



# Asymmetric cost pass-through? Empirical evidence on the role of market power, search and menu costs



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## ABSTRACT

We estimate cost pass-through rates based on data for store-level retail prices and wholesale costs for up to 90 different brands of milk sold in 327 retail stores across Germany. The abundance of the data allows us to identify heterogeneity in pass-through across retailers and relate it to underlying explanatory factors such as retailer market power, measures of consumer search and menu costs. Results from a threshold-error-correction-process clearly provide empirical support for the 'rockets and feathers' phenomenon: prices increase more quickly than they decrease. In contrast to much of the existing literature, which explains the 'rockets and feathers' phenomenon as a result of retailers exercising market power, we find the opposite result: the degree of asymmetry in prices is negatively related to market power (decreases with the Lerner-Index). Our measure of (cross-product) search costs does not account for observable differences in asymmetric cost pass-through rates between products. The 'rockets and feathers' observation is better explained by product-specific differences in menu costs ('mistake costs') and costs associated with stock-outs which can lead to a loss of consumer goodwill.

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## 1. Introduction

An asymmetric adjustment of prices to cost increases and decreases (asymmetric cost pass-through, 'aCPT')<sup>1</sup> has been observed for many agricultural and energy markets (see Frey and Manera (2007), Eckert (2013) or Perdiguer-Garcia (2013) for recent surveys of the field). Different explanations for an aCPT have been proposed in the existing literature: non-competitive markets (market power), costs of price adjustment (menu costs and 'mistake costs'), product-specific differences in costs of stock-outs, and search costs.

While there is ample empirical evidence on incomplete and asymmetric price transmission, the existing studies do not provide reliable support to interpret this as evidence in favor of one of the different explanations offered in the literature. A large share of this literature focuses on one product market using only time series data and implicitly assumes competition

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<sup>1</sup> The existing literature uses the terms 'vertical price transmission' and 'cost-pass-through' (CPT) interchangeably to characterize the impact of factor price (cost) changes on downstream product prices (Misra and Khan, 2010). We will use the term 'cost-pass-through' (CPT) or 'asymmetric cost-pass-through' (aCPT) in the present analysis.

within this market to be global (some exceptions are mentioned in the next section). ‘Unless important changes in market power are known to have occurred within the study period, this sort of analysis provides no basis for comparing price transmission under conditions of more and less market power because there is no variation in the ‘treatment variable’ (Meyer and von Cramon-Taubadel, 2004, p. 588).

The present analysis goes beyond this research by comparing the cost pass-through rates for a large number of different brands and retailers. The empirical model is based on a comprehensive data set comprising a long panel of store-level retail prices and wholesale costs for up to 90 different brands of milk sold in 327 retail stores across Germany. The abundance of the data allows us to identify heterogeneity in pass-through across retailers and measure conditional correlations between pass-through rates and factors such as retailer market power, measures of consumer search and menu costs, and product characteristics.<sup>2</sup> In a two-stage procedure, we first estimate coefficients of the threshold-error-correction-process, which are then used as a dependent variable in a regression to measure conditional correlations with our measures of market power, menu- and search costs.

## 2. Literature

In terms of the empirical approach applied, the present analysis is closely related to studies in the retail gasoline market. Deltas (2008), Verlinda (2008) and Lewis (2011) investigate pass-through rates in multiple geographic markets and across many sellers and aim at examining observed differences between markets and regions with station and local market level characteristics. According to Meyer and von Cramon-Taubadel (2004) two explanations for an *aCPT* are predominantly used in the existing literature: non-competitive markets (market power) and menu costs. The first hypothesis states that (oligopoly) retailers may exert market power by raising prices more rapidly in response to a cost increase than by cutting prices in response to a cost decrease. Borenstein et al. (1997), for example, argue that ‘prices are sticky downward because when input prices fall the old output price offers a natural focal point for oligopolistic sellers’ (p. 324).<sup>3</sup>

The second hypothesis relies on costs related to adjusting quantities and prices. Menu costs imply a lagged response to cost shocks (Ball and Mankiw, 1994). Supply adjustment costs (including menu costs) can also explain asymmetries in price adjustment if these costs are asymmetric with respect to an increase or a decrease in output quantities and/or prices.<sup>4</sup> Levy et al. (1998), however, cast some doubt on this asymmetry in menu costs: ‘given the structure of the price change process, the cost of labor used, the cost of preparing and delivering price tags, and the cost of in-store managerial time are not likely to be higher for price increases than price decreases’ (p. 113).<sup>5</sup> The authors also explore one specific component of the costs of price adjustment – the so-called ‘mistake costs’ (i.e. costs associated with mistakes that occur in the price change process) – that may have an asymmetric effect on price adjustment. According to Levy et al. (1998), costs associated with these mistakes will be low if they favor the customers, but they can be very high if the mistakes favor the store, since the store may lose reputation and customers’ goodwill and may even face legal problems. The authors argue that ‘the asymmetric effects of the mistake cost component of the price adjustment costs may indeed deter price increases more often than price decreases’ (p. 113).

Retailers’ incentives to adjust prices asymmetrically to cost increases and decreases can also differ between products. Ward (1982) suggests that retailers of perishable products might hesitate to raise prices for fear of reduced sales leading to spoilage. This would lead to negative *aCPT*. Ward’s explanation is challenged by Heien (1980), who argues that ‘changing price is not a problem for perishables, but for items with a long shelf life, price changing is costly both in terms of time to put on new labels and in goodwill lost’ (p. 15).<sup>6</sup> More specifically, *aCPT* can be the result of households’ unequal costs of maintaining relatively high or low inventories. For products that are more expensive to store in the household (perishable products), the costs of experiencing a stock-out at the retailer will be particularly high. To ward off a stock-out of these

<sup>2</sup> Previous investigations of the milk market have found evidence of asymmetric pass-through. Kinnucan and Forker (1987) observe pricing asymmetries in retail prices of dairy products (milk, cheese, butter, and ice cream) in the US, with larger and speedier reactions when farm prices are increasing. Serra and Goodwin (2003) find evidence for *aCPT* in dairy products in Spain. Chavas and Mehta (2004) analyze the butter market in the US for the period from 1980 to 2001. They find strong support for asymmetry in the adjustment of retail prices, with a stronger reaction when confronting wholesale price increases compared to wholesale price decreases. Fernandez-Amador et al. (2010) observe significant asymmetries in the vertical price transmission mechanism between producer and consumer prices of milk products in Austria using monthly data for the period from January 1996 to February 2010.

<sup>3</sup> A reviewer correctly pointed out that high markups are not necessarily associated with collusion. Monopoly and nearly monopoly markets also have high markups, but may not indicate asymmetric cost pass-through.

<sup>4</sup> In the Ball and Mankiw (1994) model, positive inflation rates can explain an asymmetric price transmission. Firms increase prices to correct for accumulated and anticipated inflation. Transmission of negative shocks would be less necessary as inflation would already have adjusted the prices. This model, however, does not explain any differences in *aCPT* between products within an economy.

<sup>5</sup> He et al. (2013) argue that the form of the pricing asymmetry in a model with menu costs critically depends on the shape of the consumer demand curve. If the demand function is convex, a firm is more likely to change its price in response to a negative cost shock and less likely to change its price responding to a positive cost shock. A concave demand function has the opposite effect. Similarly, Meyer and von Cramon-Taubadel (2004) conclude: ‘In summary, . . . attempts to explain APT [asymmetric price transmission] based on adjustment costs lead to ambiguous and sometimes contradictory results, with some authors providing arguments for positive APT, and others for negative’ (p. 590).

<sup>6</sup> Similarly, Rotemberg (2009, 2010) argues in a formal model, in which firms internalize the cost-related regret that consumers experience when prices change unexpectedly: ‘Price changes can trigger consumer regret. If a good is storable and people notice an increase in its price, they are likely to regret not having purchased earlier, while they regret not having waited if they see a price decline (Rotemberg, 2009, p. 1)’.

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