Changes in Wage Adjustment, Employment Adjustment and Phillips Curve: Japan’s Experience in the 1990s

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0. This paper...

- One of the papers in ESRI’s research project “Japan's Economy and Macroeconomic Policies from 1980 to 2007.”

- Subcommittee

  - Labor Market and Income Distribution

- Assignment

  - This paper: wage adjustment, employment adjustment, Phillips curve, and unemployment.
  - Others: unemployment, hours of work, job creation and destruction, mismatch, etc.
1. Introduction

Motivation

✓ A Persistent increase in unemployment in the 1990s and early 2000s

* Japan’s unemployment rate:
  2.2% (1992) → 3.4% (1997) → 5.4% (2002)

⇒ Why Japan experienced a persistent rise in unemployment rate?

✓ Flatter Phillips curve in the 1990s

⇒ Did the wage and/or employment adjustment mechanism of labor market change in the 1990s?
Summary

- Fast wage adjustment mechanism deteriorated to some extent due to downward nominal wage rigidity in the 1990s → create unemployment
- Slow employment adjustment mechanism did not change so much → prevent unemployment from decreasing
- Large labor supply adjustment such as discouraged worker effects got smaller in the 1990s → keep unemployment rate high
2. Phillips curve: Japan


![Phillips curve graph]

- Steep Phillips curve
  - Large wage fluctuation and small employment fluctuation: Sacks (1979), Gordon (1982), etc

Source: *Main Economic Indicators* (OECD)

Note: Hourly nominal wages include bonus and other various allowances (manufacturing industry workers).
Labor market characteristics before the 1990s

✓ Fast wage adjustment (at least in nominal term)
  • Flexible bonus payments and wage revision through annual spring wage negotiations, so called “shunto”: Freeman and Weitzman (1987), Taylor (1989), etc
  • Fast adjustment on nominal wage, but slow on real wage: Ohtake (1988) and Nakamura (1995)

⇒ Capable of mitigating a nominal shock (but vulnerable to a real shock)

✓ Slow employment adjustment
  • Flexibility in hours of working, large firm-specific skill, and lack of dismissal rules such as seniority: Muramatsu(1983) and Shinozuka(1989)
✓ Large discouraged worker effects

- Procyclical fluctuation of labor participation for married females: Ono (1981), Kurosaka and Hamada (1984), etc

Phillips curve: 1992-2006 ⇒ Why flattened?

Nominal wage change rate (%)
3. Possible reasons for a flatter Phillips Curve

- New Keynesian Phillips Curve (NKPC)
  - A micro-foundation to sort out possible reasons for a flatter curve (examine slope parameter)
  - Slope of NKPC with sticky wage (monopolistic competition and Calvo-type staggered price and wage setting)

\[
\frac{(1 - \beta \alpha_w)(1 - \alpha_w)}{(1 + \beta)\alpha_w} \left( \sigma^{-1} + \eta^{-1} \right)
\]

⇒ Two factors to flatten NKPC
  - (1) Lower probability of wage change \((1 - \alpha_w)\)
  - (2) larger Frisch elasticity \(\eta\)
* Lower probability of wage change
  \[ \sim \text{Downward nominal wage rigidity (DNWR)} \]
  under very low inflation rate

- **NKPC incorporating labor market imperfection**

  ✓ Recent development (ex. Blanchard & Gali (2006)): NKPC + Mortensen-Pissarides type labor search theory $\rightarrow$ Labor market real friction

  ✓ Slope parameter of price version of NKPC with real friction $\varphi$: Thomas (2007)

  \[
  \frac{(1 - \beta \alpha_p)(1 - \alpha_p)}{(1 + \beta \alpha_p)} \frac{1}{1 + \phi}
  \]

  $\Rightarrow$ Additional factor to flatten NKPC: larger real frictions of the labor market
* Larger real frictions in labor market
  a) Increase in employment adjustment costs
  b) Decline in discouraged worker effects

Discouraged worker effects
≈ Procyclical labor participation
≈ Procyclical search intensity
  (low search intensity when returns to search are low: efficient search)
☞ Decline of discouraged worker effects
≈ Inefficient search ≈ Increase in real friction
  e.g.) husband’s income decline or job loss
  + liquidity constraint
  → Wife tends to stay in labor market even during recession (added worker effects)
c) Increase in other real rigidities (bargaining power, unemployment insurance payments, and matching inefficiency)

Five possible factors to flatten NKPC

(1) Existence of downward nominal wage rigidity
(2) Higher labor supply elasticity
(3) Increase in employment adjustment cost
(4) Decline in discouraged worker effects
(5) Increase in other real rigidities in the labor market
4. Examining possible reasons

(1) Existence of downward nominal wage rigidity

✓ Claims for the existence of DNWR in Japan: Ohtake (2001), Harada and Okamoto (2001), etc.
  • Possible unemployment increase due to DNWR
  • Need of a slightly positive inflation

✓ DNWR of individual worker: Kuroda and Yamamoto (2003a, b), Yamamoto (2007)
  • DNWR for all types of wages in 1993-98
    (Flexibility of bonus, Possibility of wage cut)
  • DNWR for only regular salary in 2000s

- DNWR at least until 1997 (unobservable since 1998)

Impact of DNWR on unemployment: Kuroda and Yamamoto (2003c, 2005)

- Some degree of impact of DNWR to increase unemployment in the 1990s

⇒ Wage stickiness increased after collapse of the bubble economy in Japan, due to the existence of DNWR under the low inflation environment.

⇒ DNWR contributed to the flatter Phillips curve after collapse of the bubble in Japan.
(2) Higher labor supply elasticity

✓ Possibility of the change in Frisch elasticity: Kuroda and Yamamoto (2008)
  • Declining trend in the estimated Frisch elasticity in the 1990s.

⇒ A flatter Phillips curve after collapse of the bubble economy is not attributable to a rise in Frisch elasticity.
(3) Increase in employment adjustment cost

- Possibility of the change in employment adjustment speed: Higuchi (2001), Nakata (2007)
  - Still much slower employment adjustment speed in Japan, compared with the U.S.
  - Increase in Japan’s employment adjustment speed in the 1990s

⇒ It is unlikely that a flatter Phillips curve in Japan is attributable to the increase in employment adjustment costs (or decrease in adjustment speed).
(4) Decline in discouraged worker effects

✓ Possibility of the change in discouraged worker effects for married female: Higuchi and Abe (1999), Kuroda (2002), Kuroda and Yamamoto (2008), etc.

- Decline in labor force flow from “searching jobs” to “being out of labor force”
- Large added worker effects that dominates discourage worker effects (increase in wife’s labor supply due to decline in husband income)
- Declining discouraged effect due to the later-and non-marriage tendency for females

⇒ Discouraged worker effects among married females are becoming weaker in Japan.
The decline in discouraged worker effects would have reduced the efficiency of job search, and therefore contributed to a flatter Phillips curve in the 1990s.

(5) Increase in other real rigidities in labor market

- Possibility of the change in worker’s bargaining power and reservation wage
  - Decline in the number of union members
  - The 2001 amendment of the unemployment program to reduce insurance payments

⇒ Less likely to increase in the 1990s and later.
Possibility of the change in matching efficiency

- No significant increase in mismatch index in the 1990s (Tachibanaki et al. 2000, etc.)
- Mixed results for matching efficiency in the estimated matching functions (Nakamura 2002, Ohta 2002)
- Increase in the estimated “mismatch” from Beveridge curve (Higuchi 2001, etc.)

→ The estimated “mismatch” may not be consistent with the matching efficiency.

⇒ We cannot conclude that the real frictions arising from matching inefficiency have significantly increased since the 1990s.
5. Concluding remarks

Feasible factors that contributed to a flatter Phillips curve in Japan’s 1990s

1) Existence of downward nominal wage rigidity under the low and negative inflation rate

2) Decrease in discouraged worker effects for married females

Changes in adjustment mechanism and reasons for a persistent increase in unemployment

✓ Fast wage adjustment mechanism deteriorated to some extent due to downward nominal wage rigidity in the 1990s. → Created unemployment.
✓ Slow employment adjustment mechanism did not change so much.
   → Prevented fast recovery of employment.

✓ Flexible labor supply adjustment such as discouraged worker effects got weaker in the 1990s.
   → Kept unemployment rate high.