

# Commentary: Customer Markets and Financial Frictions: Implications for Inflation Dynamics

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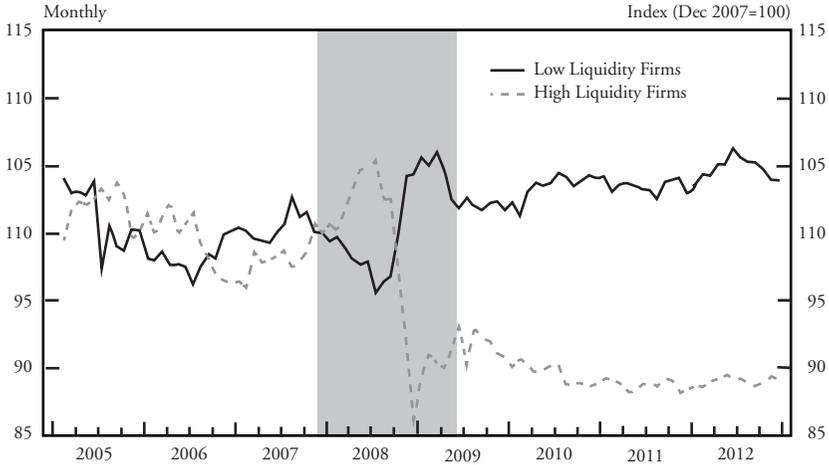
## **I. Overview**

Simon Gilchrist and Egon Zakrajšek argue that customer markets interacted with financial frictions to increase markups, inflation and the depth of the U.S. Great Recession. They present cross-industry evidence that these mechanisms operated in earlier business cycles as well. Finally, they draw lessons for monetary policy: it should put more weight on output and less weight on inflation after financial shocks.

Gilchrist and Zakrajšek build on their recent paper with Raphael Schoenle and Jae Sim on “Inflation Dynamics During the Financial Crisis” (Gilchrist et al., 2015). There they match 584 nonfinancial firms with items in the U.S. Bureau of Labor Statistics Producer Price Index (PPI) with those firms’ Compustat data on income and balance sheets from January 2005 through December 2012. Their key finding is that firms with low liquidity positions raised their prices beginning in 2008, whereas firms with strong liquidity positions slashed their prices. These price differences persisted through 2012 (Chart 1).

Their explanation for these divergent pricing patterns goes as follows. Consumers form a habit for each good—for tractability a “keeping up with the Jones” externality based on average consumption across

**Chart 1**  
**Evidence on Relative Prices from Gilchrist et al., 2015**



Note: Gray bar represents recession.

Source: Gilchrist, Schoenle, Sim and Zakrajšek, 2015.

households. Knowing this, firms price so that current marginal revenue is below current marginal cost, as today's quantity feeds into future demand and future variable profits.

Firms also face fixed costs of external financing if they find themselves illiquid. When external financing is expensive and a firm is illiquid, it will sacrifice future demand by setting a higher price today. This will generate more cash flow today (since marginal revenue is below marginal cost), helping to avoid expensive external finance. Such a trade-off between current and future profits can help explain why firms with a low ratio of liquid to total assets raised prices in the middle of the Great Recession (2007-09), whereas firms with a high ratio of liquid to total assets did the opposite. Since marginal cost arguably fell along with production in the Great Recession, the liquid firms may have cut prices in response to lower marginal cost. The higher prices at illiquid firms therefore may have reflected sharply higher price-cost markups. The negative relationship between price changes and liquidity from 2008-12 is strongest for nondurable manufacturing, where "experience" goods are arguably more prevalent.

The matching of prices in the PPI to Compustat firms is a nice contribution in its own right. The paper matches 558 nonfinancial firms, with an average of 670 establishments reporting price data on

3,700 item prices per month. Average inflation across these firms is positively correlated with overall PPI inflation (correlation 0.51). Other researchers are already taking advantage of this match, e.g. Jaimovich et al., (2015).

The quantitative theory in Gilchrist and Zakrajšek's study is also valuable. In the simulations consumer habits generate persistent relative price and output responses for constrained versus unconstrained firms. Because liquid firms take advantage of the opportunity to steal market share from the illiquid firms, the latter find it difficult to rebuild liquidity in equilibrium. Most important, the simulations demonstrate that the ingredients can matter for aggregates in general equilibrium. Simulated inflation rises in response to a negative goods demand shock due to its effect on financial constraints. If financial constraints are exogenously tightened at the same time, the effects are dramatic. Inflation jumps over a percentage point, while real output falls about 0.7 percentage point. This constitutes a major shift in the Phillips curve.

The model breaks the "Divine Coincidence" (positive comovement between inflation and the output gap in response to most shocks) seen in the standard New Keynesian model or in models with the Bernanke et al. (1999) financial accelerator. Put differently, the model can potentially account for the "missing deflation" from 2008-12.

I now briefly discuss the evidence for the ingredients in the story: customer markets, financial constraints and (especially) rising price-cost markups.

## **II. Customer Markets**

Evidence is accumulating that firms grow by acquiring customers, not just by lowering their prices or improving the quality and variety of their products. For U.S. manufacturing firms with relatively homogeneous products, Foster et al. (2008) show that firm production rises sharply with age while prices rise modestly with age. Hottman et al. (2015) look at multiproduct manufacturers of U.S. consumer goods, and estimate 70 percent of firm size heterogeneity and growth comes from selling more units of each Universal Product Code (UPC), rather than from lowering the prices of their UPCs or

adding more UPCs. As quality should be fixed over time for a given UPC, firms must be selling a higher quantity to each customer or adding customers. Byrne et al. (2015) document rising market share for individual semiconductor products after they are introduced despite rising relative prices.

More direct evidence is available for exports. Eslava et al. (2014) find that most growth in the exports of Colombian firms occurs by selling to more firms abroad. Fitzgerald et al. (2016) show that Irish firms build exports of narrowly defined products to given destination markets without cutting their prices, an export analogue to the Foster et al. (1998) finding. Roberts et al. (2012) estimate that idiosyncratic demand is the dominant factor behind sales of Chinese footwear manufacturers.

Given the importance of building demand documented in these studies, the effect of current prices on future demand should naturally be a major consideration for sellers.

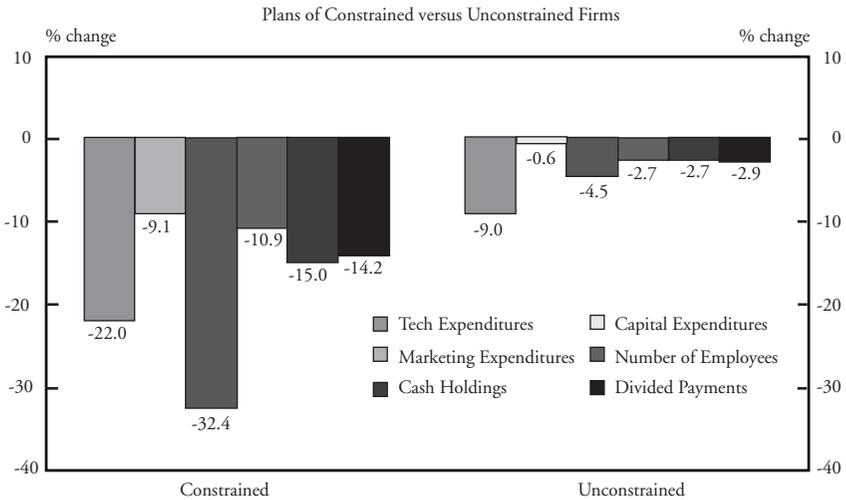
### **III. Financial Frictions**

Many studies have found that financing became more difficult to obtain during the 2007-09 financial crisis. Chodorow-Reich (2014), for example, connects the health of financing banks to the employment of bank-dependent firms. Campello et al. (2010) surveyed about 574 U.S. chief financial officers (CFO) in the fourth quarter of 2008 and asked them if they were not affected, somewhat affected, or very affected by difficulties in accessing credit. They followed up with questions about their company's plans for 2009. Those CFOs who said they were very affected ("constrained" firms) predicted much bigger declines in employment, capital expenditures and marketing expenditures in 2009. Tellingly, marketing expenditures were three times as sensitive as capital expenditures (a greater than 30 percent decline predicted for marketing versus a less than 10 percent decline predicted for capital expenditures) (Chart 2).

### **IV. Price-cost Markups**

Even if Gilchrist and Zakrajšek are right that financial frictions interacted with customer markets to induce an increase in the relative

**Chart 2**  
**Evidence for Financial Constraints in 2008:Q4**



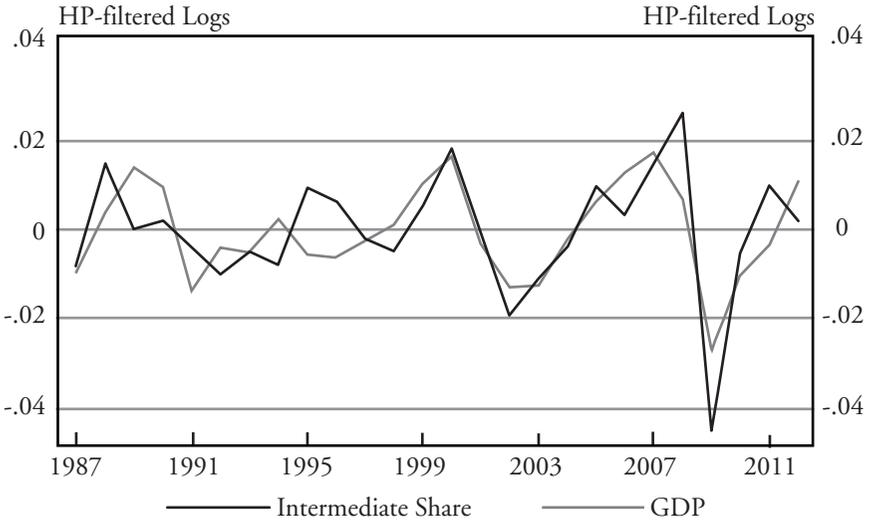
Source: Campello, Graham and Harvey, 2010.

price-cost markups of financially-constrained firms from 2008-12, this does not mean that average price-cost markups rose in the U.S. economy over this period. Just as with the cross-region evidence in Mian and Sufi (2014), one cannot infer from cross-firm evidence what a shock does to aggregates. The reason, of course, is general equilibrium effects on wages, prices and interest rates. Gilchrist and Zakrajšek, and Gilchrist et al. (2015) before them, conduct DSGE simulations precisely to provide some reassurance that the hypothesis holds up in general equilibrium. But what evidence do we have that average price-cost markups rose from 2008-12?

A recent paper by Bilts, Klenow and Malin (2015) provides two new pieces of evidence on what price-cost markups did during the Great Recession. First, they show that spending on intermediate inputs relative to firm revenue fell sharply from 2008 to 2009 (Chart 3). High price-cost markups should boost revenue relative to input costs, just as seen.<sup>1</sup> Second, they show that hours worked fell even more steeply for the self-employed as for employees in the Great Recession (Chart 4).

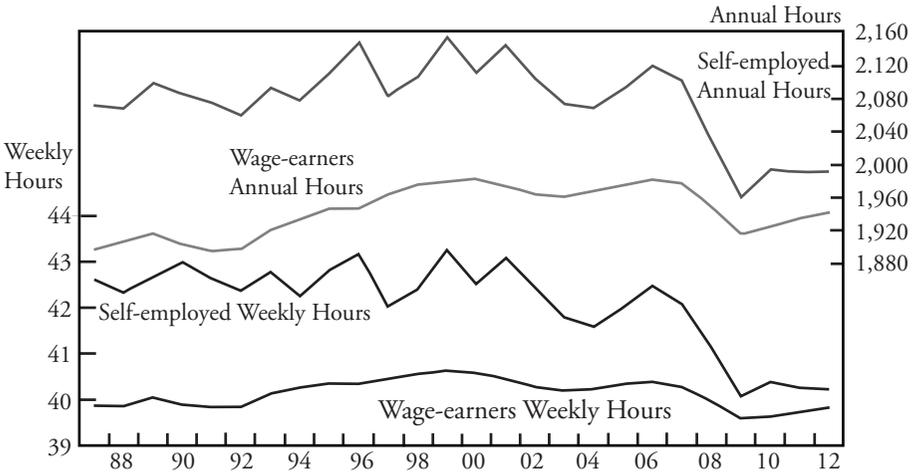
It is hard to imagine wage stickiness or search frictions mattering for the self-employed, and the income of the self-employed did not fall

**Chart 3**  
**Intermediate Inputs Relative to Revenue**



Source: Bils, Klenow and Malin, 2015.

**Chart 4**  
**Hours for Self-employed versus Wage-earners**



Source: Bils, Klenow and Malin, 2015.

enough to account for their reduced working hours. Bils et al. (2015) infer that self-employed firms struggled to generate revenue (e.g., owners of small retailers finding fewer customers coming in the door). If customers are more difficult to attract, marginal revenue should fall relative to the price, boosting the profit-maximizing markup.

The evidence in Bils et al. (2015) is indirect, so much more study is needed. The cyclicity of markups remains one of the most important (and elusive) questions in business-cycle research. But their evidence is supportive of the Gilchrist and Zakrajšek view that rising price-cost markups contributed to the depth of the Great Recession and the (only modest) disinflation that accompanied it.

**Endnote**

<sup>1</sup>A related argument is that spending on labor inputs should fall relative to revenue when markups rise. But *Bils et al. (2015)* argue that wage-smoothing could explain why labor's share fell less than the share of intermediates.

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