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### “Secular Stagnation and the Labor Market in Japan”

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September 1, 2017



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### **Service Sector Productivity in Japan**

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# **Secular Stagnation and the Labor Market in Japan**

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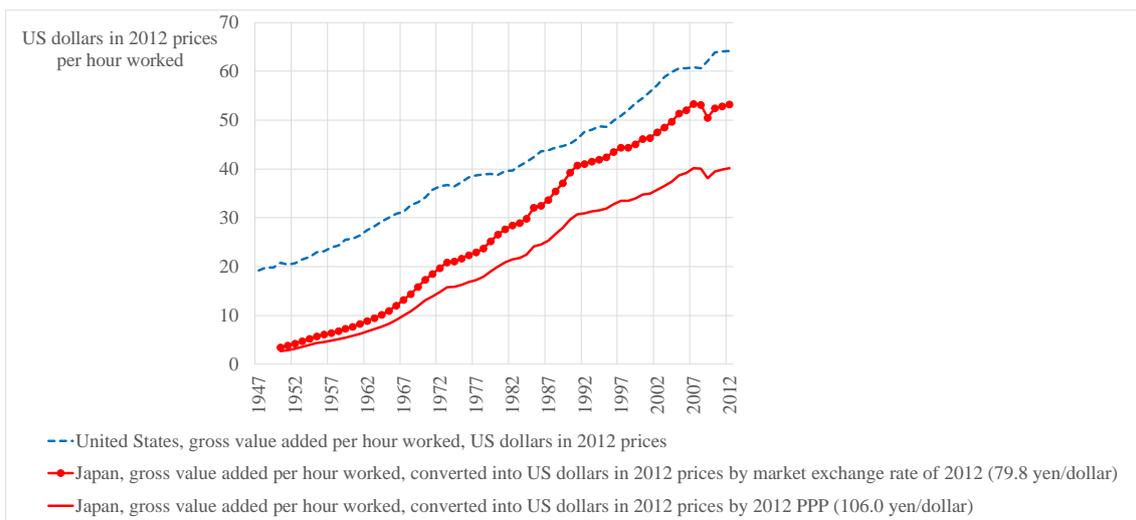
This work was supported by JSPS KAKENHI Grant Number 16H06322 “Service Sector Productivity in Japan: Determinants and Policies (SSPJ)”.

## 1. Introduction

Japan has been suffering from secular stagnation since the burst of the bubble economy in 1989-90. As shown in Figure 1, Japan's catching up with the United States in terms of labor productivity came to an end around 1990. In fact, labor productivity (measured in PPP) in Japan today is much lower than in other major OECD countries except South Korea. The aim of this paper is to examine the structural causes of Japan's secular stagnation, focusing in particular on labor market issues. The reason for focusing on this issue is as follows.

There are a considerable number of studies attempting to identify the causes of Japan's secular stagnation. Most scholars seem to agree that there are two major structural causes underlying the stagnation: insufficient final demand (excess saving problem) and slow total factor productivity (TFP) growth.<sup>1</sup> These two causes are related to each other. Under slow TFP growth, fixed capital formation becomes sluggish, and this reduces final demand. On the other hand, under excess supply, firms are reluctant to invest in intangibles, and this reduces TFP growth.

**Figure 1. Labor Productivity in Japan and the United States**



Source: OECD.Stat.

<sup>1</sup> For a more general discussion of these structural causes, see Fukao (2013) and Fukao et al. (2016b).

**Figure 2. Labor Productivity in Major OECD Countries, 2014**

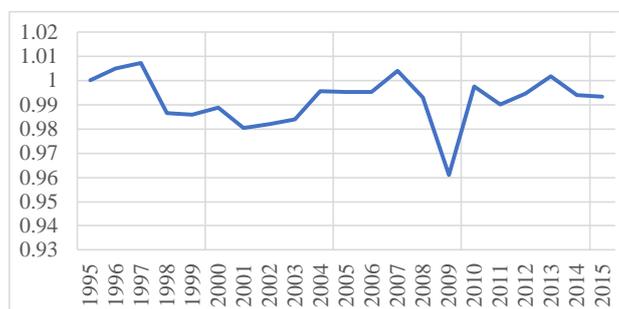


Source: OECD.Stat.

Based on this diagnosis, the Japanese government in early 2013 embarked on so-called “Abenomics,” which consists of three arrows: aggressive monetary easing, fiscal stimulus, and a growth strategy (structural reforms) to tackle the twin problems of insufficient demand problem and slow TFP growth simultaneously. The first two arrows seem to have worked to some extent in resolving the problem of insufficient demand. Partly also due to the recovery of major economies abroad such as the United States and China, the GDP gap gradually shrank, with the Cabinet Office estimating that by the fourth quarter of 2016 it had declined to minus 0.4%. Japan’s labor market has also been tightening, with the effective job openings-to-applicants ratio reaching 1.45 in March 2017, the highest value since November 1990.

Major structural reform policies of the third arrow are (1) the stimulation of private investment in targeted sectors such as medical services, activities related to renewable energy, and agriculture; (2) the promotion of female labor participation; (3) pushing for the Trans Pacific Partnership (TPP); and (4) deregulation in the targeted sectors and sectors related with the TPP. However, probably because it takes time for structural reforms to have positive effects, Japan’s TFP (macro economy) has hardly changed since 2013, as shown in Figure 3, and private investment has not accelerated.

**Figure 3. TFP Level of Japan's Macro Economy, 1995=1**



Source: The data are taken from Conference Board, Total Economy Database: Growth Accounting and Total Factor Productivity, 1995-2015 (adjusted version).

Probably in response to the disappointing results of the structural reform policies, the Japanese government in October 2015 introduced Abenomics 2.0, labeled “All 100 Million Playing an Active Role (Ichi-Oku Sou-Katsuyaku),” which consists of four pillars: (1) a strong economy (continuation of active monetary and fiscal stimulus); (2) support for child-rearing; (3) improvement of the social security system; and (4) the introduction of an “equal work, equal pay” rule. The government also introduced life-work balance policies in an attempt to reduce overtime work. These reforms focus more on labor market and social policy issues than the first round of reforms. It seems that this change partly reflects the new strategy of the ruling parties, the Liberal Democratic Party and Komeito, to incorporate traditional policies of the opposition party, the Democratic Party. At the same time, it also reflects the widespread view in Japan that labor market issues are the key for Japan’s revitalization.

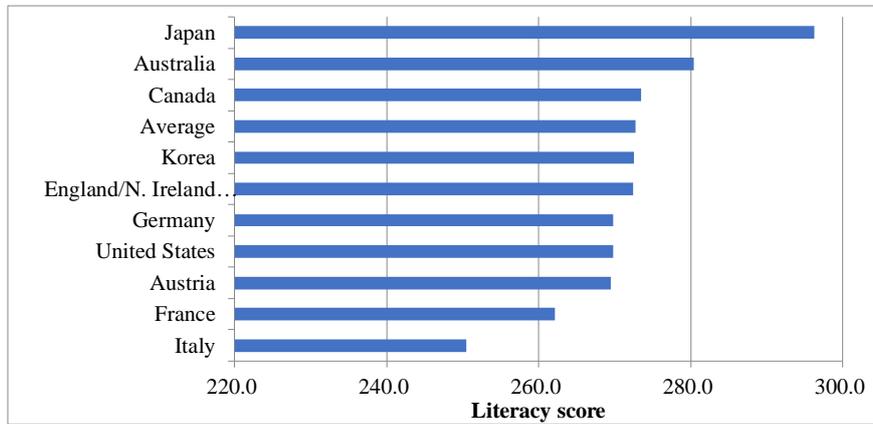
A good example of Japan’s labor market problems is provided by the recent results of the OECD’s Survey of Adult Skills (PIAAC). Japan ranks at the top among OECD countries in terms of adults’ proficiency in key information-processing skills such as literacy, numeracy, and problem solving in technology-rich environments (Figures 4 and 5 show results on literacy). Japan’s problem is that many female workers scarcely use their proficiency at work. The Japanese economy does not fully utilize its labor, especially female workers (Figure 6).

Utilizing workers’ proficiency to a greater extent would raise Japan’s productivity and labor input in efficiency terms. Since one of main causes of Japan’s insufficient demand problem is the stagnation of capital formation, which is partly caused by the shrinking working age population and low TFP growth, labor market reforms will also contribute to relieving Japan’s two structural problems.

This paper analyzes two key issues in Japan’s labor market: the non-regular employment problem and the productivity and wage gaps between large and small firms (dual labor market problem). The next section discusses the non-regular employment problem, while Section 3

considers the productivity and wage gaps. Section 4 summarizes the main findings of the paper and derives some policy implications.

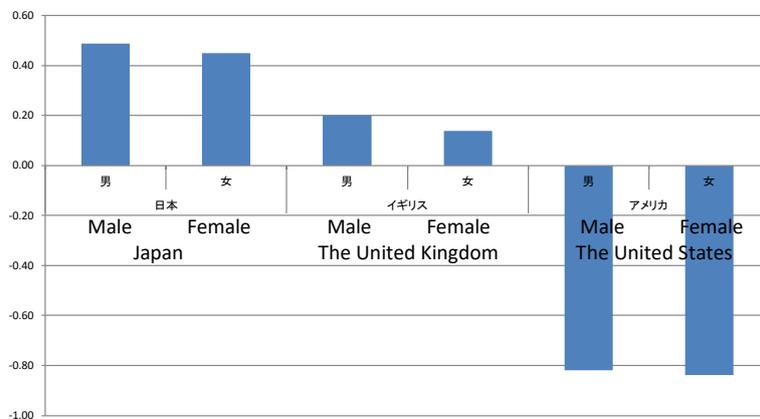
**Figure 4. Literacy Proficiency among 16-65 Year-Olds: Major OECD Countries, 2011-12**



Source: OECD (2016), *Skills Matter - Further Results from the Survey of Adult Skills (PIAAC)*.

**Figure 5. Literacy Proficiency by Country and by Sex, 2011-12**

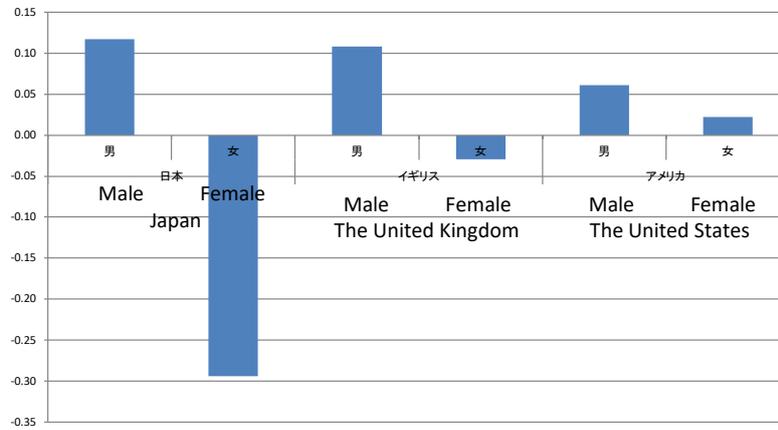
Deviation from average, divided by the standard deviation



Source: PPT prepared by Daiji Kawaguchi, University of Tokyo. Based on microdata of the PIAAC.

**Figure 6. Use of Literacy Proficiencies at Work by Country and Sex, 2011-12**

Deviation from average, divided by the standard deviation



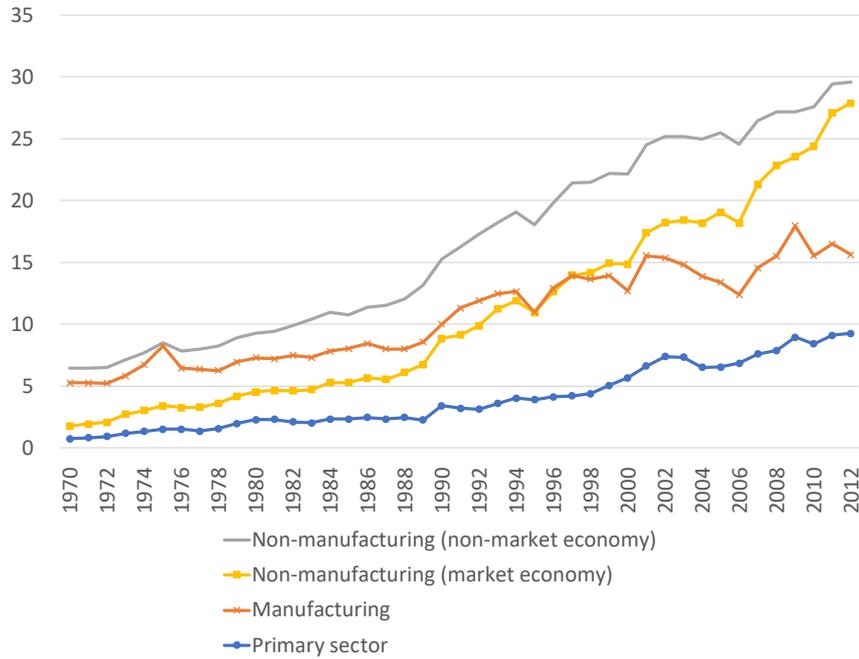
Source: PPT prepared by Daiji Kawaguchi, University of Tokyo. Based on microdata of the PIAAC.

## 2. Japan's Non-Regular Employment Problem

In Japan, the percentage of non-regular employees in total workers has increased substantially since the end of 1980s.<sup>2</sup> As shown in Figure 7, especially, in the non-manufacturing sector (both in the non-market economy and the market economy), the percentage of non-regular employees now stands at around 30%. There is a large wage gap between non-regular and regular employees (Figure 8). In the case of regular workers, wages increase as workers get older and accumulate experience in the workplace.

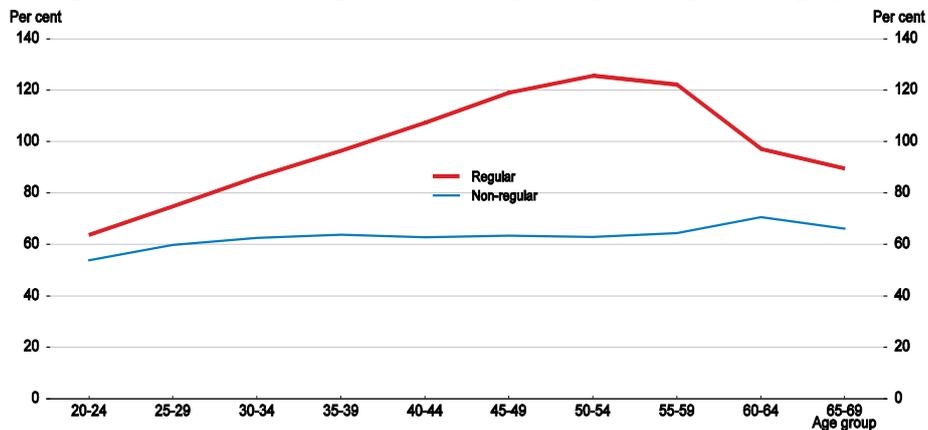
<sup>2</sup> In Japan, a regular employee “[...] is generally considered as an employee who is hired directly by his/her employer without a predetermined period of employment, and works for scheduled hours. [...] Consequently, a ‘Non-regular Employee’ is an employee who does not meet one of the conditions for regular employment.” (Asao 2011).

**Figure 7. Percentage of Non-Regular Employees in Total Workers by Sector**



Source: Hitotsubashi University and RIETI, JIP Database 2015.

**Figure 8. Wage Level as a Percentage of the Average Wage of Regular Employees, June 2015**



Source: OECD (2017). The original data are taken from Ministry of Health, Labour, and Welfare, *Basic Survey on Wage Structure 2015*. Overtime payments and bonuses are not included.

Labor economists have argued that there are two factors behind this upward slope of the age-wage profile. First, as workers accumulate human capital, their marginal contribution to production increases and this raises their wages. Second, to enhance workers' loyalty and incentivize

them, firms defer compensation for workers until they get older. Probably because Japanese firms provide active on-the-job training and some off-the-job training for regular employees (Fukao et al. 2009) but not much for non-regular employees, the age-wage profile of regular employees in Japanese is steeper than that in other developed countries (Fukao et al. 2006).

If the upward sloping of the age-wage profile is mainly caused by an increase in the marginal productivity of regular employees through the accumulation of human capital, the wage gap between regular and non-regular workers in Figure 8 can be regarded as representing the difference in labor quality between the two, meaning that the recent increase in non-regular workers has important implications. Using the Japan Industrial Productivity (JIP) Database,<sup>3</sup> we can estimate the impact of the increase in non-regular employees on Japan's labor quality through counterfactual simulation. If the percentage of non-regular employees in total workers had not increased from 1988, the average quality of Japanese labor would have been higher 8% than it is now.<sup>4</sup>

To examine the relationship between the wage profile and the marginal productivity of employees, Fukao et al. (2006) estimated both the marginal productivity of part-time employees compared to that of regular employees and the wage rate of part-time employees compared to that of regular employees, using employer-employee matched data at the factory level. They found that the productivity gap between part-time employees and regular employees is larger than the wage gap. This means that firms pay a premium to part-time workers in order to obtain flexibility of employment. They also found that although there is some deferred compensation, the major part of regular employees' wage increase with age reflects increases in their marginal productivity with age.<sup>5</sup>

It seems that firms are increasing the number of part-time workers in order to maintain the flexibility of employment levels. Given the decline of the working age population and economic stagnation, most firms cannot expect their need for employees to steadily increase, as was the case during the high-speed growth era. At the same time, areas in which individual firms have a competitive advantage over their rivals are changing quickly and Japan's comparative advantage as a whole is also changing over time.<sup>6</sup>

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<sup>3</sup> Information on the JIP Database is available on the website of the Research Institute of Economy, Trade and Industry (RIETI):

<http://www.rieti.go.jp/en/database/jip.html>

<sup>4</sup> If we suppose that Japan is on the kind of balanced growth path assumed in standard neoclassical growth models, an 8% improvement in labor quality will raise Japan's real GDP by 8%. Since the labor income share in Japan is about two thirds, 5.3 percentage points of the increase in GDP will be due to the increase in (quality adjusted) labor input, and 2.7 percentage points will be due to the increase in capital input induced by the labor input increase.

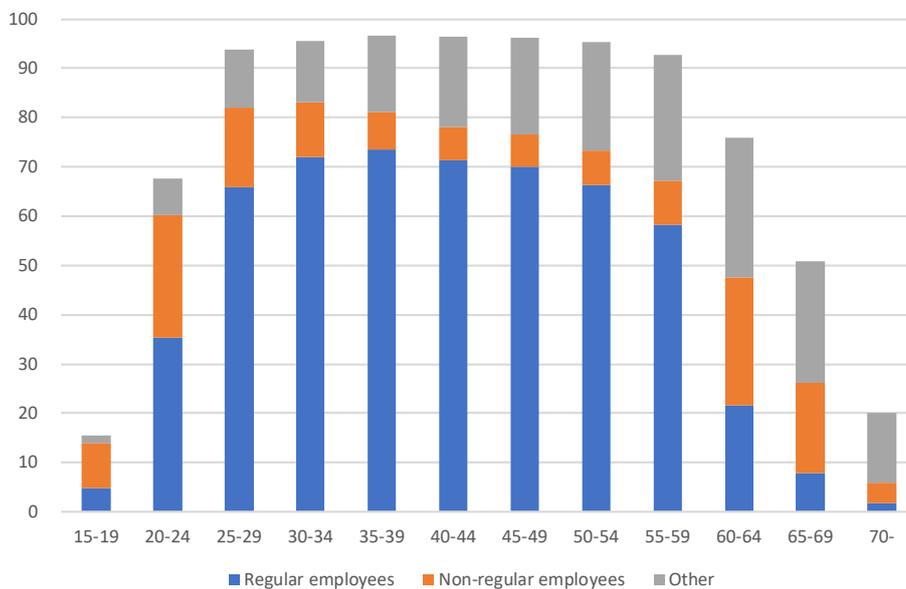
<sup>5</sup> It is important to note that the Japanese employment system for regular workers is also changing. Using microdata from the *Basic Survey on Wage Structure*, Hamaaki et al. (2012) found that the age-wage profile has become flatter in recent years.

<sup>6</sup> Matsuura, Sato, and Wakasugi (2011) constructed a theoretical model in which trade liberalization encourages firms to reduce the number of products, which raises uncertainly about the demand firms face.

Given the high job security provided under traditional employment practices, increasing the reliance on part-time workers is almost the only way for firms to keep both the level and the mix of employment flexible. Such behavior by firms is quite rational in the context of slow economic growth and Japan’s system of high job security. However, at the same time it may also be creating a huge economic loss by reducing human capital accumulation.

One could argue that the increase in non-regular employment is caused by the expansion of industries in which part-time work is widespread, such as care for the elderly or eating and drinking places, as well as by the increase in female labor participation. However, according to Asano, Ito, and Kawaguchi (2013), only one quarter of the increase in non-regular workers can be explained by changes in the industry distribution and composition of the labor force. Instead, the increase is largely due to the widespread prevalence of non-regular employment among new labor market entrants, male workers of younger cohorts and female workers of all cohorts, suggesting that the major cause for the increase of non-regular employment is the declining importance of long-term employment relationships. As shown in Figure 9(a), the percentage of non-regular employees is particularly high among young male workers, even among university graduates (Hamaaki et al. 2012). Moreover, most female workers are non-regular employees (Figure 9(b)), as are most older male workers.

**Figure 9(a). Labor Force Participation Rate by Age and Employment Status: Men (% , 2013)**

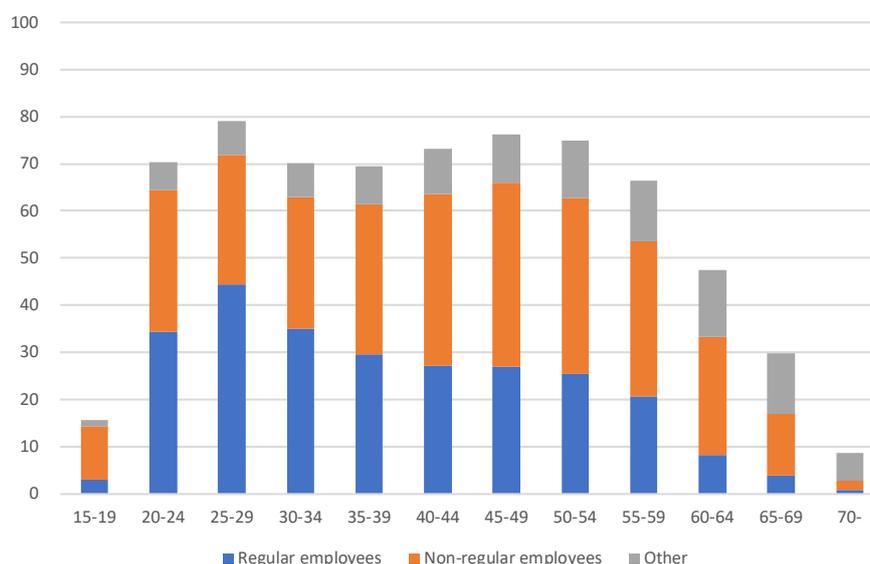


Source: *Labour Force Survey*.

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This change will increase firms’ demand for temporary workers. They empirically test their model using microdata for Japanese manufacturing plants and find moderate support for the model’s predictions.

**Figure 9(b). Labor Force Participation Rate by Age and Employment Status: Women (% , 2013)**



Source: *Labour Force Survey*.

It appears that in an environment of slow economic growth and increasing international competition, firms are reluctant to employ most of their workers as regular employees under Japan’s traditional life-time employment system. On the other hand, workers accumulate less human capital when they are non-regular workers (as most non-regular workers are part-time workers).

To resolve the non-regular employment problem, simply prohibiting non-regular employment would not be the appropriate policy response. This would cause a substantial misallocation of workers among firms.<sup>7</sup> On the other hand, reducing the job security of regular workers and improving the social security net would also not be an appropriate policy response, since there is a risk that this might substantially slow down skill accumulation among workers, given that training of workers in Japan greatly depends on the life-time employment system. Instead, Japan needs to reform the labor market, focusing on the following two aspects simultaneously. First, Japan needs to enhance labor market flexibility. Second, Japan needs to enhance human capital accumulation among workers who do not participate in the life-time employment system.

One option to achieve such reforms would be to implement policies to increase “limited regular employment,” where workers are employed based on job-specific labor contracts without lifetime employment guarantees but receive high compensation for their professional skills (Tsuru 2017). A job card system, which would allow workers to prove their skills and work experience, would also enhance the efficient reallocation of workers and the accumulation of human capital. Yet another

<sup>7</sup> On this issue, see Fukao and Kwon (2006).

avenue would be to replace the system of internal training of regular employees through training and education outside of firms, which would require reforms of Japan's professional education system at universities and vocational schools. Finally, other important measures needed are regulations to reduce the unfair payment gap between regular and non-regular employees.

According to the *General Survey on Diversified Types of Employment 2014* by the Ministry of Health, Labour and Welfare (MHLW), 22.8% of male non-regular workers, when asked why they worked as non-regular employees (respondents could choose up to three from fifteen possible answers), answered that they could not find regular employment, while 5.6% replied that they worked as non-regular employees in order to balance work with their family circumstances such as housework, child care, and nursing. In the case of female non-regular workers, 15.6% of respondents answered that they could not find regular employment, while 35.9% replied that they worked as non-regular employees in order to have a job compatible with their family circumstances. Judging from these findings, it seems that, to reduce non-regular employment among women, it is also important to make regular employment compatible with workers' family circumstances.

Life-work balance is also important to resolve the problem of Japan's low fertility rate. Among the female population, the average age of first marriage has increased especially in the case of educated full-time female workers. Such women appear to be too busy to get married and take care of their families (Sakamoto and Kitamura 2008, Brinton 2015).

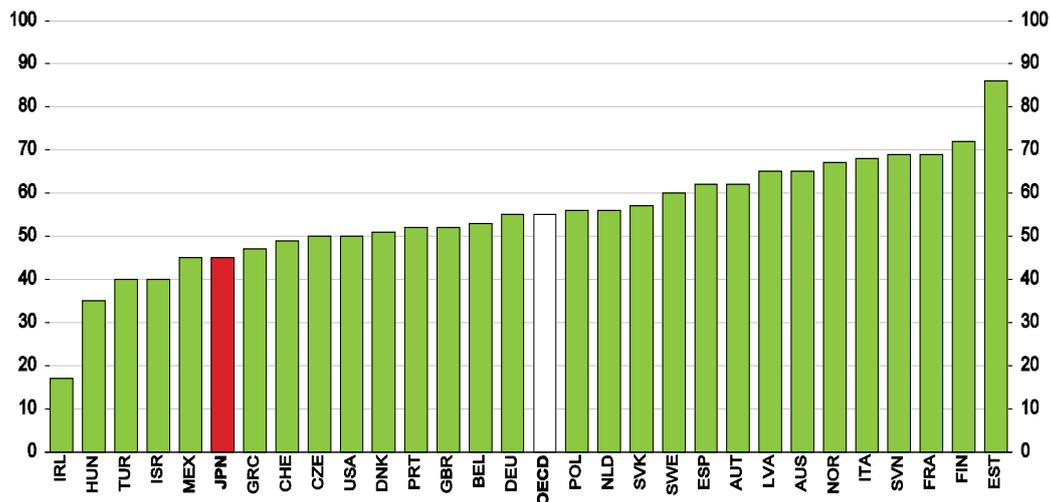
It is also important to note that the rigidity of Japan's labor market is related to Japan's low inflation rate problem. Reflecting the increasingly tight labor market, wages of non-regular workers have started to rise considerably (at an annual rate of about 2%). However, regular workers have seen very limited wage increases (Bank of Japan 2017, Chart 28). This is likely due to the following facts. First, labor unions, which are composed of regular workers, tend to give more priority to job security than to wage increases. Second, because of deferred compensation, workers do not change their job even when their wages are temporarily lower than at other firms. Third, since labor unions oppose wage cuts and it is difficult for firms to fire regular workers, wage setting for regular workers is like a long-term leasing contract for durable machines with a fixed fee. Firms' decision making with respect to the wage rates of regular workers crucially depends on their expectations regarding future inflation. And since inflation expectations are still low in Japan, firms are reluctant to raise the wage rates of regular workers.

### **3. Productivity and Wage Gaps between Large and Small Firms**

Japan's market economy has been characterized by large differences in labor productivity and wage rates between large firms and SMEs since the interwar period (the so-called "dual economy," Nakamura 1983). Oi and Idson (1999) found that firm-size wage differences in Japan are greater

than in the United States. As shown in Figure 10, labor productivity differences between small and large firms in Japan are also larger than in most other OECD countries.

**Figure 10. Labor Productivity Differences: Firms with 20-49 Workers/Firms with more than 250 Workers**



Note: Value added per person employed in 2013 in firms with 20-49 workers, relative to that in firms with more than 250 workers = 100.

Source: OECD, *Entrepreneurship at a Glance 2016*.

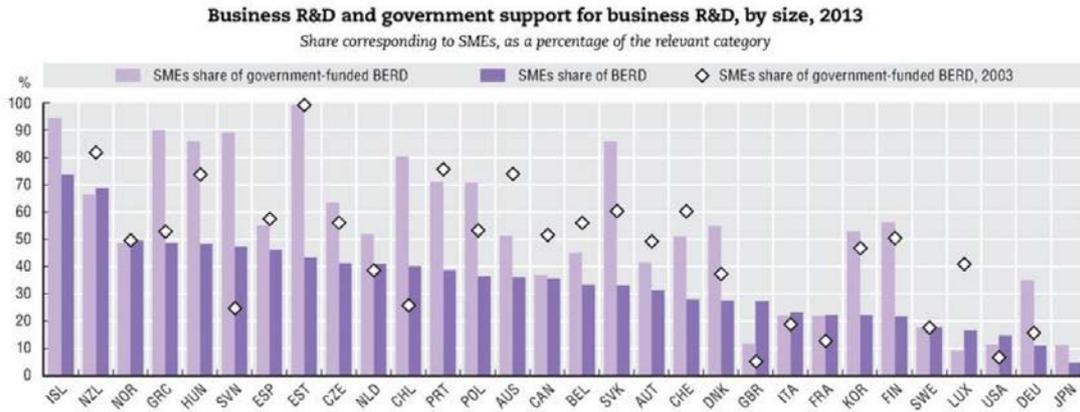
These differences have widened since the 1990s, especially in the manufacturing sector (Fukao 2013).<sup>8</sup> In the manufacturing sector, the TFP growth of large firms has actually accelerated. Small and medium-sized firms (SMEs) have been left behind in their productivity improvement (Fukao and Kwon 2006). One possible explanation of this phenomenon is that SMEs have been left behind in the ICT revolution and internationalization (Fukao et al. 2016a, Ito, Deseatnicov and Fukao 2016).

Another potential explanation of the slowdown of SMEs' TFP growth is the decline in technology spillovers from large firms (Belderbos et al. 2013). In the manufacturing sector, large assemblers, which produce final goods, have been conducting intensive research and development (R&D) for the development of new products. Meanwhile, SMEs have tended to supply parts and components to these assemblers. Supplier relationships between large assemblers and SMEs are usually stable and tight, and it is likely that SMEs benefited from spillovers from large assemblers. Moreover, probably because of this, the R&D intensity of SMEs is much lower than that of larger firms in Japan. In fact, this gap is much larger in Japan than in other OECD countries (Figure 11).

<sup>8</sup> Andrews, Criscuolo, and Gal (2015) report that TFP differences between frontier firms, which tend to be large and internationalized, and non-frontier firms have widening in many OECD countries since the 2000s. However, since their data do not cover the 1990s, we cannot judge whether such widening in TFP differences started in the 1990s like Japan or not.

However, since the 1990s Japan's leading export industries, such as the electronic and automotive industries, have increasingly relocated production abroad. Further, likely partly linked to this as well as other factors such as restructuring at large assemblers, buyer-supplier relationships in these industries in Japan have become more open (Paprzycki 2004, Ikeuchi et al. 2015).

**Figure 11. Business R&D and Government Support for Business R&D, by Firm Size, 2013**



Source: OECD, Research and Development Statistics Database, [www.oecd.org/sti/rds](http://www.oecd.org/sti/rds), June 2015. See chapter notes.

StatLink <http://dx.doi.org/10.1787/888933274115>

Source: OECD, *OECD STI Scoreboard 2015*.

Despite the importance of this problem of the widening productivity gap between large firms and smaller firms, analysis of the “dual economy” in the non-manufacturing sector has been limited. Another shortcoming of preceding studies is that differences in labor input, such as workers’ education level, sex, age, and employment status, between different firm-size groups have not been well studied. Against this background Fukao et al. (2014) examined these issues by splitting KLEMS-type data of the market economy by firm size and by industry. The remainder of this section provides a summary of the results and discusses the policy implications.

The following is a brief overview of the data used. For control totals, Fukao et al. (2014) used the JIP Database (KLEMS data on Japan). It is implicitly assumed that prices of outputs and intermediate inputs do not differ across different firm-size groups. To split data by firm size, the *Corporate Enterprise Annual Statistics*, Ministry of Finance, they employed. These statistics provide data on value added, capital stock, number of workers, and total labor cost by firm size within each industry (the financial industry is not covered). Statistics by firm-size are available only in terms of paid-in capital. Using the microdata underlying these statistics, Fukao et al. (2014) created a matrix of the distribution of workers for each industry by amount of paid-in capital and by number of workers. Using these matrixes, they converted statistics by amount of paid-in capital into statistics by number of workers. Data on labor input and wage rates by firm size and by industry are obtained from the *Basic Survey on Wage Structure*, MHLW. *The Basic Survey* provides information on wage

rates by age, sex, education, and employment status and working hours by firm size within each industry. One caveat regarding these statistics is that they do not cover firms with less than 10 employees.

For each year and each industry, Fukao et al. (2014) decompose labor productivity differences between firm-size group  $s$  and  $s'$  using the following equation:

$$\ln\left(\frac{V_s}{H_s}\right) - \ln\left(\frac{V_{s'}}{H_{s'}}\right) = \ln(q_s) - \ln(q_{s'}) + \frac{1}{2}(\nu_s + \nu_{s'}) \left( \ln\left(\frac{K_s}{q_s H_s}\right) - \ln\left(\frac{K_{s'}}{q_{s'} H_{s'}}\right) \right) + \ln(RTFP_{s,s'})$$

where

$V_s$ : Nominal value added of firm-size group  $s$ ,

$H_s$ : Total hours worked in firm-size group  $s$ ,

$q_s$ : Labor quality of firm-size group  $s$ ,

$\nu_s$ : Cost share of capital in firm-size group  $s$ ,

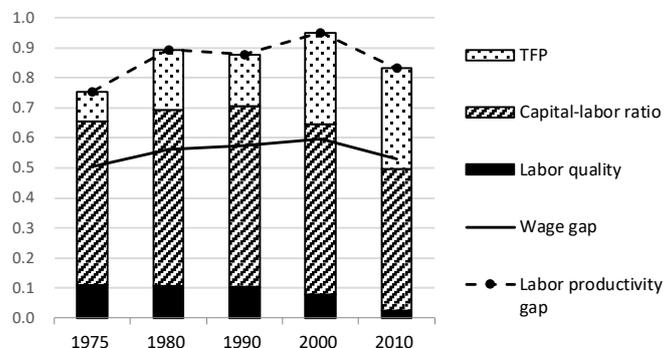
$K_s$ : Capital service input of firm-size group  $s$ ,

$RTFP_{s,s'}$ : Relative TFP level of firm-size group  $s$  in comparison with that of firm-size group  $s'$ .

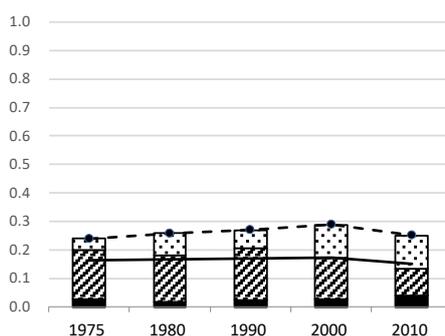
For the calculation of Jorgenson-Griliches-type labor quality indices,  $q_s$ , the study uses the industry average wage premium of each category of workers. Therefore, the study assumes that there are no difference in labor quality among the same type of worker across different firm-size groups – for instance, male university-educated full-time workers aged 30-34 years in large automobile firms and their counterparts in small automobile firms.

The results of their analyses for the total market economy are summarized in Figure 12, which shows that there are huge wage and labor productivity differences between large and small firms. Labor productivity differences are mainly caused by differences in capital-labor ratios. However, TFP differences also play an important role. The contribution of labor quality differences is declining.

**Figure 12(a). Wage and Productivity Differences (Logarithmic Values): Firms with More than 999 Employees/Firms with up to 99 Employees, Total Market Economy**



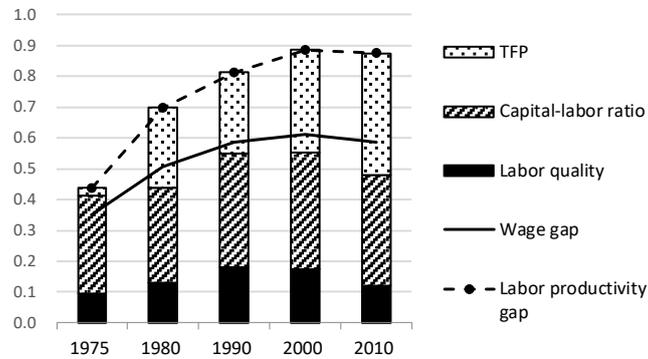
**Figure 12(b). Wage and Productivity Differences (Logarithmic Values): Firms with 100 to 999 Employees/ Firms with up to 99 Employees, The Total Market Economy**



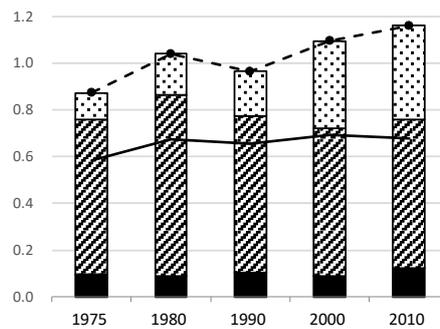
Next, let us turn to Fukao et al.'s (2014) results for each industry. As shown in Figure 12(b), wage and productivity differences between medium-sized firms (with 100-999 employees) and small firms (with less than 100 employees) are not so large. Therefore, the figures below show the results for wage and productivity differences between large firms (with more than 999 employees) and small firms (with less than 100 employees).

Figure 13 shows the results for the manufacturing sector. In the manufacturing sector, both labor productivity and wage differences have increased. Widening TFP differences made a substantial contribution to the increase in labor productivity differences.

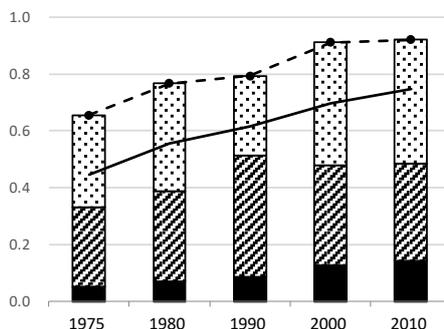
**Figure 13(a). Wage and Productivity Differences (Logarithmic Values): Firms with More than 999 Employees/Firms with up to 99 Employees, Light Industry**



**Figure 13(b). Wage and Productivity Differences (Logarithmic Values): Firms with More than 999 Employees/Firms with up to 99 Employees, Heavy Chemical Industry**

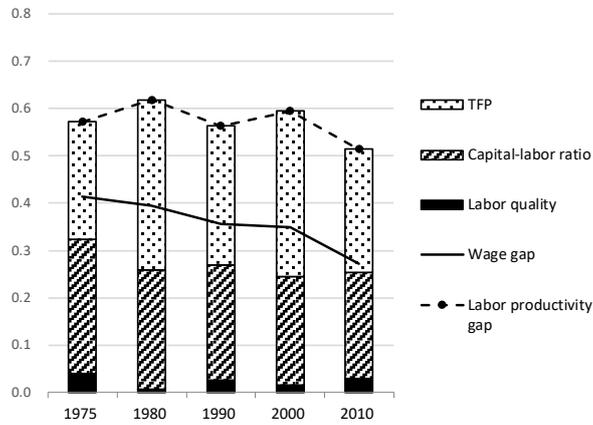


**Figure 13(c). Wage and Productivity Differences (Logarithmic Values): Firms with More than 999 Employees/Firms with up to 99 Employees, Machinery**

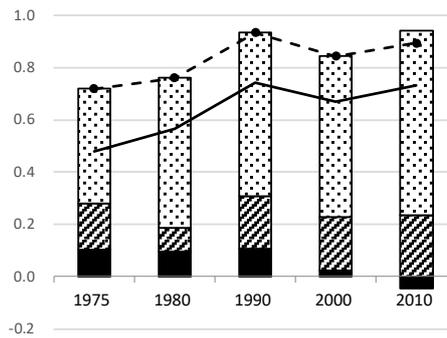


The results for the non-manufacturing sector are shown in Figure 14. In wholesale and retail, both TFP and wage differences are declining. On the other hand, in construction as well as transportation, communication, utilities and real estate, TFP differences are increasing.

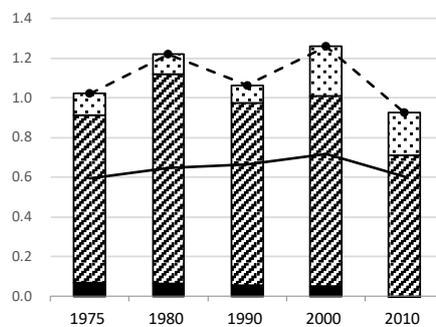
**Figure 14(a). Wage and Productivity Differences (Logarithmic Values): Firms with More than 999 Employees/Firms with up to 99 Employees, Wholesale and Retail**



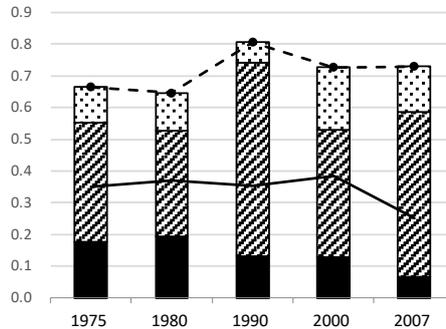
**Figure 14(b). Wage and Productivity Differences (Logarithmic Values): Firms with More than 999 Employees/Firms with up to 99 Employees, Construction**



**Figure 14(c). Wage and Productivity Differences (Logarithmic Values): Firms with More than 999 Employees/Firms with up to 99 Employees, Transportation, Communication, Utilities, and Real Estate**



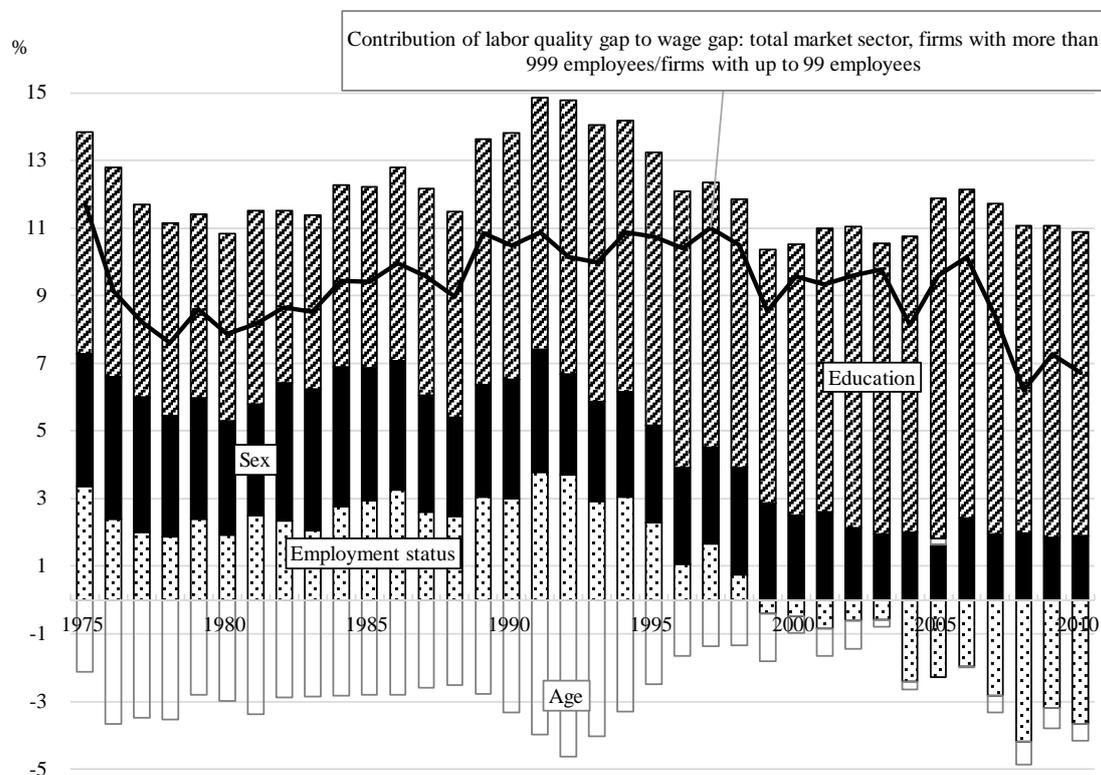
**Figure 14(d). Wage and Productivity Differences (Logarithmic Values): Firms with More than 999 Employees/Firms with up to 99 Employees, Other Services**



One of the most interesting findings of the above analysis is that wage differences are quite large, while differences in labor quality based on the Jorgenson-Griliches approach are not that large. Figure 15 shows the results of decomposing the labor quality gap in the total market sector between firms with more than 1,000 employees and firms with less than 100 employees in terms of the contribution of various worker characteristics. Labor quality of large firms based on the Jorgenson-Griliches approach is higher than that of small firms mainly because of differences in education. The labor quality gap has declined over time and was 7% in 2010. The decline was mainly caused by the increase of non-regular employees in large firms (in Figure 15, this factor is included in “employment status”).

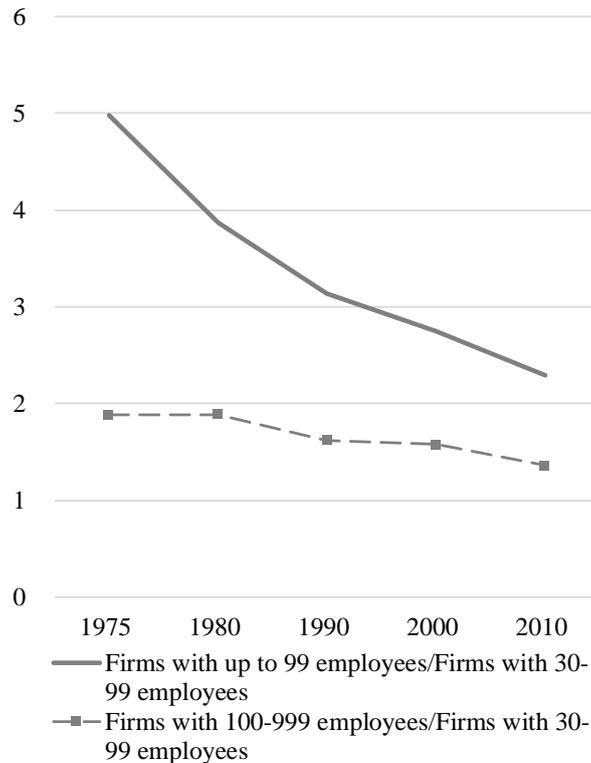
It is important to note that although the wage gap between the two firm groups is more than 50% (Figure 12(a)), measured labor quality explains only 7 percentage points of this gap in 2010. Rebick (1993) reports that in the United States, about one third of firm-size wage differences are explained by labor characteristics, such as education, experience, etc., while in Japan it is only one tenth. Our result for Japan is roughly consistent with his Rebick’s finding.

**Figure 15. Decomposition of the Labor Quality Gap: Total Market Sector, Firms with more than 999 Employees/Firms with up to 99 Employees**



What causes the firm-size wage differences that cannot be explained by worker characteristics? One possible explanation is that since labor mobility across firms is limited in Japan, workers of large firms enjoy rents as a result of belonging to larger, more productive firms. However, since most large firms remain large and do not go bankrupt, it is difficult to understand why employees at large firms can continue to enjoy windfalls in the form of high wages. Two other explanations seem more plausible. The first is differences in on-the-job and off-the-job training. As shown in Figure 16, large firms in Japan tend to provide much more job training to workers than SMEs. Using microdata on labor turnover and resulting wage changes, Genda (1996) finds that firm-size differences in job training contribute much more to firm-size wage differences than unmeasured ability differences. The second explanation is that, in Japan, graduates of top-ranked universities are much more likely to get a job at a large firm than other graduates (Higuchi 1994). This suggests that there might be a large gap in innate ability across workers in different firm-size groups that is difficult to measure using the Jorgenson-Griliches approach.

**Figure 16. Off-the-Job Training Expenses (including Opportunity Costs) by Firm Size:  
Total Market Sector**



Source: Fukao et al. (2014).

Firm-size wage differences that are not explained by the standard Jorgenson-Griliches approach account for about 45 percentage points (the 52% in Figure 12(a) minus the 7% in Figure 15). If we assume that all of this gap is due to labor quality differences, the TFP of firms with more than 999 employees relative to firms with less than 100 employees, when measured without taking such difficult-to-measure labor quality differences into account, will be overestimated by this difference of 45 percentage points times the labor income share, which is around two-thirds in Japan. This means that we could explain 30 percentage points of firm-size TFP differences by such difficult-to-measure labor quality differences, which is very close to the total TFP gap of 32% in Figure 12(a). As shown in Table 1, small firms are much more prevalent in Japan than in the United States. Firms with less than 1,000 employees account for 72% of all employment. In the case of the United States, such firms account for only 55%. This indicates that the low productivity and low wage rates of SMEs are a particularly pressing issue in the case of Japan.

**Table 1. Number of Employees by Firm-Size Group: Japan-U.S. Comparison, All Industries**

Firm size (No. of employees)	Japan				United States			
	2001		2006		2001		2006	
(a) 1 to 4	1,486,150	4%	1,574,110	5%	5,866,666	5%	6,262,490	5%
(b) 5 to 9	2,176,265	7%	1,993,335	6%	6,844,090	6%	7,274,534	6%
(c) 10 to 19	2,954,728	9%	2,736,690	9%	8,369,988	7%	8,794,210	7%
(d) 20 to 49	4,442,234	13%	4,188,269	13%	11,767,978	10%	12,260,057	10%
(e) 50 to 99	3,300,383	10%	3,166,835	10%	8,442,216	7%	8,868,873	7%
(f) 100 to 249	4,177,981	13%	4,144,598	13%	9,813,665	9%	10,497,066	9%
(g) 250 to 499	2,832,588	9%	2,794,966	9%	6,258,633	5%	6,762,233	6%
(h) 500 to 999	2,528,727	8%	2,573,958	8%	5,866,407	5%	6,063,319	5%
(i) 1000+	9,274,478	28%	8,935,484	28%	51,128,895	45%	52,125,133	44%
Total	33,173,534	100%	32,108,245	100%	114,358,538	100%	118,907,915	100%

Source: Fukao et al. (2016a). The original data are obtained from the *Establishment and Enterprise Census* for Japan and the *Business Dynamics Statistics* for the United States.

If we assume that all of the firm-size wage differences not explained by the standard Jorgenson-Griliches approach are caused by difficult-to-measure labor quality differences, almost all of the firm-size TFP differences can be explained by this factor. Therefore, in order to understand firm-size TFP differences and the slowdown in Japan's TFP growth, it is important to examine such firm-size labor quality differences in more detail.

#### 4. Conclusions

This paper examines two key issues in Japan's labor market: the non-regular employment problem and the productivity and wage gaps between large and small firms (dual labor market problem).

In Japan, the percentage of non-regular employees in total workers has increased substantially since the end of 1980s. It appears that in an environment of slow economic growth and increasing international competition, firms are reluctant to employ most of their workers as regular employees under Japan's traditional life-time employment system. On the other hand, workers accumulate less human capital when they are non-regular workers (as most non-regular workers are part-time workers). In order to resolve the non-regular employment problem, Japan needs to enhance labor market flexibility. In addition, Japan also needs to enhance human capital accumulation among workers who do not participate in the life-time employment system.

Japan's market economy has been characterized by large differences in labor productivity and wage rates between large firms and SMEs since the interwar period (the so-called "dual economy," Nakamura 1983). These differences have widened since the 1990s, especially in the manufacturing sector (Fukao 2013). Using level accounting, this paper examined what factors cause these differences. The analysis showed that there are large TFP differences between large firms and SMEs.

Moreover, there are also large wage differences which cannot be explained by the standard Jorgenson-Griliches approach. One plausible explanation of these phenomena is that both the TFP differences and wage differences are caused by difficult-to-measure labor quality differences. If this hypothesis is correct, this would imply that there might be large room to improve Japan's macro-level TFP by improving the quality of workers in SMEs through education and training.

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