Working Less and Bargain Hunting More:
Macro Implications of Sales during Japan's Lost Decades

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Macro Implications of Temporary Sales

- Are temporary sales important for the macroeconomy, or the real effect of monetary policy?
  - Despite flexible prices?
  - Maybe yes, if sales depend on macroeconomy.
- Facts
  - Does retailers' decision on sales depend on the macroeconomy?
  - How did sales pricing change during Japan's lost decades and why?
- DSGE model with sales
  - Do frequent changes in sales prices dampen the effect of monetary policy shock?

Today's talk

- Empirical Facts from Two Datasets
- Survey on Time Use and Leisure Activities (Household side)
  - showing that time spent shopping is negatively correlated with time spent working.
- POS scanner data (Retailer side)
  - showing that sales become increasingly important.
  - showing that the frequency of sales is negatively correlated with time spent working.
- Implying endogenous consumer search (bargain hunting)

Literature

- Interaction between hours worked and bargain hunting.
- Nevo and Wong (2015) document the increase in shopping intensity and the decline in households' opportunity cost of time during the Great Recession.
- Aguiar and Hurst (2007) use scanner data and time diaries to examine households' substitution between shopping and home production. They find that older households shop the most frequently and pay the lowest price.
- Lach (2007) analyzes store-level price data following the unexpected arrival of a large number of immigrants from the former Soviet union to Israel. He finds that the immigrants have a higher price elasticity and a lower search cost for goods than the native population.

Facts

- Survey on Time Use and Leisure Activities
  - Every five years
  - 200,000 members in 83,000 households
  - Daily patterns of time allocation: time use spent working and shopping

Working time is negatively correlated with shopping time.

Table: Time Use (minutes per day)

	Men			Women		
	(who work) Shopping	(who work) Working	(who do not work) Shopping	(who work) Shopping	(who work) Working	(who do not work) Shopping
1986	6	493	9	27	371	37
1991	9	481	12	30	358	38
1996	11	469	15	30	345	39
2001	13	456	18	31	324	39
2006	14	470	20	31	335	39
2011	15	466	22	32	326	40

Note: Working time includes commuting time. Source: Statistics Bureau, *Survey on Time Use and Leisure Activities*.

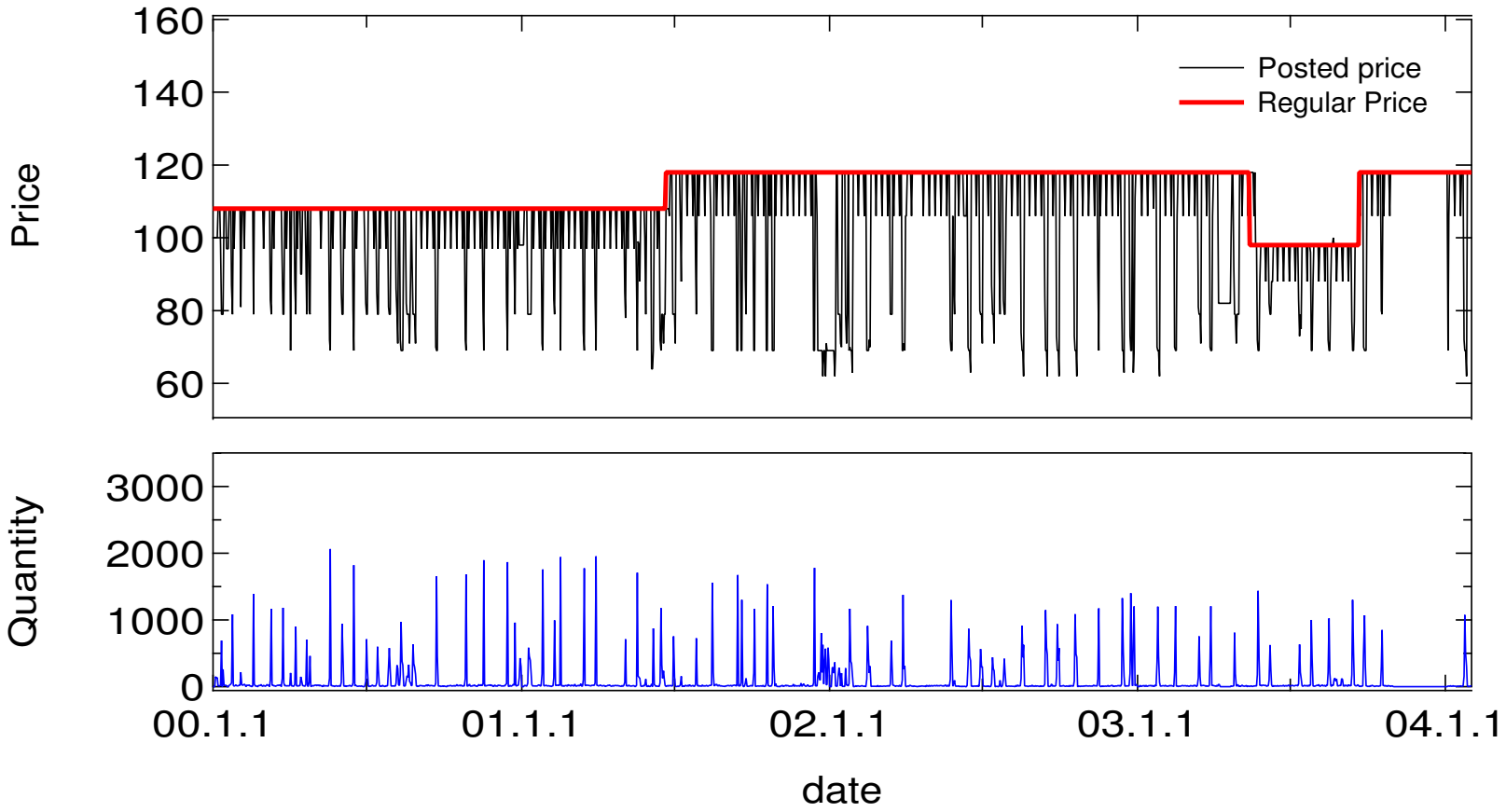
Table: Regression Results for Time Spent Shopping (minutes per day)

	All	Persons who spend their time mainly working	Men who spend their time mainly working
working time	-0.059***	-0.063***	-0.058***
	(0.002)	(0.003)	(0.003)
non-city	4.911***	2.996***	3.389***
	(0.619)	(0.388)	(0.460)
female	12.034***	11.646***	
	(1.295)	(1.200)	
age control	Y	Y	Y
Observations	180,240	91,188	62,878

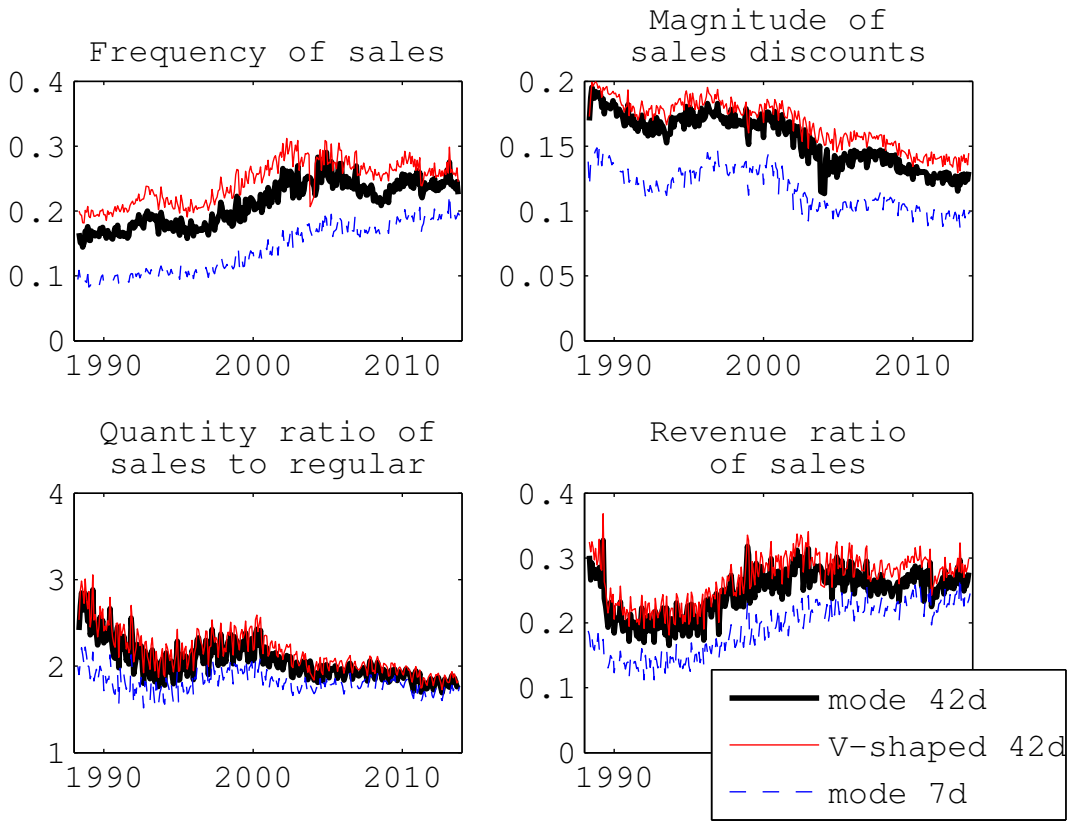
Notes: Figures in parentheses represent robust standard errors. ***, **, and * represent significance at the 1, 5, and 10 percent levels, respectively.

- Daily scanner or Point of Sales (POS) data.
  - information about prices at a store, product level
  - from 1988 to 2013
  - covering over 6 billion records
  - gathered by Nikkei Digital Media from various retail shops throughout Japan.

Price Changes of a Cup Noodle at a Store



Sales have become increasingly important in households' expenditure activity.



Relation between Sales Frequency and Macroeconomic Indicators in Trend

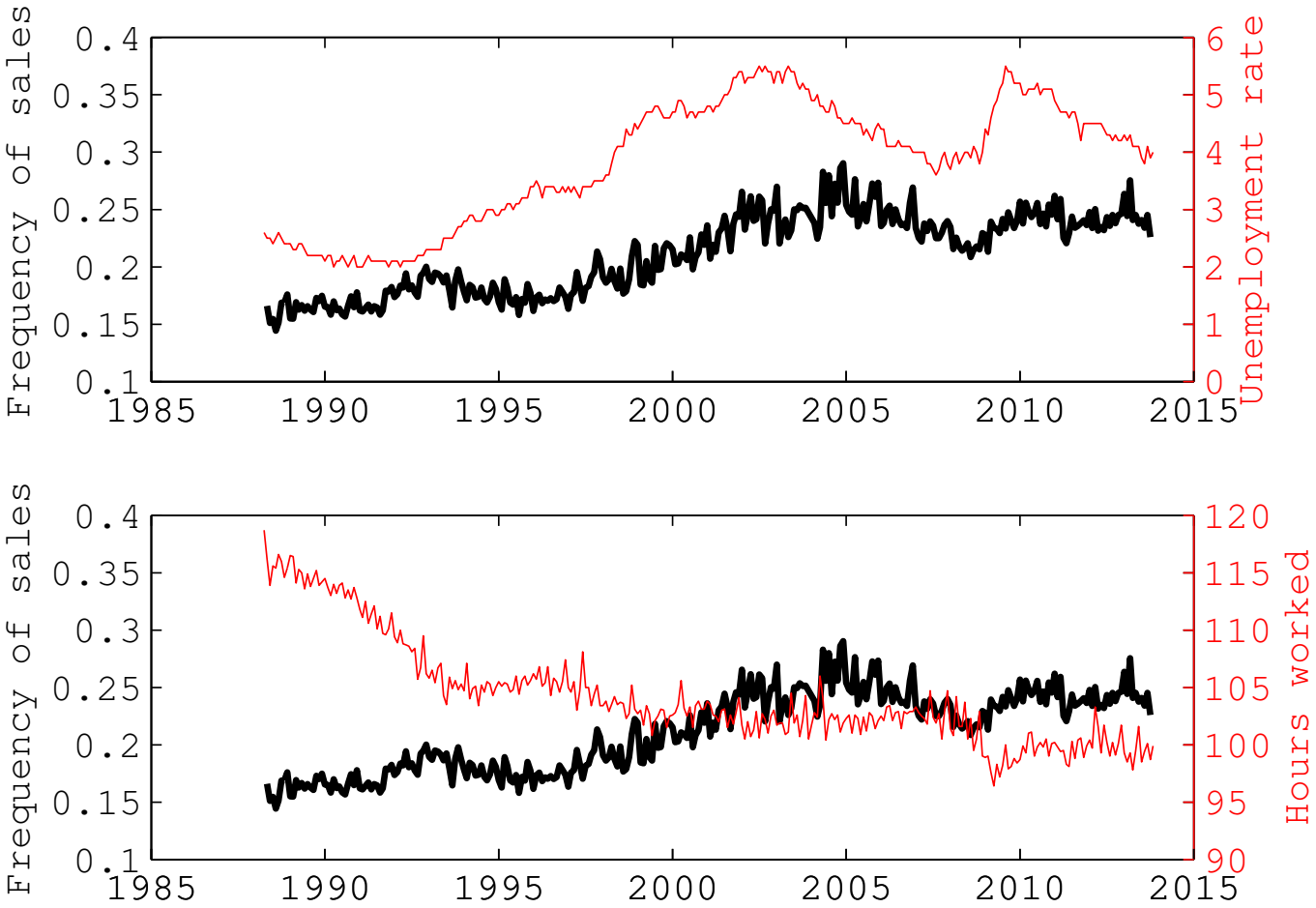


Table: Correlation between the Frequency/Magnitude of Sales and the Macroeconomy

	Frequency of sales					
Filter	mode	V-shaped	mode	V-shaped	mode	mode
Window	42d	42d	7d	7d	42d	42d
Goods	all	all	all	all	food	domestic
Macro variables						
Unemp	0.215	0.147	0.479**	0.505**	0.239	0.017
Hours	-0.428**	-0.393**	-0.480**	-0.444**	-0.471**	-0.020
CPI	-0.243	-0.205	-0.251	-0.261	-0.330	0.150

Note: ** and * represent significance at the 5 and 10 percent levels, respectively.

Summary and Discussions

- A negative correlation between the frequency of sales and hours worked. Endogenous bargain hunting and sales holding.
- Acyclical in Coibion, Gorodnichenko, and Hong (2012)
- Two reasons
  - Japan is not the United States.
    - Every-day-low-price strategy is not common in Japan.
    - In the US, every-day-low-price strategy is adopted mainly by lower-priced stores like Wal-Mart, while temporary sales are conducted mainly by higher-price stores. When unemployment rises, higher-priced stores give up price-sensitive customers.
    - As Sudo, Ueda, and Watanabe (2014) point out, prices in Japan are revised ten times more frequently, due to frequent temporary sales.
    - On a consumer side, Japanese households are said to go shopping more frequently. The average shopping frequency is three to four times a week.
  - Our POS data have long sample periods, from 1988 to 2013, while Dominick's data in the US range from 1989 to 1997.