# The Distributional Consequences of Large Devaluations (AER, 2017)

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## Question

▶ What are the differential effects of changes in the relative price of goods on households, following a large devaluation?

▶ What are the underlying mechanisms of such distributional effects?

### Preview of the Main Result

1. Cost of living for low-income households rose significantly as compared to that of high-income households.

2. Such effect is largely because low-income households consume tradable goods, goods with more tradable components, and goods with lower distribution margins more than high-income households.

# Methodology and Framework

▶ Construct household-specific price indices using data from Bank of Mexico and Mexican household surveys to estimate "Across" and "Within" effects of 1994 Mexican devaluation

$$\hat{P}_t^h = \underbrace{\sum_{g \in G} \omega_g^h \hat{P}_{g,t}}_{\hat{P}_{Across,t}^h} + \underbrace{\sum_{g \in G} \omega_g \hat{P}_{g,t}^h}_{\hat{P}_{Within,t}^h} + \underbrace{\sum_{g \in G} \left( \omega_g^h - \omega_g \right) \left( \hat{P}_{g,t}^h - \hat{P}_{g,t} \right)}_{\hat{P}_{cov,t}^h} - \underbrace{\sum_{g \in G} \omega_g \hat{P}_{g,t}}_{\hat{P}_t}$$

▶ Inspect the mechanism focusing on distribution margin $(1 - \eta)$ and pass-through of exchange rate change $\alpha$:
Set up formulae for price changes and estimate them

$$\hat{P}_{\nu_g,t} = \eta_{\nu_g} \hat{P}_{\nu_g,t}^T + (1 - \eta_{\nu_g}) \hat{P}_t^D = \hat{P}_t^N + \eta_{\nu_g} \alpha_{\nu_g} \hat{E}_t$$

$$\hat{P}_{g,t} = \hat{P}_t^N + \eta_g \alpha_g \hat{E}_t + \mathrm{Cov}_\nu(\eta_{\nu_g}, \alpha_{\nu_g}) \hat{E}_t$$

# Effects of Relative Price Changes

## Premises

1. Change in prices, $\hat{P}_{g,t}$ and $\hat{P}_{\nu_g,t}$, are observed in DOF data
2. Weights, $\hat{w}_g^h$ and $s_{\nu_g}^h$, are obtained from 1994 Mexican household survey
3. Survey data confirms that high-income households consume high-priced varieties while low-income households consume low-priced varieties.

| | Across $\sum_g \omega_g^h \hat{P}_{g,t}$ | | Within $\sum_g \omega_g \hat{P}_{g,t}^h$ | | Combined $\sum_g \omega_g^h \hat{P}_{g,t}^h$ | |
|------|----------|-----------|---------|---------|---------|---------|
| | Decile 1 | Decile 10 | Quart 1 | Quart 4 | Quart 1 | Quart 4 |
| 1994 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1996 | 1.87 | 1.79 | 1.92 | 1.71 | 2.08 | 1.68 |

Table 1: Household-specific Price Indices

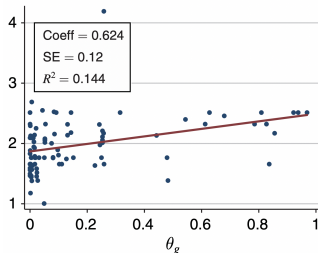# Understanding Across Effect - Price Change

$$\hat{P}_{g,t} = \hat{P}_t^N + \eta_g \alpha_{loc} \hat{E}_t + \eta_g \theta_g (\alpha_{int} - \alpha_{loc}) \hat{E}_t$$

Price change of a good category $g$ is bigger with

1. Higher $\eta_g$: Lower distribution margin
2. Higher $\theta_g$: Higher fraction of traded varieties within $g$
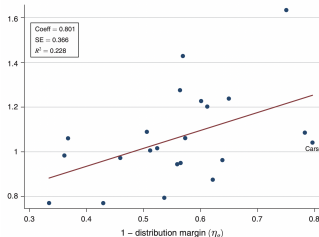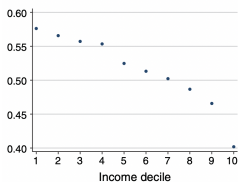


(a) $\hat{P}_{g,t}$ and $\eta_g$        (b) $\hat{P}_{g,t}$ and $\theta_g$

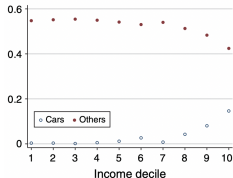# Understanding Across Effect - Consumption Patterns

$$\hat{P}^h_{Across,t} = \hat{P}^N_t + \omega^h_T \left[ \alpha_{loc} \sum_{g \in T} \tilde{\omega}^h_g \eta_g + [\alpha_{int} - \alpha_{loc}] \sum_{g \in T} \tilde{\omega}^h_g \eta_g \theta_g \right] \hat{E}_t$$
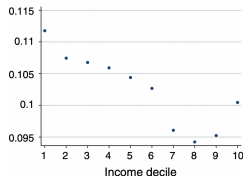
Across effect is bigger with

1. Higher $\omega^h_T$: Higher expenditure share on tradable goods
2. Higher $\sum_{g \in T} \tilde{\omega}^h_g \eta_g$: More $g$ with low distribution margins
3. Higher $\sum_{g \in T} \tilde{\omega}^h_g \eta_g \theta_g$: More $g$ with low local variety shares



(a) $\omega^h_T$  (b) $\sum_{g \in T} \tilde{\omega}^h_g \eta_g$  (c) $\sum_{g \in T} \tilde{\omega}^h_g \eta_g \theta_g$

# Understanding Within Effect

$$\hat{P}_{\nu_g,t} - \hat{P}_{g,t} = \left( \frac{\eta_{\nu_g,t-1} \frac{\alpha_{\nu_g}}{\alpha_g} - \eta_{g,t-1}}{\eta_{g,t-1}} \right) \eta_{g,t-1} \alpha_g \hat{E}_t$$

$$\Rightarrow \hat{P}_{\nu_g,t} - \hat{\bar{P}}_{g,t} = \left( \frac{\eta_{\nu_g,t-1} - \bar{\eta}_{g,t-1}}{\bar{\eta}_{g,t-1}} \right) \bar{\eta}_{g,t-1} \bar{\alpha}_g \hat{E}_t = \left( \frac{\bar{P}_{g,t-1} - P_{\nu_g,t-1}}{P_{\nu_g,t-1}} \right) \bar{\eta}_{g,t-1} \bar{\alpha}_g \hat{E}_t$$

|       | Devaluation   | Placebo        |
|-------|---------------|----------------|
| Coef. | 1.426 (0.282) | -0.086 (0.052) |
| $R^2$ | 0.135         | 0.003          |

Table 2: Predicted and Observed $\hat{P}_{\nu_g,t} - \hat{P}_{g,t}$

- ▶ Within effects are larger for varieties with high $\eta_{\nu_g}$.
- ▶ Distribution margins $(1 - \eta_{\nu_g})$ are lower for cheaper varieties.
- ▶ Local goods are not necessarily cheaper varieties.
- ▶ Expensive varieties with higher quality might potentially have lower $\alpha_{\nu_g}$ or lower mark-ups. (NOT checked in this paper)