Menu Costs and Information Rigidity:
Evidence from the Consumption Tax Hike in Japan

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Introduction

- Raising consumption taxes generates inflation and provides a new policy to stimulate the economy, as discussed by Feldstein (2002) and Correia et al. (2013).
- This discussion relies on a crucial assumption that consumption tax hikes are immediately passed through to prices.
- This paper examines firms' price-setting behavior in response to Japan's tax hike in April 2014.

Result I: Menu Costs

- The first set of results indicate that firms paid menu costs when passing through the tax hike to their prices.

Figure 1: Distributions of price changes from 2010 to 2017

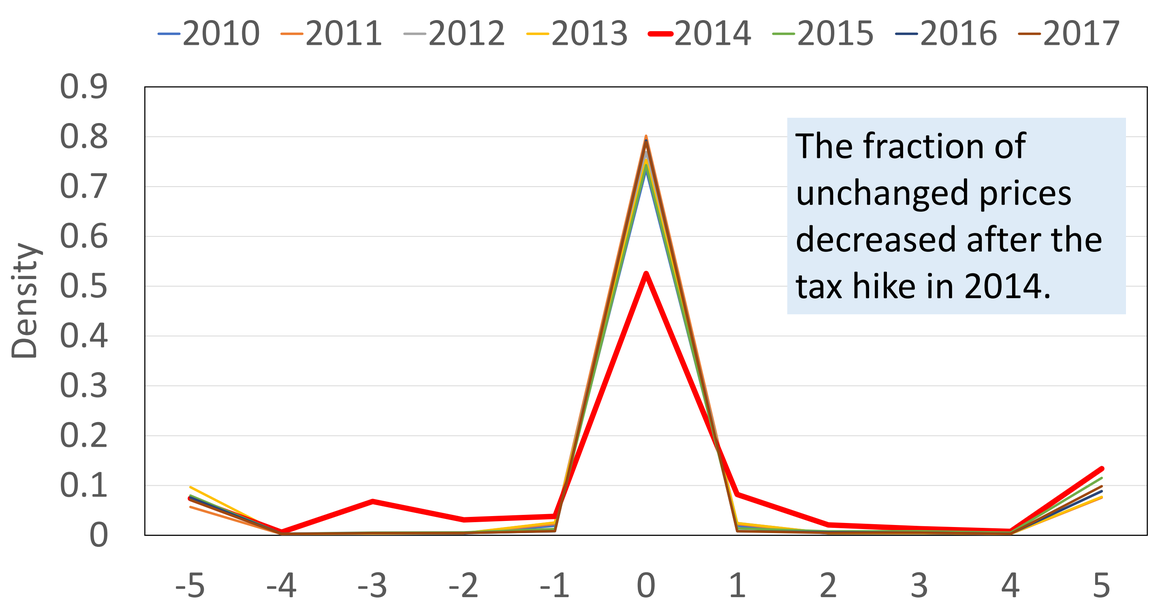
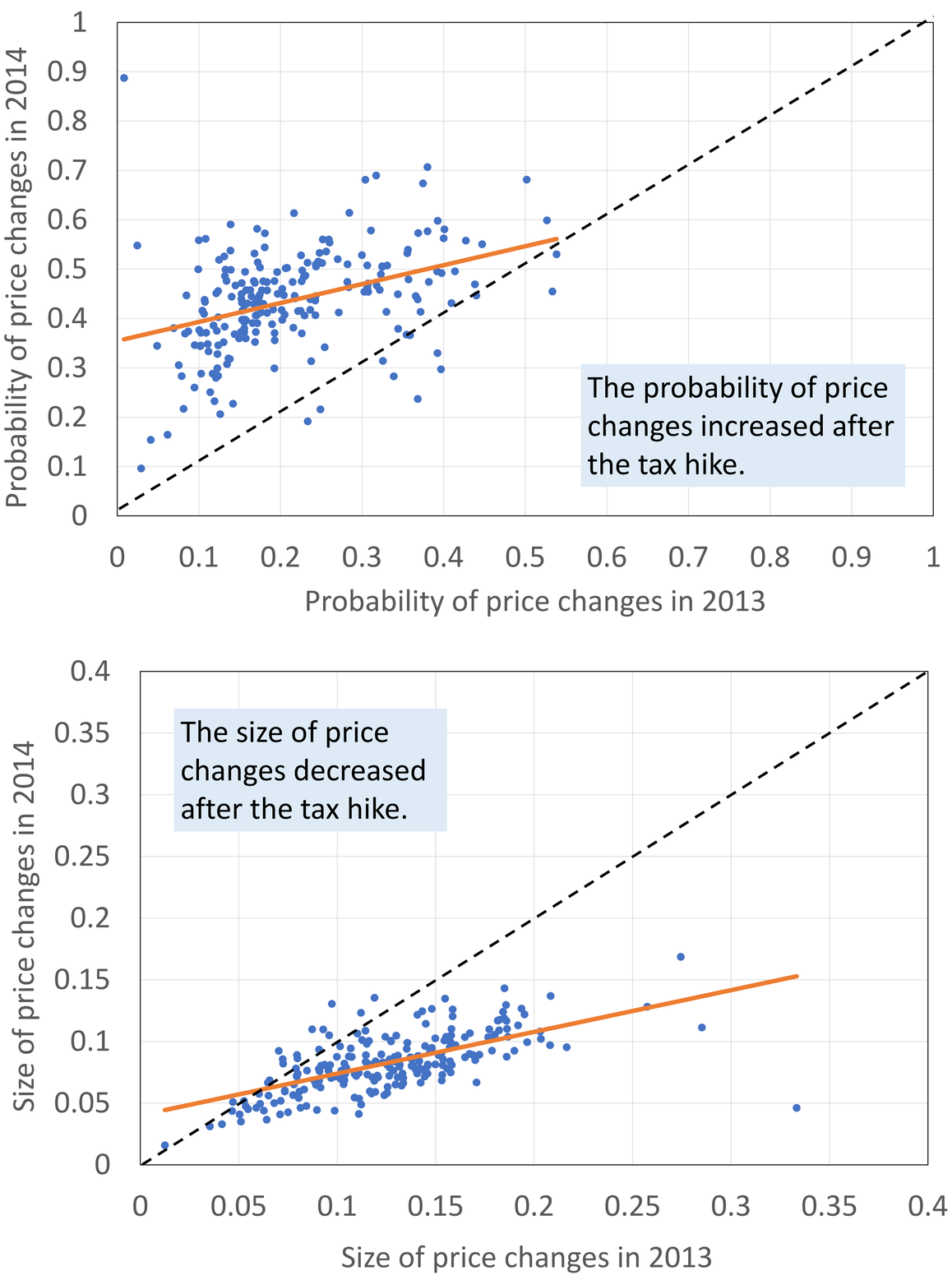


Figure 2: Probability & size of price changes by product category



Result II: Information Rigidity

- Although firms paid menu costs, more than half of prices did not change on a tax-excluded basis (as in Figure 1).
- The second set of results indicate that this price stickiness was driven by information gathering costs.

Identification strategy: As the number of products sold increases,

1. menu costs increase (i.e., firms have to replace a larger number of price tags), whereas
2. information gathering costs do not increase (i.e., information on common shocks can be used for repricing all products).

- I quantify the impact of economies of scope on price adjustment.

A: Logit model estimation

$$\Pr\left(I_{i,s} = 1, 0 \middle| X_{i,s} = x\right) = \Phi\left(\beta X_{i,s}\right)$$

- $I_{i,s}$ is the price-change indicator for item i sold at store s.
- Explanatory variables $X_{i,s}$ include the number of products a firm sells (N) and control variables.

B: Regression equation

$$Size_{i,s} = \gamma X_{i,s} + \epsilon_{i,s}$$

- $Size_{i,s}$ is the size of non-zero price changes for item i sold at store s.

Table 1: Estimation results

	April 2013		April 2014
		Unconditional	Conditional
	(1)	(2)	(3)
A: Prob. of price changes			
$\log_{10} N$	0.0131	< 0.0383	0.0324
	(0.0006)	(0.0007)	(0.0007)
Observations	1,845,880	2,105,716	1,967,450
B: Size of price changes			
$\log_{10} N$	-0.0064	-0.0040	-0.0048
	(0.0005)	(0.0003)	(0.0004)
Observations	376,883	696,150	586,177

Summary

- Main findings:
  1. Prices became less sticky after the tax hike, suggesting that firms paid menu costs (i.e., attached new price tags).
  2. Nonetheless, more than half of prices did not change on a tax-excluded basis, suggesting that firms faced information gathering costs.
- This argument was verified in light of multi-product firms' price-setting behavior. Specifically, the tax hike induced firms to pay a large portion of variable costs associated with price adjustment (menu costs), meaning that the remaining costs are fixed costs (information gathering costs) and economies of scope had a larger impact.
- Japan's experience indicates that raising consumption taxes can be an effective policy measure to stimulate the economy.

References

1. Correia, I., E. Farhi, J.P. Nicolini, and P. Teles (2013) Unconventional Fiscal Policy at the Zero Bound, AER 103(4), 1172-1211.
2. Feldstein, M. (2002) The Role for Discretionary Fiscal Policy in a Low Interest Rate Environment, NBER WP Series No. 9203