entry and exit dynamics of establishments.

Our empirical investigation yields three key findings. First, we find that product-level price margins are substantially dispersed cross-sectionally across different counties. The cross-sectional dispersion in margins is driven by the dispersion in prices across counties, rather than in marginal costs for the same firm. This implies that differences in local area elasticities rather than iceberg costs play a substantial role in determining the level of prices in the market at a given point in time.

Second, while there is large cross-sectional variation across markets and firms, the distribution of price margins changes very little over time and over the business cycle relative to sales and operating profit margins. For instance, while sales growth declined substantially and became more negatively skewed in the recent Great Recession relative to 2006-07,² the distribution of price margins changed very little (Figure 1). We confirm our finding that price margins adjust very little over the cycle relative to operating profits, using regression analysis that exploits variation in local market economic conditions, and estimation of responses to exogenous monetary policy and oil price shocks.³

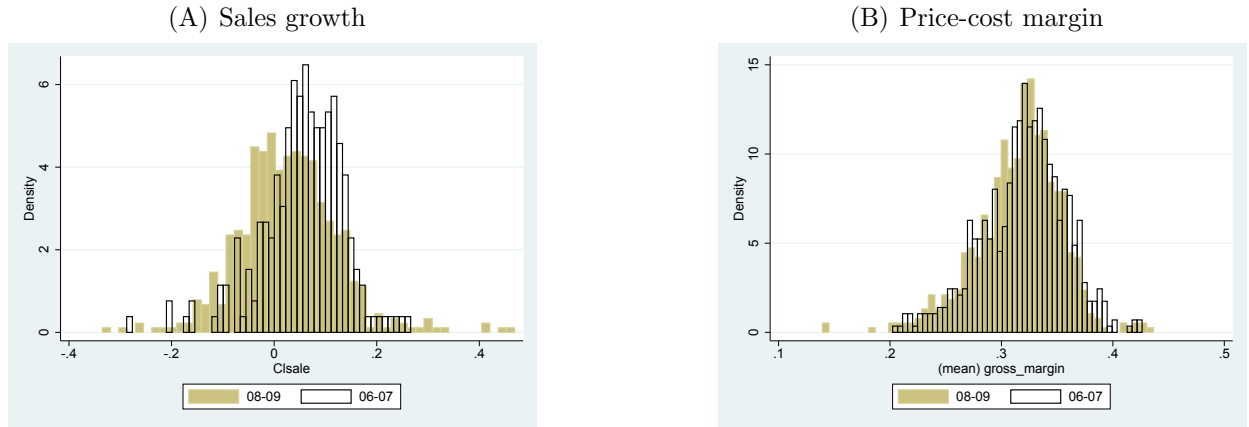
Our third finding is that firms instead adjust other fixed components much more than their gross margin over the cycle. We show that rental expenses, spending on equipment and property, and the number of employees are highly negatively correlated with sales and output growth. The net number of stores owned by the firm is also highly procyclical. This implies that firms adjust on fixed expenses, rather than varying their variable price margins when sales decline. As a result, we see their operating profits (which equals gross margins net of other operating expenses) move much more than their gross margin.

Lastly, we discuss the implications of our empirical findings for different business cycle models. Our empirical finding of acyclical margins is inconsistent with models which rely on variable mark-ups to generate fluctuations in firm employment and net entry over the business cycle. Instead, our findings are supportive of models with constant mark-ups and heterogeneous firm productivity in the cross-section. We describe a simple geography model

²The skewness of sales growth during recession is also documented in Bloom, Guvenen and Salgao (2015) for a number of different countries.

³Our findings are consistent with papers such as Nekarda and Ramey (2013) and Hall (2014), who indirectly infer variations in price margins from labor shares and advertising expenses, respectively.

Figure 1: Distribution of sales growth and price margins across markets



Note: The data source for the graph comes from a large U.S. retailer. The figure shows the distribution of average sales growth (left panel) and mark-ups (right panel) across different U.S. counties. The price margin is the ratio of (price-marginal costs) to price, computed at the average SKU (product item) level for each county at a point in time. Each observation reflects the average county-time price margin, and the graph reflects the distribution of these price margins across markets.

in the spirit of Melitz (2003) that is consistent with our empirical findings. We discuss the implications of these models for spatial variation and regional inequality following aggregate economic shocks.