

## Labor Force Participation Rate in Japan

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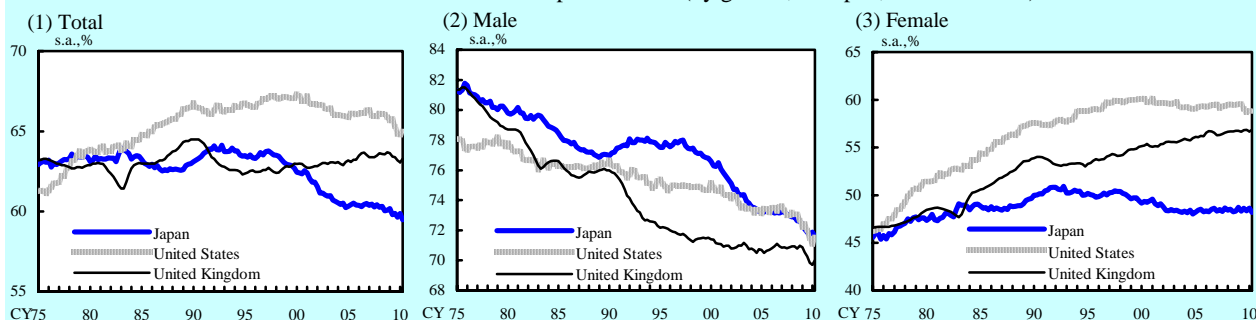
Although Japan's labor force participation rate has declined in recent years, the rates of participation among different age and gender groups show various patterns. We overview some of those developments and examine the determinant factors of labor supply from cyclical as well as structural perspectives. From the cyclical perspective, we find that younger and elderly males gave up looking for work due to the recession after the collapse of Lehman Brothers (a phenomenon known as the "discouraged worker effect") and therefore the labor force participation rates of those categories declined. On the contrary, the labor force participation rate of females around 30 years old was firm, since spouses entered job markets to support households' income following the decline in the husbands' income (known as the "household assistance effect"). From the structural perspective, our empirical analysis suggests that population aging puts downward pressure on the aggregate labor force participation rate in the long run. Female labor force participation rates, however, were relatively stable, since carrier opportunities for females have expanded and because more females have wanted to work.

### 1. Introduction

The labor force participation rate, which is defined as the ratio between the labor force and the working age population (15 years old and above), shows the share of people who want to work. It had been stable until the late 1990s, but has declined in Japan since then (Chart 1(1)).<sup>1</sup> The participation rate for males has declined except for the 1990s (Chart 1(2)). The participation rate for females, in contrast, had risen until the early 1990s and flattened afterward (Chart 1(3)). The labor participation rate for females in Japan has been significantly lower than that in other developed countries, while the level for males in Japan has

been higher in general than those in other developed countries. Various underlying factors could have contributed to these differences between gender groups. We focus on the labor supply behavior and examine the determinant factors of labor supply in Japan from cyclical as well as structural perspectives. Section 2 summarizes stylized facts about the labor force participation rates by age and gender groups. Section 3 examines cyclical factors that affected the participation rate during the latest recession. Section 4 investigates the structural factors based on the empirical analysis using a cohort-based model. Section 5 concludes the review.

Chart 1 Labor Force Participation Rates (by gender, in Japan, U.S. and U.K.)



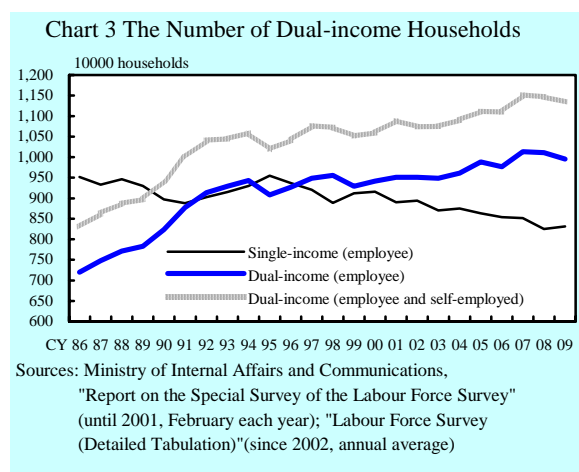
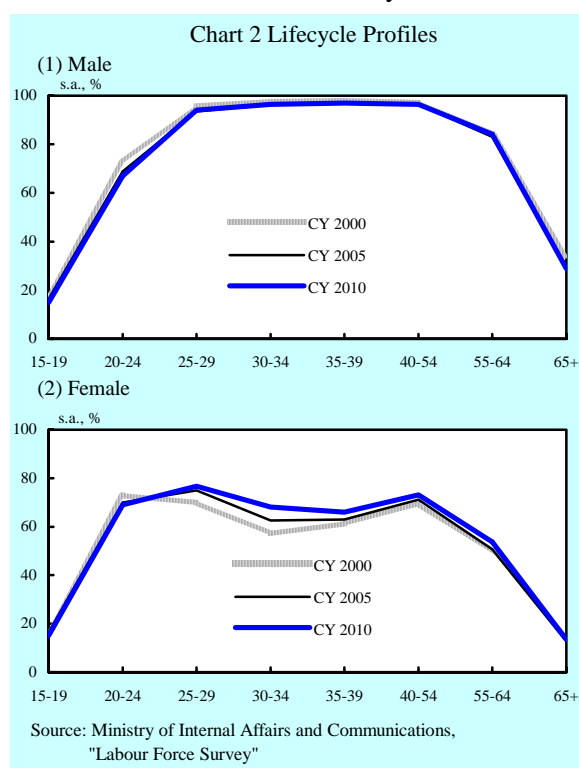
Note: The working age population, in Japan is above 14 and those in U.S. and U.K. are above 15.

Sources: Ministry of Internal Affairs and Communications, "Labour Force Survey"; CEIC

## 2. Labor Force Participation Rates by Age and Gender groups

### (1) Lifecycle Profiles of Labor Force Participation Rates

Chart 2 illustrates lifecycle profiles of labor force participation rates for males and females by age group. The participation rate of males increases until age 25-29, then flattens, then starts to decline from age 55-64. The shape of the lifecycle profile has not changed significantly in recent past. The lifecycle profile for female shows an M-shaped curve, which indicates that many women leave the labor force when they marry or give birth to children; they tend to return to work after their children have grown. The M-shaped curve has become flatter in recent years. <sup>ii</sup>

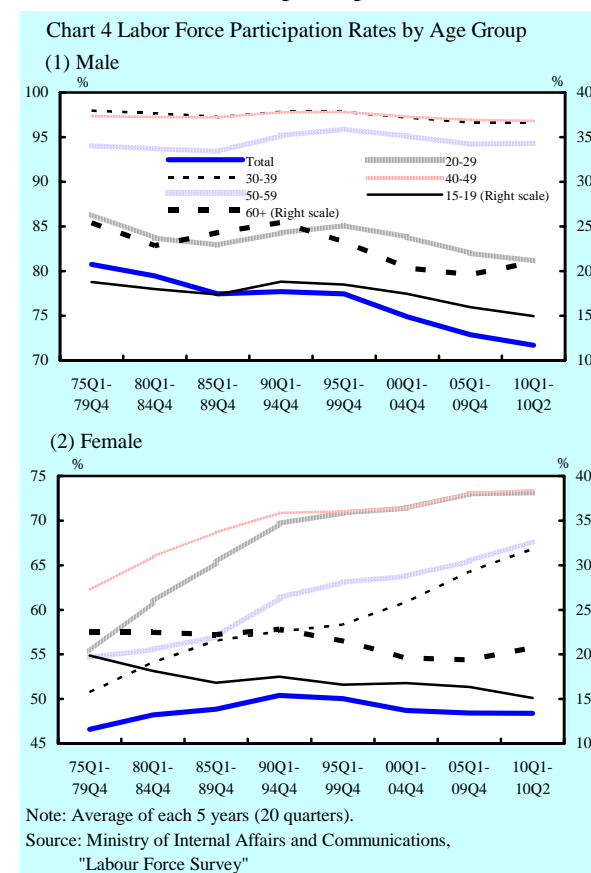


The number of dual-income households has increased while the number of single-income households has gradually decreased in recent years. This indicates that the labor force participation for females has been increasing (Chart 3).

### (2) Medium to Long-term Trend of Participation Rate

Chart 4 presents the participation rates of each age group. The downward trend of the participation rates for those aged teens-20s and for males older than 60 is conspicuous. However, given that the labor participation rate as a whole fell more rapidly than those of any age groups, the steep downward trend of the aggregate participation rate cannot be explained by those of each age group. Population aging puts additional downward pressure on the aggregate participation rate. The share of elderly people, whose labor participation rates are low, has been increasing, and, as a result, the total participation rate has declined.

The participation rates of young (teens) and elderly (above 60) females show a downward trend, while a substantial upward trend of those of age 20s-50s is observed. The aggregate rate for females had risen until the first half of the 1990s, and turned flat afterward. This development is due to the mixture of the above-mentioned opposite movements of the labor participation rates.



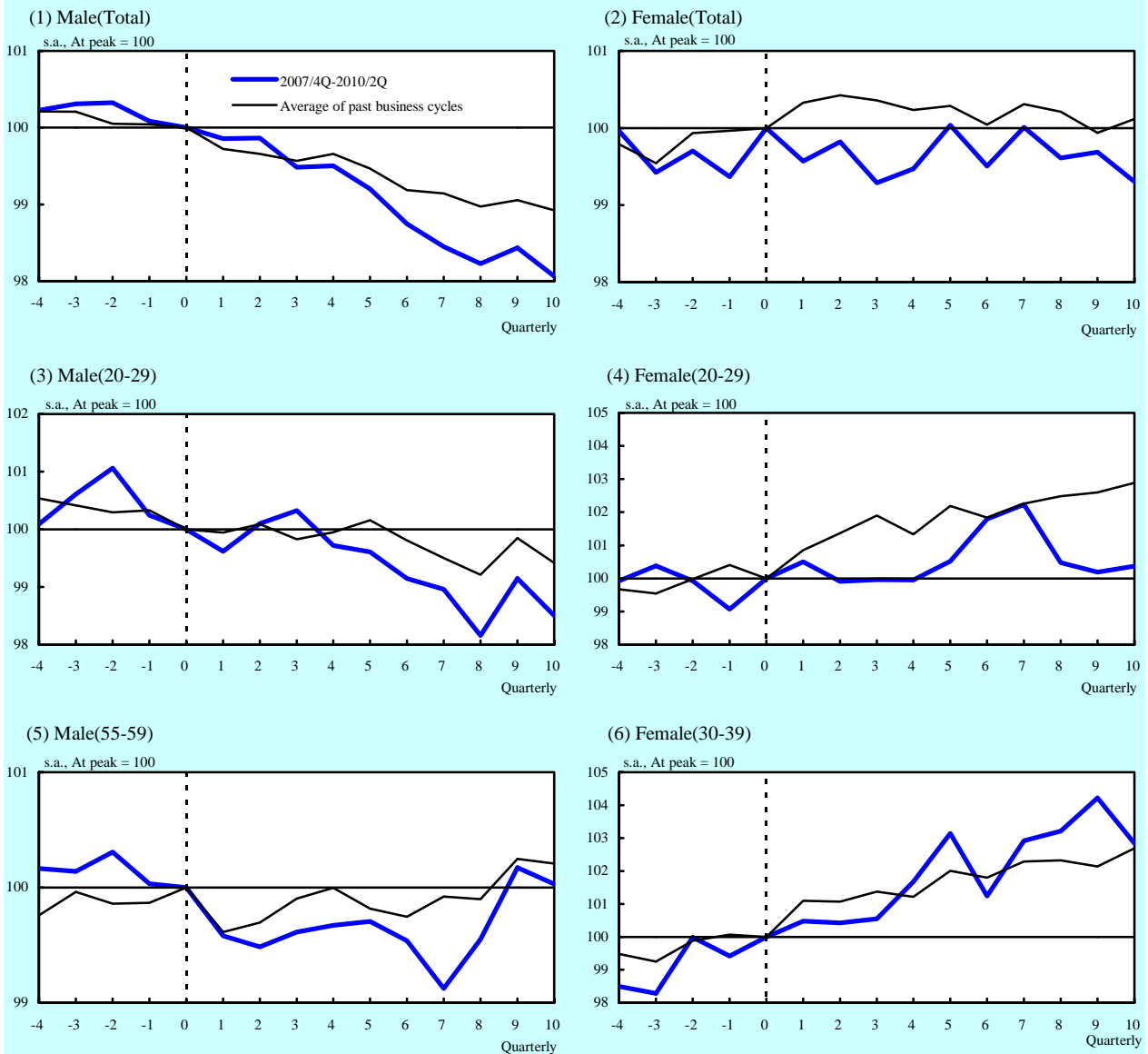
### (3) Movements of Labor Participation Rate in Past Business Cycles

Next, we focus on the short-term fluctuations of the labor participation rates along with business cycles. The factors contributing to the short-term fluctuations of the labor participation rates can be different from those of medium to long-term factors. Chart 5 shows the labor force participation rates of certain gender and age categories in the past recession periods. During the latest recession period, the participation rate for males (bold line) declined as was the case for the past recessions

(thin line). The magnitude is especially large for those in their 20s and late 50s. On the contrary, the participation rates for females tend to rise during recession periods. During the latest recession, unlike that for males, there has been no clear declining trend in the labor participation rate for females, although the rate for females does not rise as in the past recessions. The participation rate of those in their 20s rose moderately, and that of workers in their 30s rose significantly during the latest recession.

We examine the factors behind the above-mentioned cyclical movement below in more detail.

Chart 5 Labor Force Participation Rates in Past Business Cycles



Notes: 1. The levels of labor participation rates are re-based at 100 at the peaks of business cycles.  
 2. Average of past business cycle is the average of 6 business cycles between a business cycle peaked at 1977/1 (8th cycle) and that at 2000/11 (13th cycle).

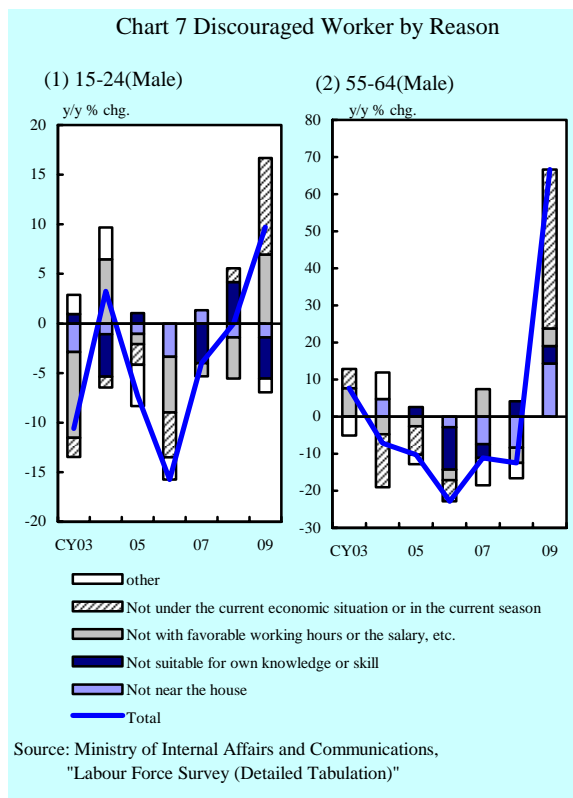
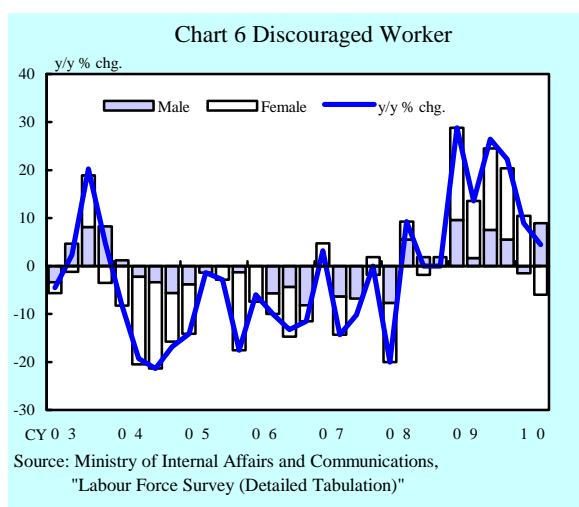
Source: Ministry of Internal Affairs and Communications, "Labour Force Survey"

### 3. Cyclical Factors

In Section 3, we describe two different cyclical factors that affect the fluctuation of the labor force participation rate. One is that many people simply give up the hope of finding jobs due to sluggish labor demand during recession periods (the discouraged worker effect). This is the dominant factor for the males' labor participation rate movements, particularly for young and elderly males. The other is that spouses tend to enter into the labor market to supplement household income, since the incomes of many husbands have declined (the household assistance effect). This is the dominant factor for the labor participation rate movements among females, particularly for those in their 30s.

#### (1) Discouraged Worker Effect

Chart 6 shows the number of discouraged workers who stop searching for work because they feel no suitable jobs are readily available in the current economic situation, even though they are willing and able to work. The number of discouraged workers increased significantly after the Lehman shock, both for males and females, because of the dramatic change in the labor market. During the period, female discouraged workers increased irrespective of age group, but male discouraged worker increased especially for young and elderly age groups. Chart 7 shows the number of discouraged male workers by reason. Young (age 15 to 24) and elderly (age 55 to 64) males gave up looking for work during the latest recession period because they felt that no suitable jobs were available in the present business conditions.

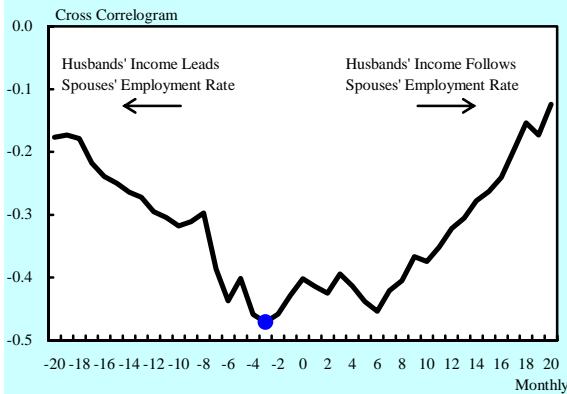


#### (2) Household Assistance Effect

Spouses tend to enter into the labor market to supplement household income as their husbands' income declines. This is called the "household assistance effect," and also known as the Douglas-Arisawa's effect named after the economists who found this regularity.<sup>iii</sup> According to past empirical researches, the probability of a spouse's labor participation is negatively associated with her husband's income level. This is true for the movements of female participation rates after the Lehman shock.

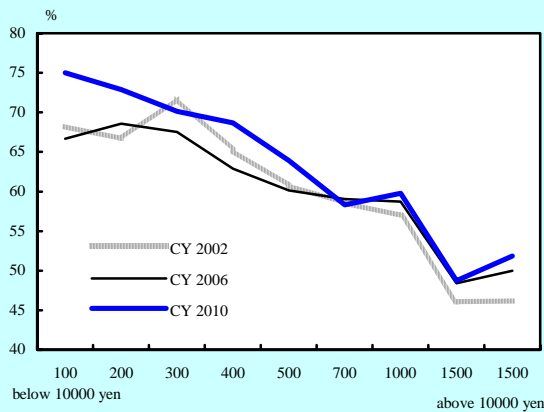
Chart 8 shows the cross correlogram between income levels for husbands and the participation rates of spouses. The coefficients are negative, and the labor participation rates of spouses tend to delay for husbands' income movement. When the husbands' income declines, the spouses start to find work. Cross-section data also shows that the relationship between husbands' income level and spouses' labor participation has not changed through the 2000s (Chart 9).

Chart 8 Cross Correlogram Between Husbands' Income Level and Spouses' Employment Rate



Note: Estimation is made from the data from 2001/1 to 2010/6.  
Source: Ministry of Internal Affairs and Communications, "Survey of Household Economy."

Chart 9 The Relation Between Husbands' Income Level and Spouses' Labor Force Participation

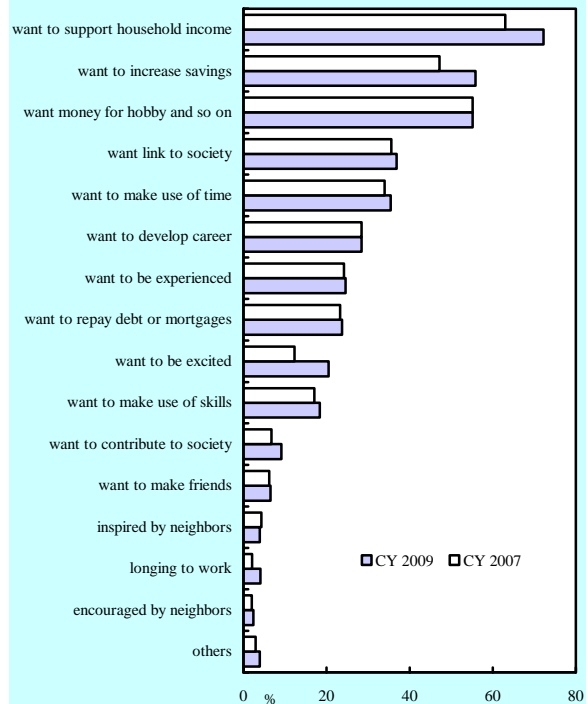


Notes: 1. Age of spouses ranges 25-54 years old.  
2. First quarter of each year.  
Source: Ministry of Internal Affairs and Communications, "Labour Force Survey (Detailed Tabulation)."

According to a private survey that shows reasons for spouses' participation in the labor market, the number of responses "want to support household income" are the highest, and increased from 2007 to 2009 (Chart 10).<sup>iv</sup>

While similar female participation behavior was observed in past business cycles, increasing flexibility of the employment system utilizing part-time or temporal workers may have contributed to further increases in spouses' labor participation rates in recent years.

Chart 10 Reasons Why Spouses Participate in the Labor Market



Source: INTELLIGENCE. LTD, "an report."

#### 4. Structural Factors

##### (1) Cohort-Based Analysis

In Section 1, we describe that the participation rate for males tends to decline in the long-run, while that of females has been flat. In this section, we examine some structural factors by using an empirical technique called cohort-based analysis<sup>v</sup>. We decompose the aggregate labor participation rate to three factors: (1) age effect, (2) time effect, and (3) cohort effect (see Box below). The age effects show lifecycle patterns of labor participation rates. The time effect is the change in labor participation rates affected by macro economic conditions of each year, and the cohort effect is the impact of particular generations on labor participation.

First, chart 11 (1) exhibits the age effect of males and females; it captures lifecycle patterns of labor participation rates. The profile for male (bold line) shapes is trapezoid, and female (thin line) profile shows an M-shaped curve.

Second, Chart 11 (2) shows the time effect. The time effect for males has a declining trend, except for the 1990s, which suggests that the labor supply increased more than the trend in the 1990s due to tight labor market conditions during the bubble period. The expectation of medium to long-term growth did not decline as large as the actual GDP growth rate in the first half of the 1990s, since the weak GDP was thought to be a temporal phenomenon. Corporations maintained strong labor demand, given such firm growth expectations. At the same time, the total fertility rate showed record-low levels, and firms started to worry about future labor shortages. Given the expectation that the future labor market of regular workers would be much tighter, firms employed many regular employees, and the actual labor market became tighter and tighter. However, growth expectations declined more than the average actual growth rates in the recent past due to bank failures and to the negative growth at the end of the 1990s. Slack in the labor market for regular workers increased dramatically. Chart 12 shows that the differences between expected growth rates and actual growth rates co-move with the time effect for males, while that for females shows an upward trend. The result suggests that labor market conditions improved for female workers as various structural changes were implemented.

Third, chart 11 (3) illustrates the cohort effect. While the profiles for males are flat, those for females rise. This indicates that more females of the recent cohorts enter the labor market than those of elderly cohorts. This trend is due to structural changes in Japan's labor market, including, for example, 1) increase in educational level of females, 2) equality of employment opportunity backed by the newly-introduced legislation (Equal Employment Opportunity Act for Men and Women), and 3) more firms have introduced flexible labor contracts such as flexitime, working at home, and so on.

Chart 11 Age Effect, Time Effect, and Cohort

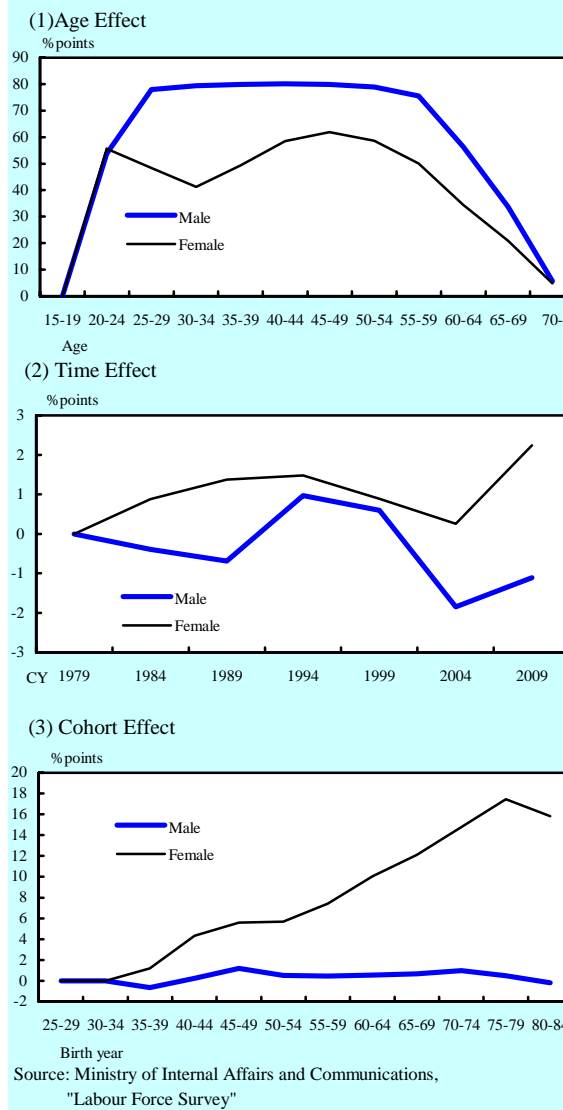
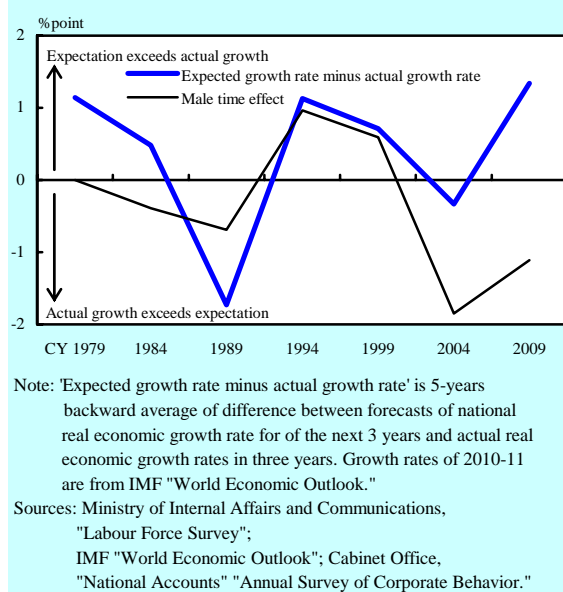


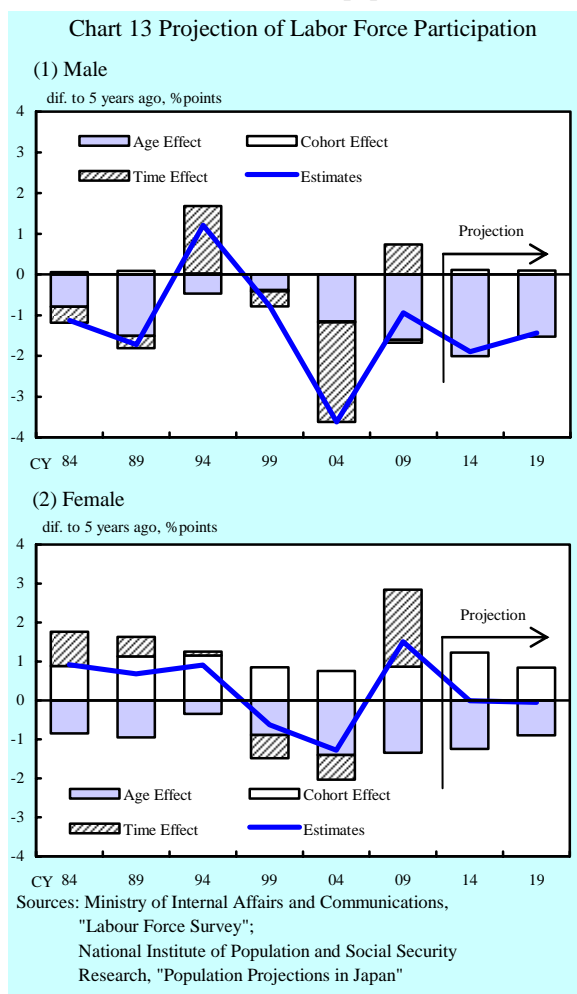
Chart 12 Males' Time Effect and Expected Growth





## (2) Projection of Labor Force Participation Rate

By using the empirical results, we extrapolate labor participation rates up to 2019.<sup>vi</sup> Chart 13 exhibits the decomposition of each factor. The age effect puts downward pressure on the labor participation rates for males due to population aging of the baby boomers.<sup>vii</sup> The cohort effect, however, puts upward pressure on the labor participation rates for females, and partly compensates the downward pressure of the age effect. In this projection, there is uncertainty on the future time effect for females. We assume there is no time effect after 2009. It is, however, possible that a significant positive contribution of time effect from 2004 to 2009 means structural changes in the labor market. It is uncertain whether the positive effect had already vanished. If the structural change continues, the positive contribution of the time effect will persist and the forecast of the labor participation rates will increase more than that of this paper's estimate.



## 5. Conclusion

We examine the developments of labor participation rates of each gender and age, and investigate the determinant factors of labor supply in terms of cyclical as well as structural perspectives.

From the cyclical perspective, we found that two different factors are at work: the discouraged worker effect in the negative direction, and the household assistance effect (also known as "Douglas-Arisawa's effect") in the positive direction. This is true for the latest recession period.

From the structural perspective, the cohort-based analysis result suggests that population aging (age effect) accounts for a substantial part of the recent decline in labor participation rates for males. On the contrary, the cohort effect of females has contributed to increase in the labor participation rates, and partly compensates for the downward pressure from population aging.

The aggregate labor participation rate is likely to continue declining due to strong downward pressure from population aging over the long run. The decline of the labor participation rate will put downward pressure on the potential growth rate.<sup>viii</sup>

To support sustainable economic growth, it is necessary to improve the environment for working females and the elderly to increase the labor supply. Especially for married females in their 30s, whose participation rate is lower than those in other developed countries, there is some chance to increase the labor participation rate of those females and to flatten the M-shaped curve by providing a more convenient labor environment. This will lead to an increase in female labor participation rates.

## 【Box】 Cohort-based Analysis

### (1) Outline of Cohort-Based Analysis

A cohort-based analysis is an econometric method used to identify features peculiar to a certain generation born at a specific year, in other words "cohort." Specifically, it distinguishes (1) a feature peculiar to a specific generation (Cohort Effect), (2) a feature peculiar to a specific age group (Age Effect), and (3) a feature peculiar to a specific year (Time Effect), and then obtain their contributions for the change of labor force participation rate. In actual estimation, set dummy variables for each categories (generation <cohort>, age, year), and then estimate by ordinary least squares. In an example below, set dummy variables for 4 age groups, 3 years, and 6 cohorts.

Year	Age	Labor Force Participation Rates
CY 1999	20-24	73%
	25-29	96%
	30-34	97%
	35-39	98%
CY 2004	20-24	68%
	25-29	94%
	30-34	97%
	35-39	97%
CY 2009	20-24	68%
	25-29	94%
	30-34	96%
	35-39	97%

Distinguish three effects,  
 1. Age Effect  
 2. Time Effect  
 3. Cohort Effect

\*The Shaded groups denote a 1975-79 birth cohort.

	CY 1979	CY 1984	CY 1989	CY 1994	CY 1999	CY 2004	CY 2009
15-19	[ ]	[ ]					
20-24	[ ]	[ ]					
25-29			[ ]				
30-34				[ ]			
35-39					[ ]		
40-44						[ ]	
45-49							[ ]
50-54							
55-59							
60-64							
65-69							
70-74							

### (2) Estimation

Labor Force Participation Rate  $R_{i,j}$

$$= \text{cons} + \beta_{\text{time},i} \cdot \text{Time dummy}_i + \beta_{\text{age},j} \cdot \text{Age dummy}_j + \beta_{\text{cohort},k=i-j} \cdot \text{Cohort dummy}_{k=i-j}$$

$$i = \text{CY}1979, 1984, 1989, 1994, 1999, 2004, 2009$$

$$j = \text{age group } 15-19, 20-24, \dots, 70-74$$

$$k = \text{birth year } 1925-29, 1930-34, \dots, 1980-84$$

- (a) Estimation is made from the data CY 1979-2009.
- (b) Survey year is every five years, CY 1979-2009 (7 categories).
- (c) Age group is every five ages (12 categories).
- (d) Birth year is every five years, CY 1925-84 (12 categories).
- (e) Classify age 70+ into 70-74.
- (f) In the estimation, survey year 1979, age group 15-19, and birth year 1925-29 and 1930-34 are set as the reference categories.

Note: Cohort figure at middle part is based on Cabinet Office, "Survey on the Measures of Aged Society."



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<sup>i</sup>Labor force participation rate is calculated as the number of labor force divided by the number of the population aged 15 years and above. Labor force includes employed person and unemployed person. People who give up finding jobs due to economic conditions are not included in labor force.

<sup>ii</sup>The M-shape has not only become flatter -- it has also shifted to the right in recent years. This shift may be due to late marriage and late childbirth.

<sup>iii</sup>See, for example, White Paper on the Labour Economy (2009); Fumio Otake, "Income Differentials in the 1990s," *The Journal of Labour Studies*, No.480, July 2000, pp. 2-11.

<sup>iv</sup>The source for data is a report from INTELLIGENCE. LTD. We use the aggregate number of earning and non-earning spouse.

<sup>v</sup>See other studies that use the same empirical technique, including Bruce Fallick and Jonathan Pingle, "A Cohort-Based Model of Labor Force Participation," *Finance and Economic Discussion Series*, 2007-2009; Almut Balleer, Ramon Gomez-Salvador and Jarkko Tuurnen, "Labor Force Participation in the Euro Area: A Cohort Based Analysis," *ECB Working Paper Series*, No.1049.

<sup>vi</sup>We assume that cohort effects after birth year of 1985 are the same as those of 1980-1984. To estimate future age effects, we use "population projection in Japan (based on medium estimates)," National Institute of Population and Social Security Research.

<sup>vii</sup>The baby boomers in Japan are the people who were born between 1947 and 1949. They reach retirement age around 2010. The retirement of baby boomer generation put additional downward pressure on labor supply.

<sup>viii</sup>The relationship between labor supply and potential growth can be found in Fueki, T. , I. Fukunaga, H. Ichiue, T. Sekine, and T. Shirota, "Measuring Potential Growth in Japan: Some Practical Caveats," *Bank of Japan Review Series*, 10-E-1, 2010. and Hara, N., N. Hirakata, Y. Inomata, S. Ito, T. Kawamoto, T. Kurozumi, M. Minegishi and I. Takagawa, "The New Estimates of Output Gap and Potential Growth Rate," *Bank of Japan Review Series*, 06-E-3, 2006.

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