

KIER DISCUSSION PAPER SERIES

KYOTO INSTITUTE OF ECONOMIC RESEARCH

Discussion Paper No.874

“Job polarization and jobless recoveries in Japan:
Evidence from 1984 to 2010”

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July 2013



KYOTO UNIVERSITY
KYOTO, JAPAN

Job Polarization and Jobless Recoveries in Japan: Evidence from 1984 to 2010 *

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June 17, 2013

Abstract

This study presents evidence for the existence of job polarization in Japan, identifies its effects across four age cohorts, and shows its relationship to Japan's business cycles during 1984–2010. The findings indicate that middle-skilled occupations decreased most sharply among the youngest workers. Our examination of the relationship between occupational categories and the business cycles demonstrates that job polarization is cyclical rather than gradual. Particularly, only employment in middle-skilled occupations did not recover after recessions. This finding underlies Japan's jobless recovery.

JEL Classification: E24, E32, J23, J24

Keywords: Jobless recoveries, job polarization, business cycles

*We thank Tomoyuki Nakajima for introducing us to this topic and for his invaluable advice.

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1 Introduction

This study examines job polarization in Japan’s labor market from 1984 to 2010. Job polarization refers to the shift in employment from middle-skilled occupations toward highly-skilled and low-skilled occupations. Drawing on data from Japan’s Labour Force Survey and Population Census, we investigate the trend in job polarization and its relationship to business cycles. We use data for employment and the average number of hours worked per week (hours per worker, hereafter) because the latter are more volatile than the employment-population ratio in Japan (Rogerson and Shimer, 2011). Therefore, observing only data for employment may generate misleading conclusions. We investigate job polarization as measured by employment and the amount of work defined by multiplying employment by hours per worker.

This study presents four major conclusions about Japan’s labor market during 1984–2010.

First, middle-skilled occupations decreased while highly skilled and low-skilled occupations increased, regardless of employment or amount of work, particularly after the 1990s. In short, job polarization is a documented phenomenon during the period.

Second, we examine employment among four age cohorts and find that middle-skilled occupations decreased most sharply among the youngest group during the examined period.

Third, job polarization was cyclical, not gradual. Changes in employment and amount of work in highly skilled occupations coincided with the business cycles, whereas the measures for middle-skilled occupations did not recover after recessions.

Fourth, we establish the relationship between job polarization and “jobless recoveries,” the phenomena whereby aggregate output revives after recessions, while aggregate employment continues to contract. Jobless recoveries are observed only in middle-skilled occupations during 1984–2010. Japan’s highly skilled and low-skilled occupations did not experience contractions, or they rebounded after the turning point in aggregate output. This indicates that jobless recoveries in aggregate employment are related to the fact that middle-skilled occupations disappeared during recessions and recovered slowly afterward. Moreover, the trend of hours per worker in routine occupations weakened claims about jobless recoveries as measured by amount of work. However, this effect was not robust and provides no concrete evidence for claims about jobless recoveries as measured by amount of work.

A growing body of literature exists on job polarization.¹ Autor, Levy, and Murnane (2003) and Autor, Katz, and Kearney (2006) show that job polarization has been occurring in the United States since the 1980s. Goos and Manning (2007) and Goos, Manning, and Salomons (2009) document job polarization in Europe, while Ikenaga (2009) presents evidence of job polarization in Japan.²³ This paper is closely related to the latter’s work, albeit with significant differences. Ikenaga (2009) investigates the trend in job polarization, whereas we study the relationship between job polarization and business cycles. In addition, we find that job polarization occurs even if measured by amount of work, a finding not documented by Ikenaga (2009). In addition, she does not study the relationship between job polarization and age.

Furthermore, this paper is closely related to Jaimovich and Siu (2012), who find that job polarization in the United States occurs almost entirely during recessions and is related to jobless recoveries. We establish that this was also the case in Japan during 1984–2010: job loss in middle-skilled occupations is concentrated in recessions, and jobless recoveries are observed only in middle-skilled occupations.

This paper proceeds as follows. Section 2 describes the data. Section 3 examines the trend in job polarization during 1984–2010. Section 4 investigates the relationship between the behavior of occupational employment and business cycles. Section 5 concludes.

2 Data

We use data from the Labour Force Survey from April 1984 to December 2010⁴ and the 2000, 2005, and 2010 Population Census. Employment data are normalized by the population. Data from the Labour Force Survey are seasonally adjusted and logged.

Following Acemoglu and Autor (2011), we define four types of occupations: non-routine cognitive, non-routine manual, routine cognitive, and routine manual.⁵ Non-routine cognitive occupations employ “professional and technical workers” and “managers and officials.” Routine cognitive occupations employ “clerical and related workers” and “sales workers.” Routine manual occupations employ “workers in transport and communi-

¹Acemoglu and Autor (2011) present a survey of the literature on job polarization.

²Ikenaga (2009) uses data from the Population Census.

³See also Ikenaga and Kambayashi (2010) for job polarization in Japan.

⁴Data are taken from Labour Force Survey, downloaded from <http://www.stat.go.jp/english/data/roudou/index.htm> for the period January 2000–December 2010. Data for the period April 1984–December 1999 are not available at this URL and were obtained from the Statistical Library in Tokyo.

⁵The Labour Force Survey and Population Census classify the number of employed persons by occupation.

cation” and “production process workers and laborers.” Non-routine manual occupations employ “protective service workers and service workers.” These classifications are based on rankings in the occupational income distribution. Non-routine cognitive occupations tend to be highly skilled occupations. Non-routine manual occupations are low-skilled. Both routine occupations are said to be middle-skilled.

3 Trends

3.1 Aggregate Employment

Figure 1⁶ shows rates of change in employment and amount of work for each occupational category during three periods: 1984–1990, 1991–2000, and 2001–2010. The figure indicates that, regardless of employment or amount of work, routine occupations have been decreasing, and non-routine occupations have been increasing. Routine occupations disappeared moderately during the 1980s and decreased sharply during the 1990s and 2000s.

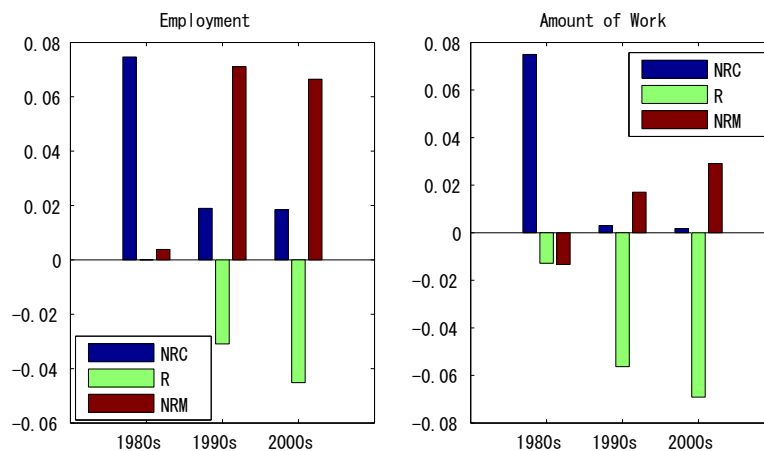


Figure 1: Job Polarization: Trend

3.2 Generational Relationships

We now investigate the relationship between job polarization and age. Table 1 shows the percentage change in employment from 2000 to 2010 for four age groups:⁷ 15–34 years,

⁶In the rest of paper, ALL, NRC, NRM, and R represent aggregate employment, non-routine cognitive, non-routine manual, and routine occupations, respectively.

⁷This subsection draws data from the Population Census.

35–49 years, 50–64 years, and 65+ years.⁸ Table 1 indicates that routine occupations decreased among every age cohort from 2000 to 2010; however, they have decreased more rapidly for the youngest cohort (15–34 years). Moreover, the number of young workers (15–34 years) employed in non-routine manual occupations rose dramatically during the period.

	15-34	35-49	50-64	65-
ALL	-9.6	-7.6	-2.7	-2.5
NRC	1.1	-8.0	14.0	-13.8
NRM	35.5	20.5	20.1	48.0
R	-18.3	-10.5	-9.2	-2.5

Table 1: Percentage Change in Employment between 2000–2010 (by Age)

4 Relationship to Business Cycles

4.1 Employment and Business Cycles

Figure 2 shows the trend in per capita employment and amount of work for all occupations, non-routine cognitive, non-routine manual, and routine occupations. The blue, green, and red lines represent employment, amount of work, and hours per worker, respectively. The shaded regions indicate the peak-to-trough periods set by the Economic and Social Research Institution.

First, note that aggregate per capita employment fluctuated and declined by 2%. Moreover, the reduction in amount of work exceeded 8% and has been noteworthy since the 1990s. In addition, Figure 2 shows that employment in non-routine cognitive occupations grew until 1991,⁹ after which its growth rate diminished. On the other hand, hours per worker is gradually decreasing throughout the time. Thus, the amount of work fluctuated slightly after the 1991 recession and approximately coincided with the business cycles.

Employment in non-routine manual occupations consistently increased, and the hours per worker declined. Thus, the amount of work increased gradually during the period.

⁸Data are normalized by the population of each group.

⁹As Hayashi and Prescott (2002) state, this fact is related to major revisions of the Labor Standards Law added 1 day to paid vacation. The statutory workweek changed from 48 hours down to 40 hours. Thus, employment in non-routine cognitive occupations grew rapidly.

Although employment in non-routine manual occupations has risen about 15% during the 25 years, the reduction in hours per worker has exceeded 10%. In addition, employment and hours per worker in non-routine manual occupations have fluctuated slightly and appear unrelated to business cycles.

The main observable difference between routine and non-routine occupations is that hours per worker and employment decreased for routine occupations. We also see a surprising 14% reduction in amount of work in the routine occupational category. In addition, declines in employment and amount of work in routine occupations are concentrated during recessions and do not recover afterward. This indicates that job polarization was cyclical, not gradual, during the period. Employment in routine occupations did not recover after recessions; however, employment in non-routine cognitive occupations did.

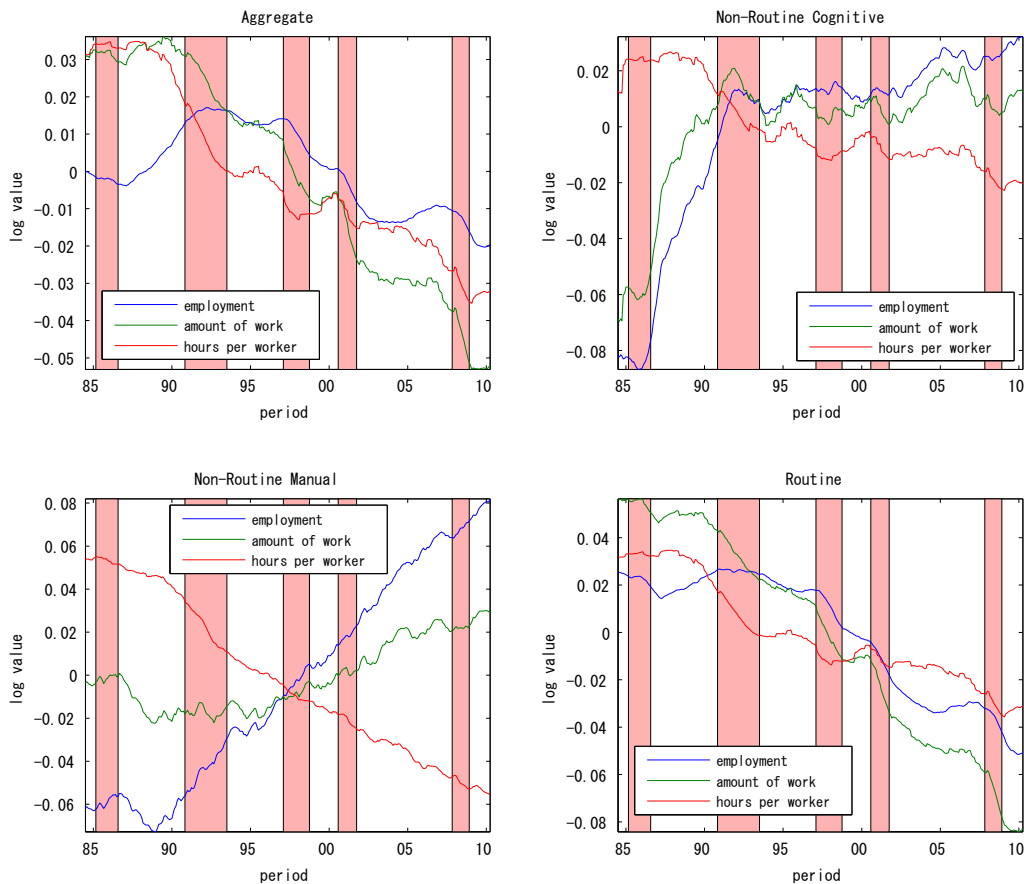


Figure 2: Transition of Employment and Amount of Work

4.2 Relationship to Jobless Recoveries

The previous section implies the relationship between job polarization and jobless recoveries. Jobless recoveries refer to the phenomena where after recessions, aggregate output starts growing again, while aggregate employment continues to contract. To investigate jobless recoveries, the data are bandpass filtered. The results are shown in Figure 3. This indicates that although it took few years for employment in aggregate and routine occupations to return to the level at the trough in the 1985, 1991, and 2000 recessions, employment in non-routine occupations was growing during recessions or rebounded soon after the troughs. That is, jobless recoveries in aggregate employment are because of jobless recoveries in routine occupations. Jobless recoveries in aggregate employment relate to the fact that jobs of routine occupations decreased during recessions and recovered slowly after recessions.

We also indicate that the difference of behaviors between employment and hours per worker. As Rogerson and Shimer (2011) remark, the behavior of hours per worker is also notable factor in Japan's labor market.. Table 2 shows the number of months required for employment, hours per worker, and amount of work in routine occupations to return to their trends. In every recession during the sampled period, it took less than one year for hours per worker to recover; however, employment took more than three years.¹⁰ This finding implies that the trend in hours per worker weakened the phenomena of jobless recoveries measured by amount of work. However, this effect is weak and provides no convincing information for claims about jobless recoveries. Table 2 shows that recovery in amount of work generally took more than a year. However, after the 2000 recession, it took more than four years.

¹⁰In the 1997 recession, the length of recovery of employment is about one year. This is caused by the short interval before the next recession.

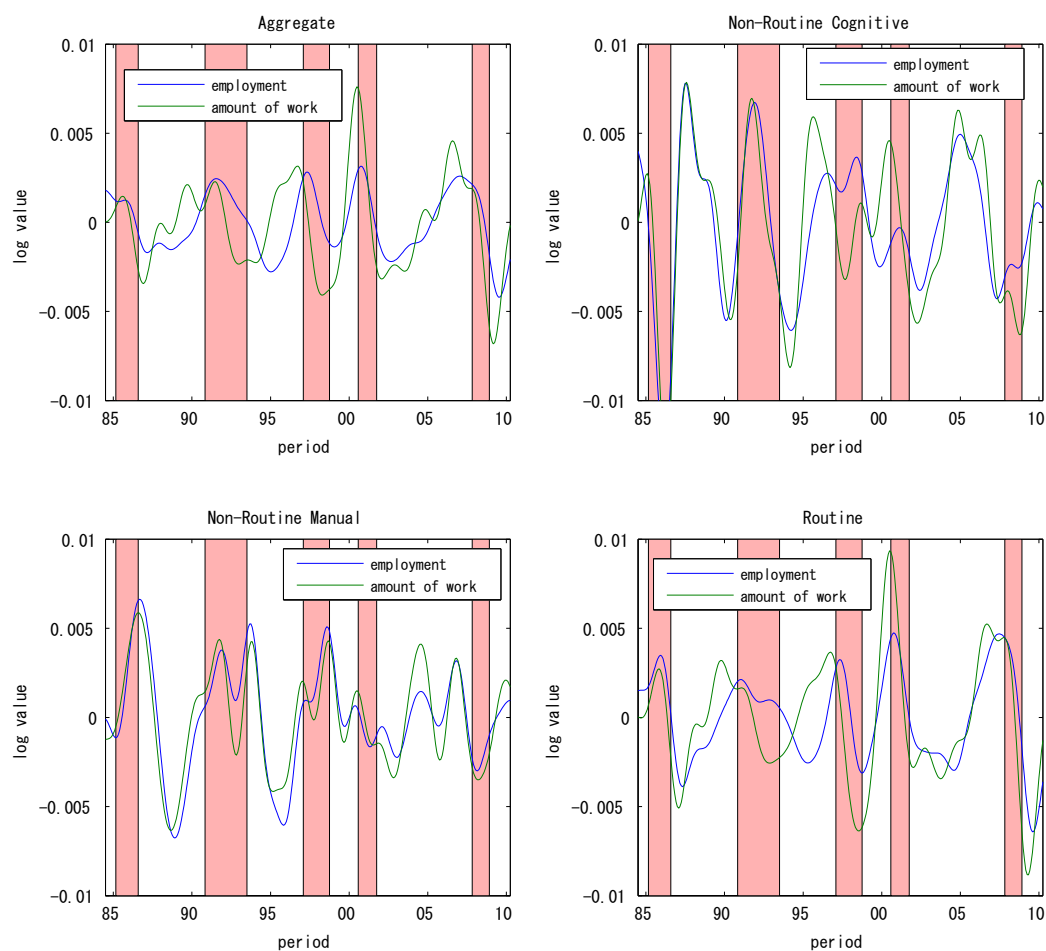


Figure 3: Cyclical Behavior

	Employment	Hours per Worker	Amount of Work
1985	38	11	28
1991	37	10	14
1997	12	11	11
2000	46	10	47
2008	N/A	10	N/A

Table 2: Measures of Recovery following Recessions (Routine Occupations)

5 Conclusion

This study has provided evidence for the existence of job polarization in Japan and its relation to business cycles for the period 1984–2010. It has documented that employment and the amount of work in highly skilled occupations recovered quickly after recessions, whereas this was not the case for middle-skilled occupations. In addition, it documented that middle-skilled occupations have decreased more sharply among the youngest age cohort. The study’s findings imply that job polarization is related to the phenomenon of jobless recoveries. Most job reductions occurred in routine occupations. Finally, the study showed that the trend of hours per worker in routine occupations does not provide convincing evidence about claims concerning jobless recoveries.

This study indicates that a explanation of why job polarization occurs must be consistent with the fact that employment in middle-skilled occupations have decreased more sharply among the youngest age cohort.

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