



JSPS Grants-in-Aid for Creative Scientific Research

## Understanding Inflation Dynamics of the Japanese Economy

# Price Rigidity at Near-Zero Inflation Rates: Evidence from Japan

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May 12, 2017

A comparison of micro price dynamics in  
China, Japan, and US

by

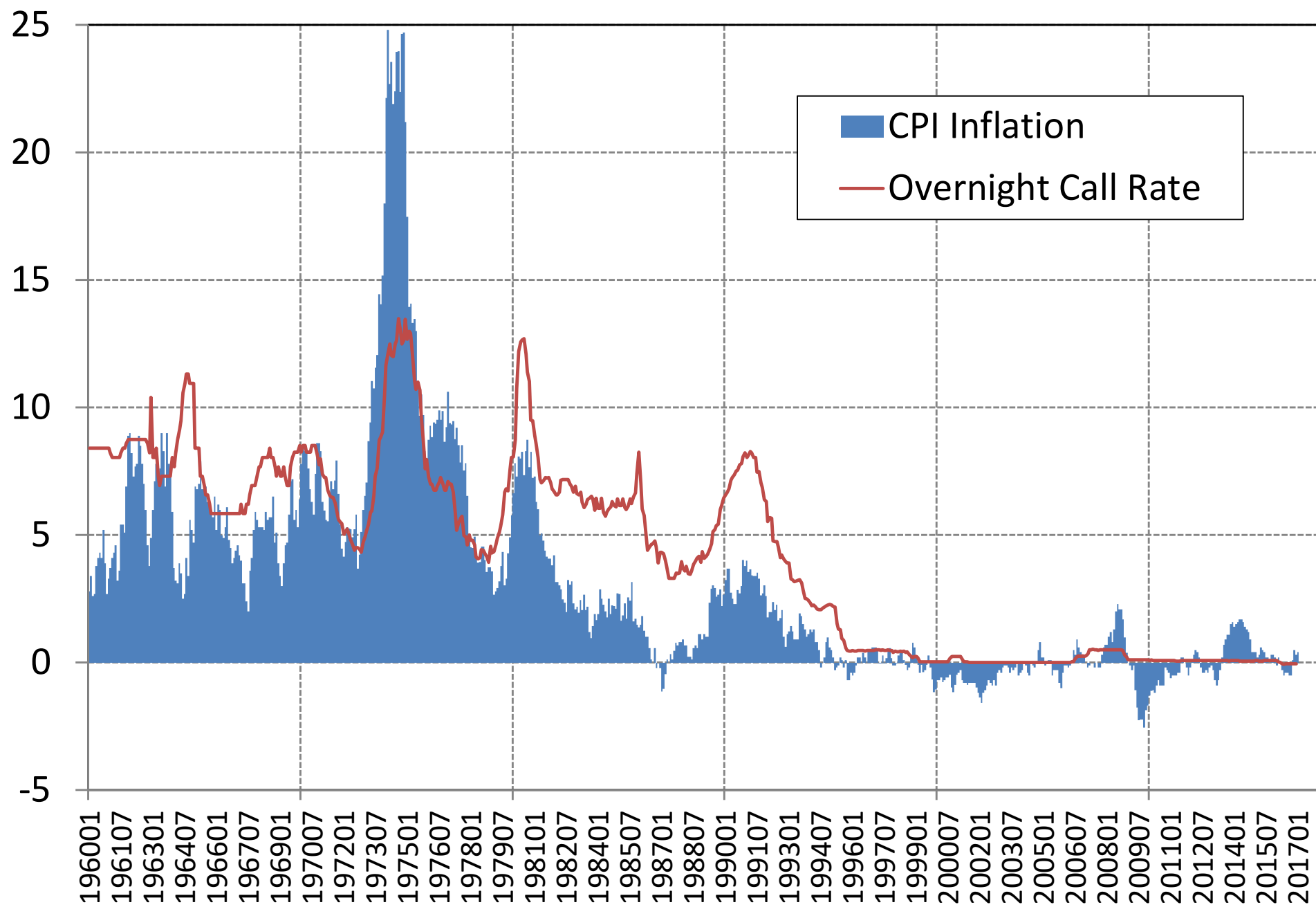
Kozo Ueda

Kota Watanabe

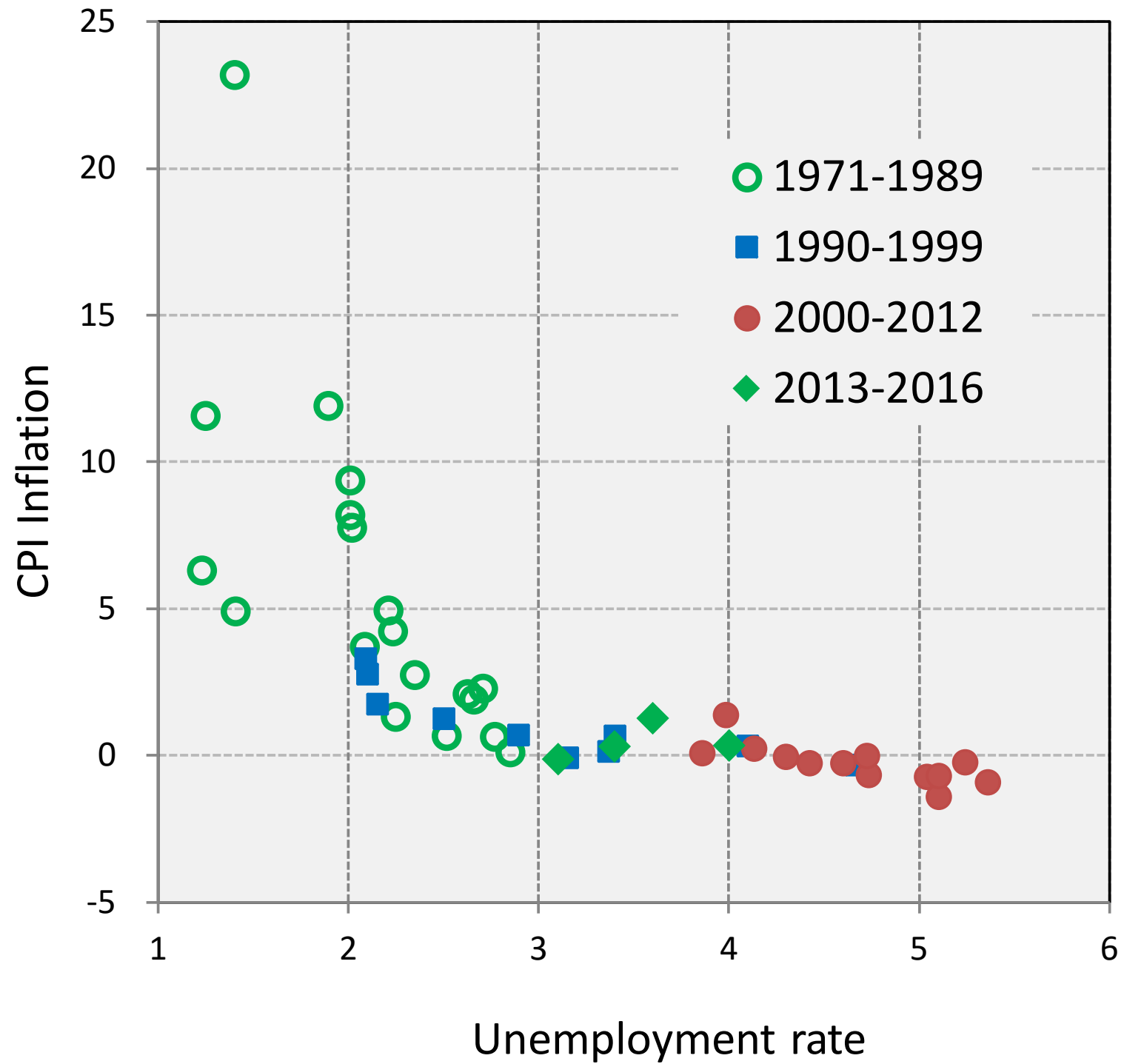
and

Tsutomu Watanabe

# Consumer price inflation in Japan



# Phillips curve in Japan, 1971-2016



# Price rigidity at near-zero inflation rates

- 1. To what extent?**
- 2. Why?**
- 3. Any implications?**

# Sectoral price data

## Example of “items” in Japan’s CPI data

### Oils, fats & seasonings

#### Oils & fats

Edible oil

Margarine

#### Seasonings

Salt

Soy sauce

Soybean paste

Sugar

Vinegar

Worcester sauce

Ketchup

Mayonnaise

Dressing

Jam

Instant curry mix

Instant dried soup

Flavor seasonings

“Furikake”, granular flavor seasonings

“Tare”, liquid seasonings

“Tsuyu”, liquid seasonings

Mixed seasonings

Prepared pasta sauce

### Recreational durable goods

TV sets

Mobile audio players

Electronic dictionaries

Video recorders

Personal computers (desktop)

Personal computers (notes)

PC printers

Cameras

Video cameras

Pianos

Desks

### Recreational goods

#### Stationery

Ball-point pens

Notebooks

Scissors

#### Sporting goods

Golf clubs

Baseball gloves

Tennis rackets

Fishing rods

Pants for exercise

Swimming suits

Athletic shoes

# YoY CPI Inflation by Item

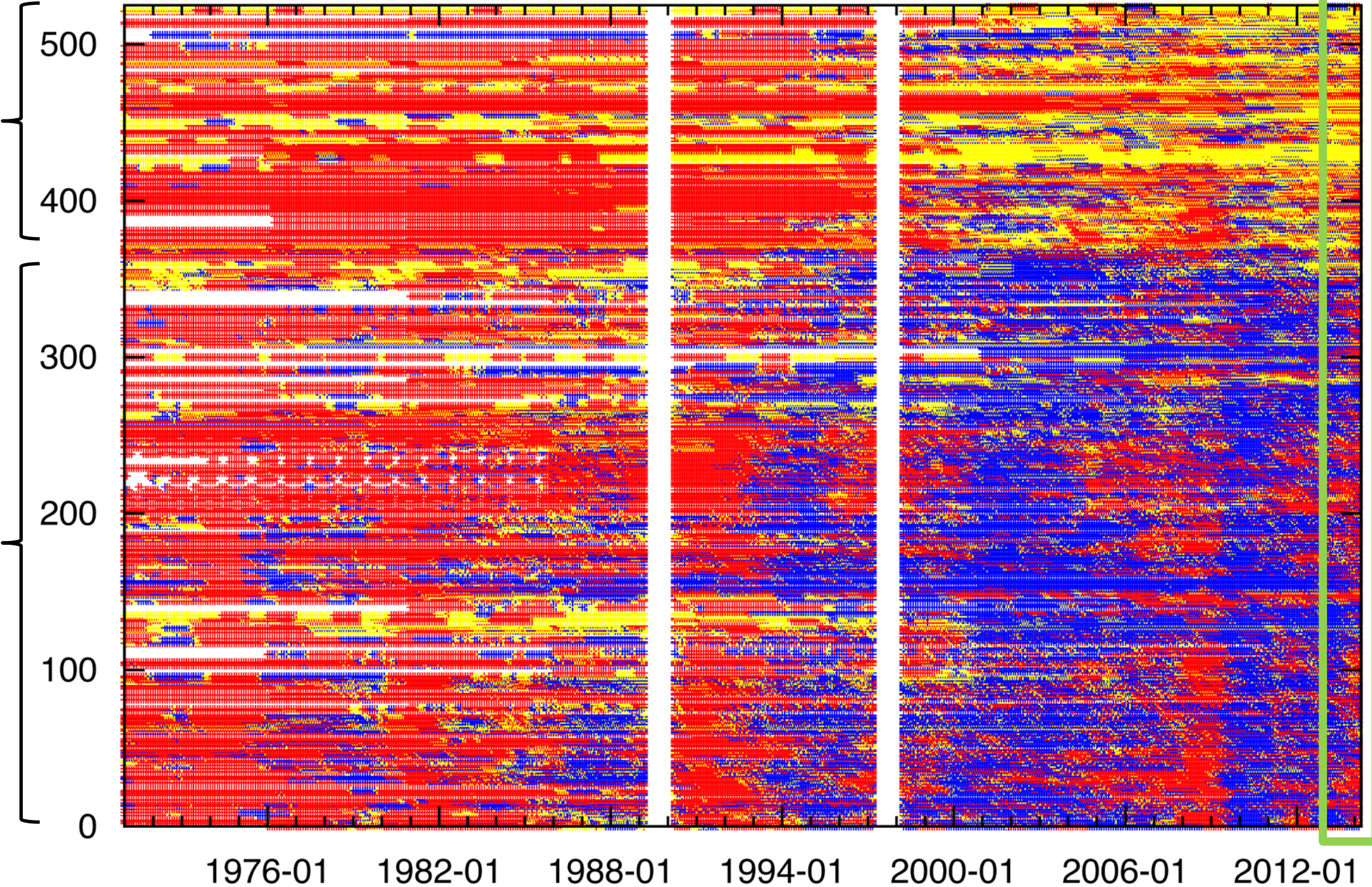


Start of  
Abenomics

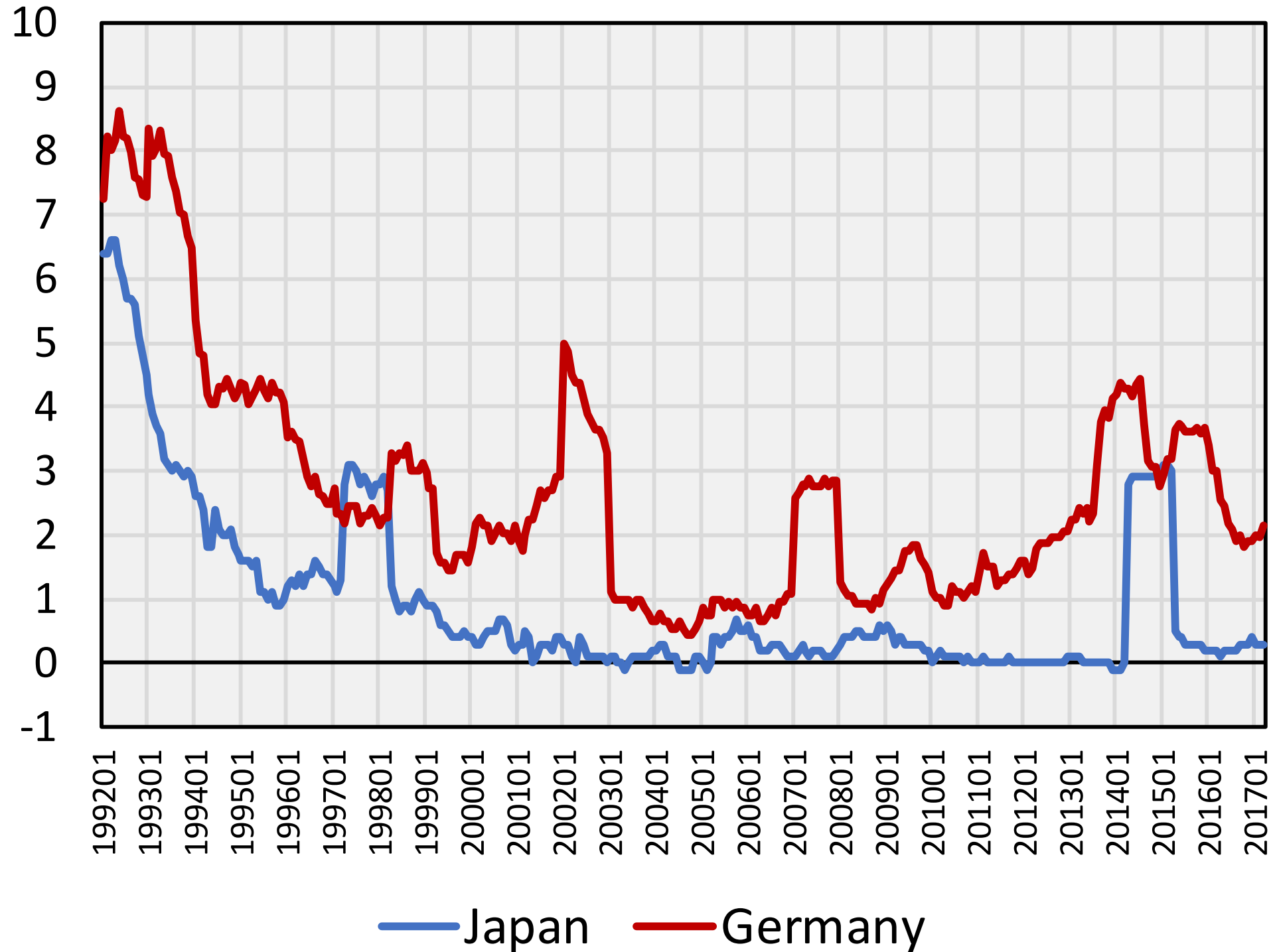


Services

Goods

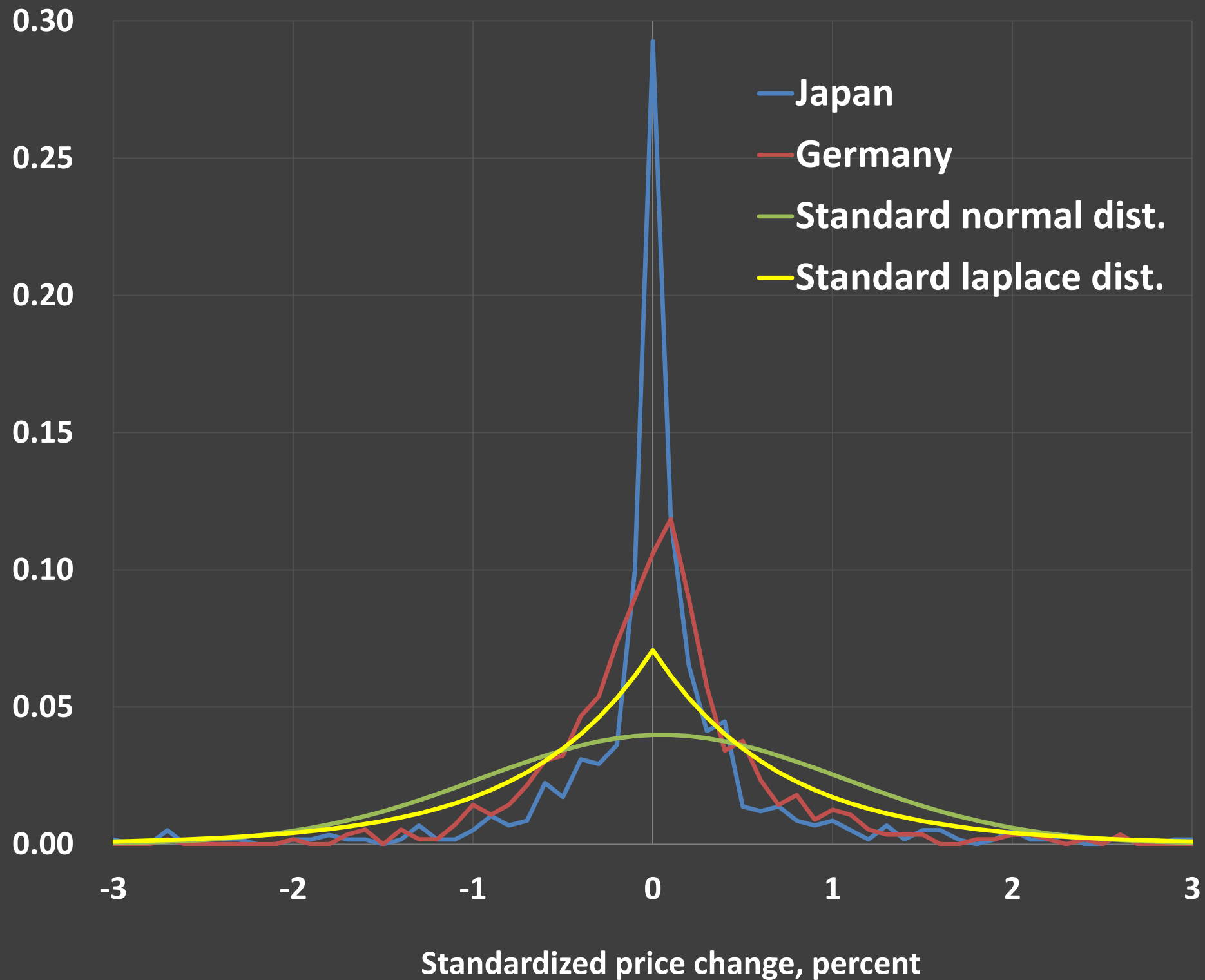


# Haircut price inflation in Japan and Germany

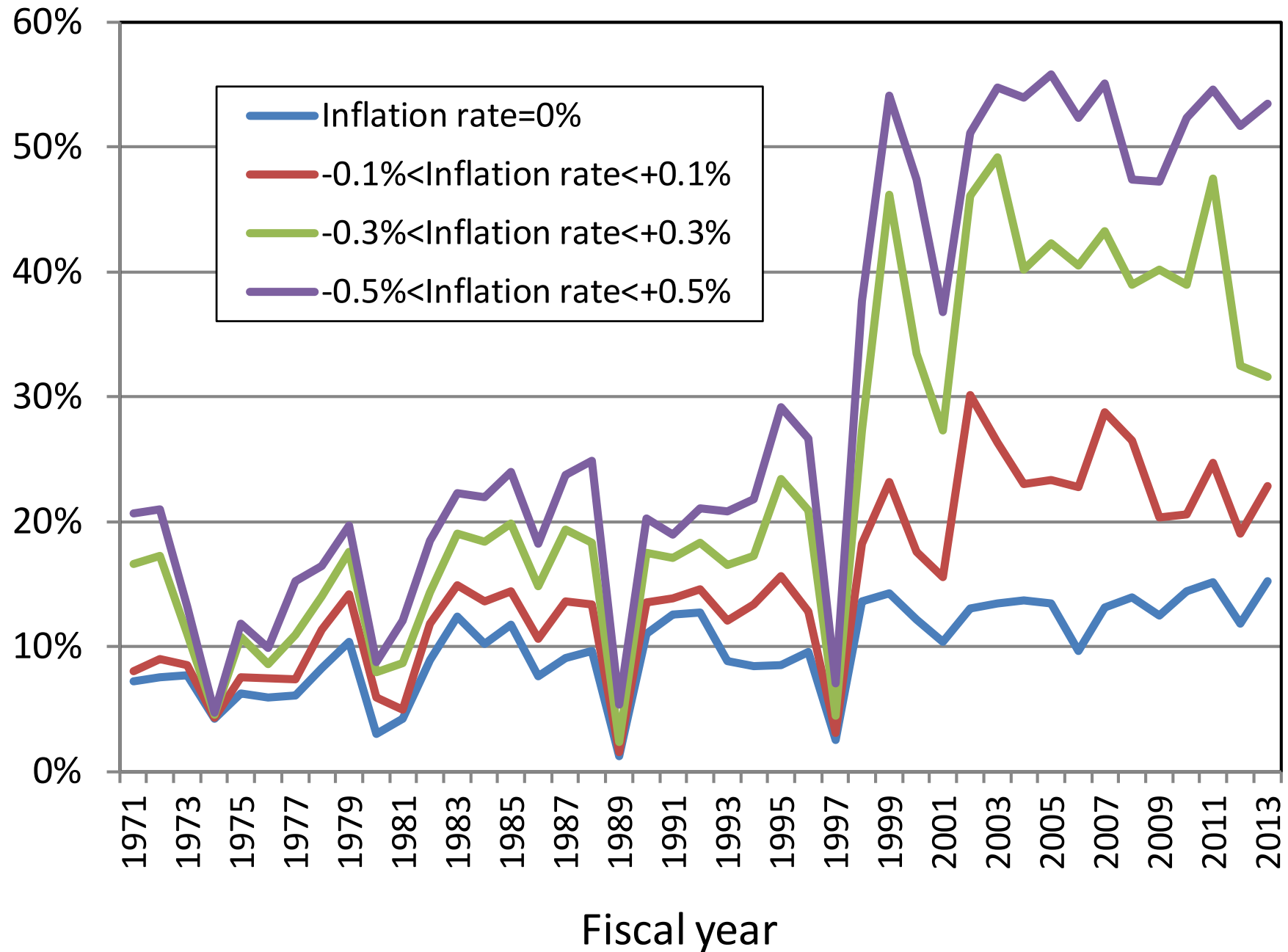




# Histogram of standardized price changes in March 2017



# Fraction of items with a near-zero inflation rate



# A little bit about the theory

- **Trend inflation ( $\Delta m_t$ )**

- Trend inflation is determined by monetary policy.
- Menu cost model implies that prices become stickier as trend inflation goes down from positive or as it goes up from negative.
- The mode of price change distribution is affected at least partially by trend inflation.

- **Inflation norm ( $\bar{\pi}$ )**

- Okun (1981)
- There exists a social norm about price/wage inflation. The norm is determined by various things, including historical path of inflation, policies and institutional things adopted by the government and the central bank. The norm could change over time but only gradually.
- The mode of price change distribution is affected at least partially by inflation norm.

# Cross-country comparison of the item-level price change distribution

We compare eight countries in terms of:

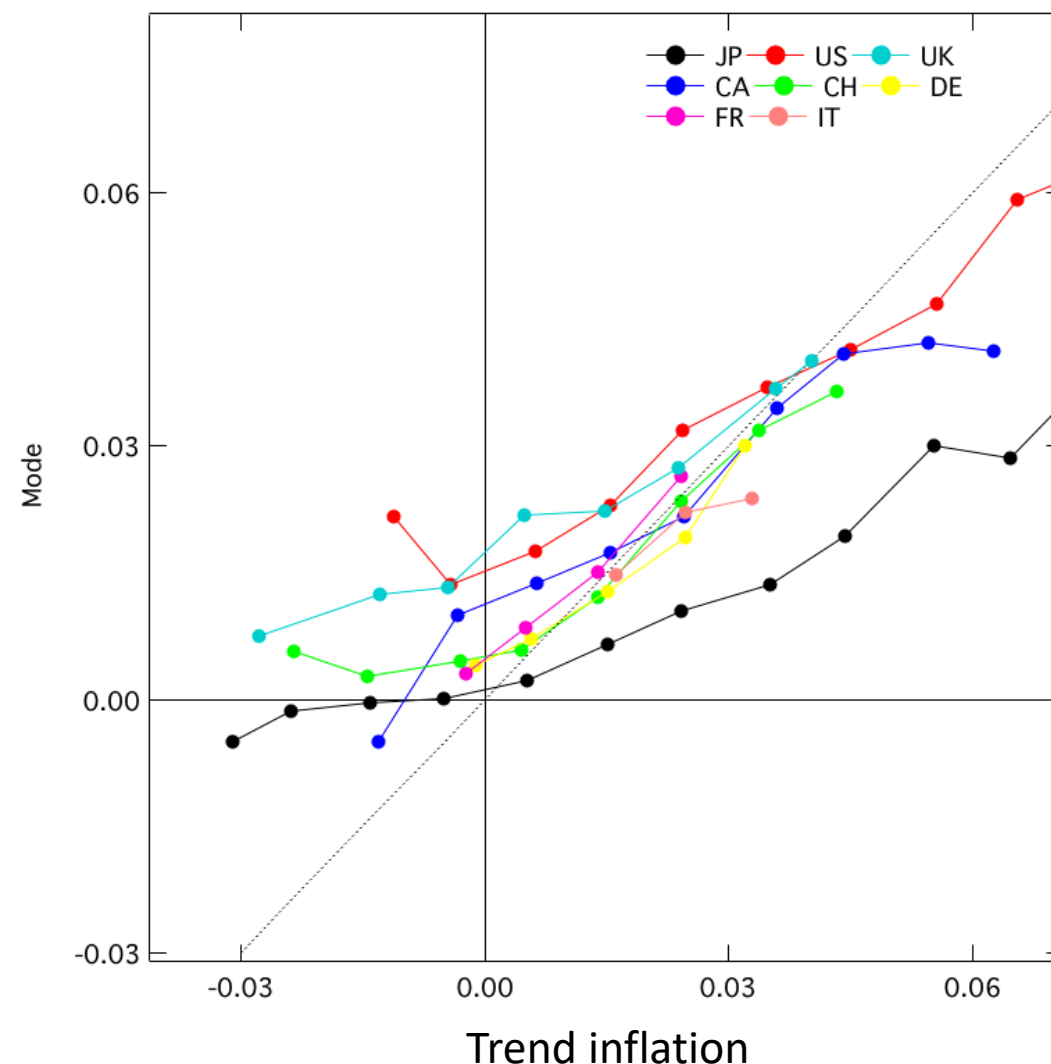
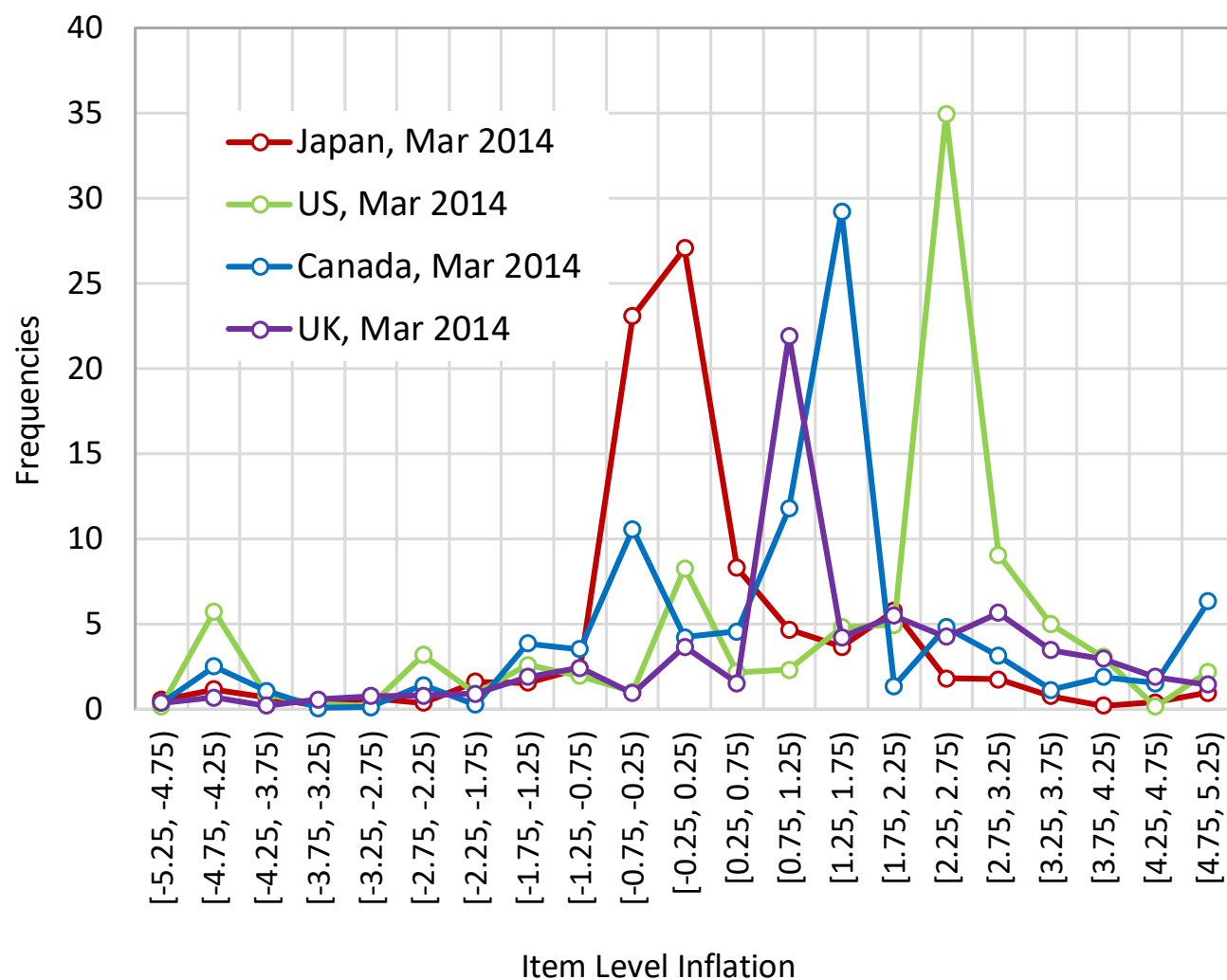
- ① Fraction of items with no price change
- ② Mode of the item-level price change distribution
- ③ Relative price variability (RPV)

to see whether there is any difference in  $\bar{\pi}$  (i.e., inflation norm) and  $\Delta m_t$  (i.e., trend inflation) between the countries.

	Number of items	Sample period
Japan	588	1970-2016
United States	182	1970-2016
Canada	170	1985-2016
Germany	577	1991-2016
France	262	1990-2016
Switzerland	268	1982-2016
Italy	215	1996-2010
United Kingdom	687	1997-2016

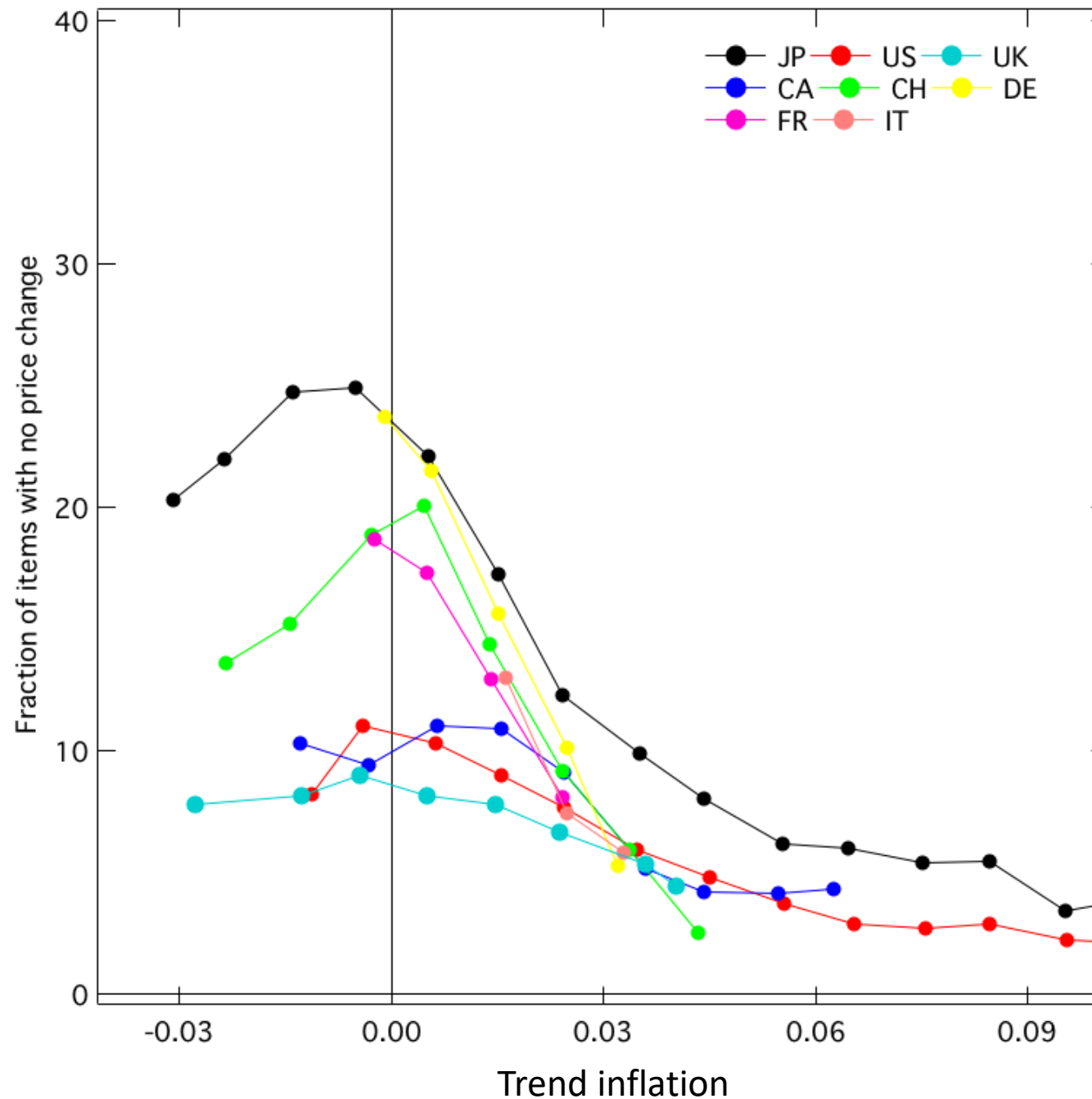
## Result #1:

### Mode of the price change distribution conditional on trend inflation



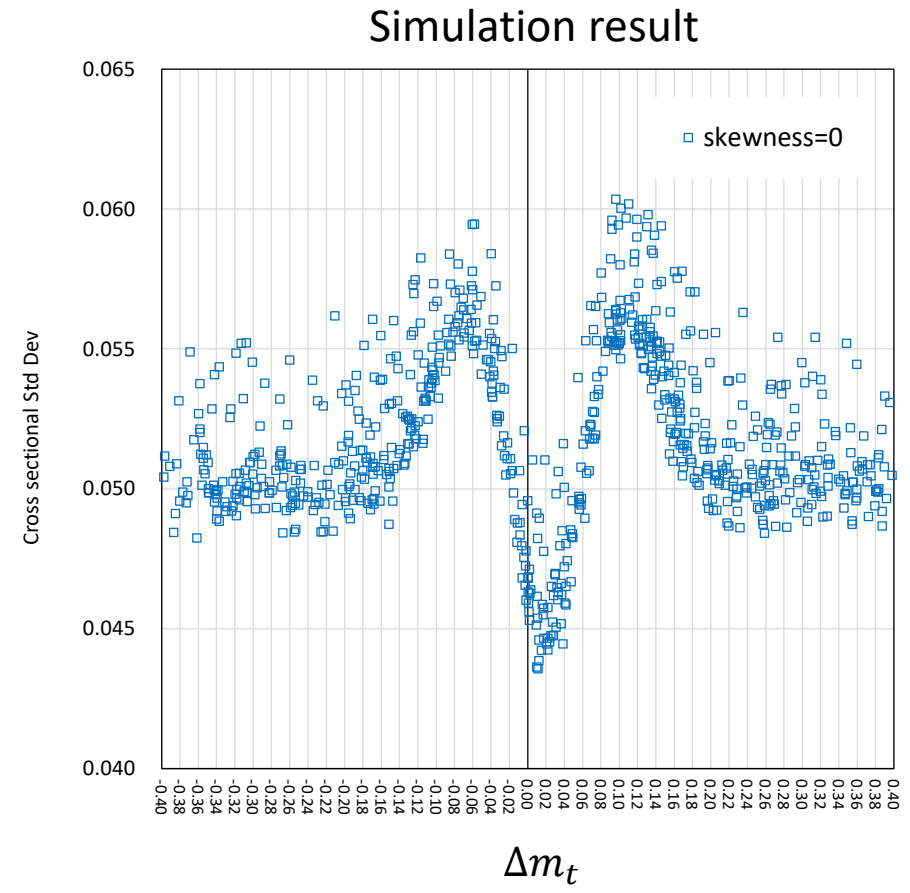
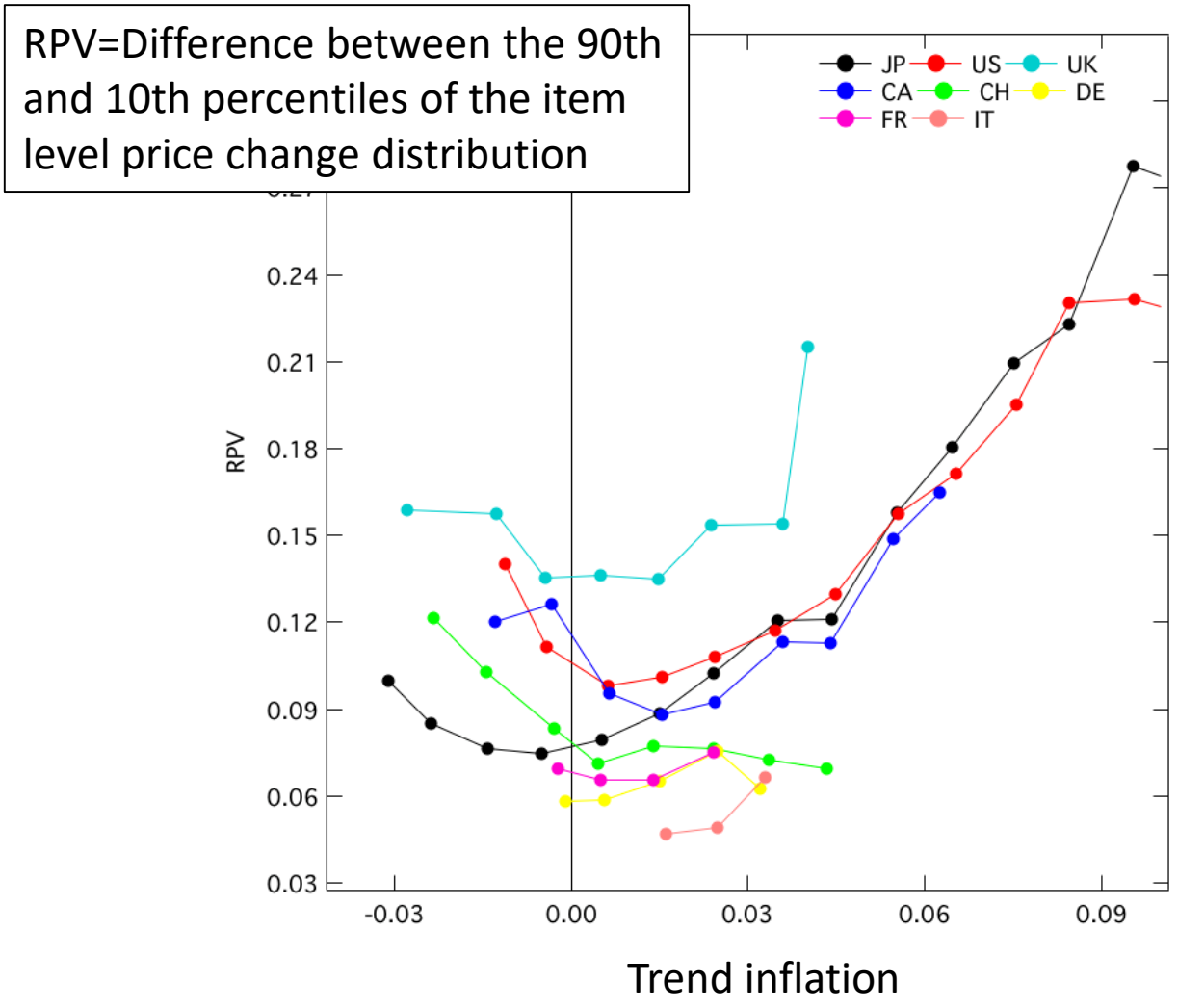
The mode of the distribution is very close to zero for Japan, while it is near 2 percent for other countries. This suggests that whereas in the United States and other countries the “default” is for firms to raise prices by about 2 percent each year, in Japan the default is that firms keep prices unchanged. This is true even if we control for trend inflation.

## Result #2: Fraction of items with no price change conditional on trend inflation



Price stickiness increases as trend inflation comes closer to zero, which is consistent with the prediction of menu cost models. However, prices are much stickier for Japan than the other countries.

# Result #3: Relative price variability conditional on trend inflation



Result #1: the mode of the item-level price change distribution is lower for Japan than the other countries.

Result #3: the bottom of the U-shaped relationship between RPV and trend inflation is lower for Japan than the other countries.

➔ Both of the two findings suggest that inflation norm is around zero for Japan but it is higher and positive for the other countries.

# Main findings and implications

## To what extent were prices sticky?

- For the majority of the 588 items constituting the CPI, the year-on-year rate of price change was near-zero, indicating the presence of very high price stickiness. This situation started during the onset of deflation in the second half of the 1990s and continued even after the CPI inflation rate turned positive in spring 2013.

## Why were prices so sticky?

- The observed difference between Japan and the other countries cannot be explained by the difference in  $\Delta m_t$  (i.e., trend inflation) but it can be explained by the difference in  $\bar{\pi}$  (i.e., inflation norm). Inflation norm is in the vicinity of zero for Japan, while it is somewhere around 1 percent for the other countries. It seems likely that it is the result of the prolonged deflation Japan has experienced, which has led firms to gradually change their pricing behavior and eventually keep prices unchanged.

## Any implications?

- Given that inflation norm is already very close to zero for Japan, it will not be easy to end deflation.