Does competition increase pass-through?

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Questions about pass-through and market power are salient across the energy industry. Pass-through of fuel costs to retail electricity prices has been an important concern of competition policy in the UK electricity sector. Similarly, the extent to which a carbon price imposed on energy-intensive (and often significantly concentrated) industries such as electricity, cement and steel is passed onto market prices is central to the effectiveness of market-based regulation towards climate change.

How does competition affect pass-through? A common intuition is that firms with market power have an incentive to "absorb" part of a cost change whereas, under perfect competition, price equals marginal cost so pass-through is 100%. This suggests that more intense competition leads to stronger pass-through. Perhaps most prominently, this intuition holds in a textbook linear Cournot model, with 50% pass-through under monopoly rising to 100% as the number of firms grows large.

This paper revisits the basic question of how competition affects cost pass-through. It generalizes earlier results from the pass-through literature and highlights their sensitivity to the assumption of constant marginal cost. In short, a more competitive market will have a more "cost reflective" price but it does *not* follow that price changes will necessarily be more reflective of cost changes.

The model has two key features. First, to facilitate the comparison with perfect competition, the industry sells a homogenous product and the setup nests perfect competition, monopoly and oligopoly as special cases. Second, firms have convex cost functions, which can be justified purely on technology grounds or by invoking the frictions that arise from principal-agent problems within the firm.

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The main point is that, if firms have even modestly increasing marginal costs, the standard intuition is overturned and more intense competition actually *reduces* pass-through. A less flexible production technology, with more steeply increasing marginal cost, always leads to lower pass-through. This holds in a textbook model of perfect competition and extends to imperfect competition. However, the effect is stronger for a more competitive market because it has higher industry output. This helps explains why, in markets with a fairly inflexible production technology, more competition can be associated with less pass-through. Importantly, these results apply to the "normal" case where pass-through is less than 100%.

Consider comparing two markets with different intensities of competition. For a like-for-like comparison, suppose that any differences in demand and cost conditions are controlled for. The analysis shows that the more competitive market always has lower pass-through if cost convexity is sufficiently pronounced. For example, if demand is strictly convex and firms' cost functions are at least quadratic, then the more competitive market passes on less of a (small) cost increase.

The paper presents a simple new expression for the rate of cost pass-through that nests prior results for perfect competition, oligopoly, and monopoly. It shows pass-through is determined by four factors: the price elasticity of demand, a measure of demand curvature, the elasticity of marginal cost, and the intensity of competition.

By contrast, existing literature on imperfect competition typically assumes that firms have constant marginal costs. As a result, pass-through analysis has focused solely on demand-side properties.

More broadly, these results may have implications for competition policy including for merger analysis, in particular, for understanding the degree to which cost savings from horizontal mergers are passed on to consumers, and for the evaluation of the "passing-on defense" whereby cartel damages are limited because affected firms pass the overcharge onto their own customers.