

# **Pass-through in a Concentrated Industry**

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# Paper Overview

- Estimation of pass-through in the cement industry:
  - ▶ Industry pass-through,
  - ▶ Own and cross pass-through.
- Counterfactuals using pass-through estimates:
  - ▶ Incidence of carbon tax,
  - ▶ NESHAP amendments,
  - ▶ Merger effects.

# Contributions

- Present a framework to estimate pass-through with aggregate price data and plant level cost data.
- Counterfactual analysis of important policies (environmental regulation and anti-trust).
- Contrast and validate pass-through results from structural models (EPA, Fowlie, Reguant and Ryan (2014)).

# Identification of Own and Cross Pass-through

- Main specification:

$$P_{mt} = \alpha_0 \sum_{j \in m} \omega_{jmt} c_{jmt} + \alpha_1 \sum_{j \in m} \omega_{jmt} c_{jmt} \sum_{k \neq j} \frac{1}{d_{jkt}} + \dots$$
$$\dots + \beta \sum_{j \in m} \omega_{jmt} \sum_{k \neq j} \frac{c_{kt}}{d_{jkt}} + \text{Controls} + \bar{\epsilon}_{mt}$$

- Requires substantial variation across plants at within a market.
- If  $c_{kt} \approx c_{jt}$ , then it cannot be separately identified.
- If  $c_{jt} \approx e_{jt} c_t$ , use variation across markets and time in  $e_{jt}$ ,  $\omega_{jt}$  and  $d_{jkt}$ .

## Sources of Variation

- Variation in market structure ( $d_{jkt}$ ) or capacity ( $\omega_{jt}$ ) necessary but not sufficient to separately identify  $\alpha_1$  and  $\beta$ .
- Differences in  $e_{jt}$  likely to be limited within a market:
  - ▶ Technology of a plant,
  - ▶ Fuel choice.
- Fuel choice, possibly endogenous and correlated across plants, time fixed effects likely to take out a good part.
- Variation across markets with alternative configurations, plant fixed effects likely to take out a good part.
- Relies on fine micro-variation, measurement error on capacities and fuel choice might be a concern.

# Multi-collinearity

Table 4: Regression Results with the Baseline Specification

	OLS		FGLS		Bayesian	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	<i>Pass-through variables</i>					
Fuel Costs	0.99 (0.23)	1.01 (0.23)	1.02 (0.15)	1.16 (0.24)	1.1 (0.17)	1.31 (0.16)
Fuel Costs $\times$ Inverse Rival Distance	-5.49 (1.71)	-4.14 (1.70)	-6.95 (0.67)	-5.09 (0.97)	-3.1 (0.95)	-3.75 (1.01)
Rival Fuel Costs $\times$ Inverse Rival Distance	5.07 (2.07)	3.52 (2.18)	6.93 (0.77)	4.55 (1.15)	3.1 (1.03)	3.62 (1.09)

# Suggestions

- Show sources of variation (within market-year) after partialling out other explanatory variables.
- Show sensitivity to covariates (e.g.,  $\beta = 0$  or  $\alpha_1 = 0$ ).
- Focus on industry pass-through and competition measured at the market level:
  - ▶ Distance measures, coastal vs. non-coastal, etc.
- Emphasize last section: analysis of environmental policies, tax incidence across elasticity ranges, etc.
- Examine how sensitivity to own and cross pass-through in merger simulations.