



RIETI Discussion Paper Series 15-E-102

Female Labor Force Participation in Asia: Lessons from the Nordics

KINOSHITA Yuko
RIETI

GUO Fang
Hubei University



Research Institute of Economy, Trade & Industry, IAA

The Research Institute of Economy, Trade and Industry
<http://www.rieti.go.jp/en/>

Female Labor Force Participation in Asia: Lessons from the Nordics¹

KINOSHITA Yuko
International Monetary Fund
Research Institute of Economy, Trade and Industry

GUO Fang
Hubei University

Abstract

Both Japan and Korea are trying to boost female labor force participation (FLFP) as they face the challenges of a rapidly aging population. Though FLFP has generally been on a rising trend, the female labor force in both countries is skewed towards non-regular employment despite women's high education levels. This paper empirically examines what helps Japan and Korea to increase FLFP by type (i.e., *regular* vs. *non-regular* employment), using the structural vector autoregression (SVAR) model. In so doing, we compare these two Asian countries with two Nordic countries: Norway and Finland. The main findings are: (i) child cash allowances tend to reduce the proportion of *regular* female employment in Japan and Korea, (ii) the persistent gender wage gap encourages more *non-regular* employment, (iii) a greater proportion of *regular* female employment is associated with higher fertility, and (iv) there is a need for more public spending on childcare for ages 6-11 in Japan and Korea to help women continue to work.

Keywords: Female labor force participation, Fertility, Labor market duality

JEL Classification Numbers: J08, J13, J16, J21, J71

RIETI Discussion Papers Series aims at widely disseminating research results in the form of professional papers, thereby stimulating lively discussion. The views expressed in the papers are solely those of the author(s), and neither represent those of the organization to which the author(s) belong(s) nor the Research Institute of Economy, Trade and Industry.

¹ This study is conducted as a part of research studies of Research Institute of Economy, Trade and Industry (RIETI). We would like to thank Odd Per Brekk, Rodrigo Cubero, Stephan Danninger, Giovanni Ganelli, Giang Ho, Sonali Jain-Chandra, Kalpana Kochar, Masayuki Morikawa, Monique Newiak, Jack Ree, Kazuo Yamaguchi, IMF Executive Directors's Office of the Nordic-Baltic Constituency and participants at RIETI and OECD-IMF seminars for valuable comments. The views expressed here are those of the authors and do not necessarily reflect those of the IMF or IMF policy.

1. INTRODUCTION

Greater female labor force participation (FLFP) can boost growth by increasing the labor supply. Increased contribution by women in the labor force has become one of the key policy issues particularly in developed economies that face a rapidly aging and shrinking population (IMF, 2013). FLFP has been rising in many OECD countries over the past decades, though the differences across countries remain large (Jaumotte, 2003).

Though it has been on the rising trend over time, FLFP in Japan and Korea remains lower than the OECD average. Interestingly, the fertility rate is also low in these two countries, reflecting the challenges they face of a rapidly aging population (Figure 1). It is not surprising that both governments are now considering tapping into the ample supply of underutilized female labor force as the economy grays. As much as differences in FLFP reflect cross-country and cross-household preferences of women's choosing to work (and have children), the public policies can play a role in reducing barriers to entry and eliminating discriminatory gaps so as to reduce the opportunity cost of working and childbearing for women.

This paper examines what would help increase FLFP in Japan and Korea in comparison with the Nordic countries. Given that FLFP is over-represented in the segment of low-paid and non-regular employment in Japan and Korea, the focus of our study is what would increase the proportion of regular employment in overall FLFP. In contrast to Japan and Korea, Nordic countries— the forerunners of gender equality— are known for not only a high female labor force participation rate but also a modest fertility rate. Women in Nordic countries are well-represented in regular employment as well. This makes the Nordic countries a model case for other countries such as Japan and Korea.

This paper will also pay special attention to the relationship between FLFP and the fertility rate in the analysis. Against the backdrop of a shrinking population, increased FLFP should not come with a cost of lower fertility. The Nordic experience shows that a country can have both working women and children under certain circumstances. We will also have a discussion on what helped reduce the negative impact of FLFP on fertility.

The main questions we ask in this paper are: (i) what are the main drivers for FLFP in Japan and Korea? For each country, do regular employment and non-regular employment respond asymmetrically to different shocks? (ii) what lessons can these countries learn from Nordic countries? We use the SVAR model for the empirical analysis. In so doing, we pay special attention to the form of employment (i.e., regular vs. non-regular work) in addition to (aggregate) FLFP.

The contributions of this paper to the literature are two-fold. First, many studies focus on aggregate FLFP rather than a composition of labor force by type. We think that the distinction between the quantity and quality of employment is particularly important for advanced Asian countries as total FLFP could mask the issue of underemployment of skilled female labor force (Fernández, 2013; Schwartz et al. 2013; Goldman Sachs 2014). Second, past studies mostly utilize cross-country data to study female labor market participation (Kogel, 2004; Steinberg and Nakane, 2012). To our knowledge, this is one of the first studies utilizing the SVAR model to analyze this issue. Women's decision of entering the labor force is influenced by various factors. The relevant variables are often correlated with one another and the direction of causality is unclear (e.g., having children may

influence the incidence of FLFP and FLFP in turn may influence a decision of a subsequent childbirth). The VAR analysis will enable us to assess each variable even in the presence of strong correlation.

The paper is organized as follows. In the next section, we give an overview of stylized facts and issues on female labor force in Japan and Korea. We present our empirical analyses in Section 3 and discuss policy implications in Section 4. Finally, Section 5 concludes the paper and suggests future research.

2. STYLIZED FACTS ON FEMALE LABOR FORCE

2.1 FEMALE LABOR FORCE: CROSS COUNTRY COMPARISON

Figure 1 shows the various indicators of gender equality and FLFP for 19 OECD countries. The female labor force participation rates (FLFP) in Japan and Korea are lower than the average of 19 OECD countries but not on the bottom. When we turn to the gap between women and men, the wage gap is the highest in Korea and Japan. In 2012, the average women's wage was 26 percent and 37 percent lower than men's wage in Japan and Korea, respectively. Similarly, female labor participation was about 25 percent and 30 percent lower than male labor participation rate in Japan and Korea, respectively. The gender gap in tertiary school enrolment in Japan and Korea is wider than in other countries. Turning to the fertility rate, Japan and Korea are among countries with low fertility rates. It is noted that relatively low FLFP does not translate to higher fertility rate in Japan and Korea. On the other hand, countries with a high FLFP and a low gender gap such as Norway and Finland seem to maintain a moderate fertility rate. This casual observation tells us that working women do not necessarily have less children (or a low fertility rate) in Nordic countries.²

Figure 2 shows the employment profile over the life cycle across four countries in question: Finland, Japan, Korea, and Norway. The first panel shows female employment profile by age group. There is a striking difference between Asian and Nordic countries. In Japan and Korea, there is a drop in FLFP at the age group of 25-29 while no such drop is found for Finland and Norway. In Japan and Korea, FLFP starts to increase moderately again after 45-49. This is a so-called M-shaped pattern over the working-life span among Asian female labor force (Ishizuka, 2014). This implies a disruption in the career progression of women around the time of marriage and/or childbearing. Women drop out of the labor force in their working prime age. When they return to the labor market after the childrearing, they return as non-regular workers.

The four lower panels in Figure 2 show the age-employment profile by gender in each of the four countries. Here we also observe that there is a larger gender gap between FLFP and MLFP (Male labor force participation) in Japan and Korea. The gender gap in LFP is far smaller in Finland and Norway.

² See Section 3 for the discussion on the relationship between fertility and FLFP.

2.2 Female labor force in Japan

Japan's female labor force participation is at a relatively modest level of 65 percent in 2013, increased from 55 percent in 1985. It is now better compared to the average of Asian countries but relatively lower than the G-7 average. Despite the increasing trend in FLFP, the majority of female employees in Japan are non-regular workers with lower wages and less job protection. Among all female employees, 55 are non-regular workers, of which 60 percent are part-time workers.

The gender gap also remains high and persistent. Japan ranks 105th out of 136 countries in the overall gender gap score in World Economic Forum's *Global Gender Gap 2013*, which is the second largest labor market gender gap among the advanced economies next to South Korea. Gender wage gaps are particularly large in Japan, with women earning on average just 71 percent of Japanese men (Goldman Sachs, 2014). Given that the education gap between men and women was almost closed in Japan, a huge gender gap in the labor market does not make economic sense, implying the underutilization of the educated female labor force.

There are only few women who occupy leadership positions in business or politics. The proportion of female administrative/managerial workers is only 11.1 percent in Japan compared to 43.1 and 34.5 percent in the US and the UK, respectively (Cabinet Office, 2013).

Many studies show that the main barriers to women in reaching leadership positions are the lack of pro-family public support such as sufficient childcare facilities, women's "double-burden" in balancing work and domestic responsibilities, and inflexible work hours (that require their physical presence in the office for long hours) which are common to many other countries (McKinsey, 2014).

There are also other unique barriers to Japanese women in the workforce. Many companies use the two-tier tracking systems with permanent career-track positions (*sogo shoku*) mainly reserved for male workers and routine-work jobs (*ippan shoku*) for the majority of female workers. These lead to a greater gender wage gap and underinvestment in female human capital but are not yet legally prohibited as a form of discrimination. Such indirect discrimination in the hiring and promotion systems is one of the main deterrents for continued career progression of Japanese women (Yamaguchi, 2013).

2.3 Female labor force in Korea

Korea is similar to Japan in the demographic trend of fewer children and rapidly aging population. Despite significant increases in educational attainment levels, only just over half of Korean women with a university level education are in the workforce (OECD, 2013). Korea's FLFP was 55 percent in 2012, 10 percentage points lower than in Japan. The M-shaped pattern of FLFP by age groups can be also observed in Korea as women continue to drop out of the labor force to marry and raise children in their prime working age. The gender gap in wages and labor participation rate remains wide in Korea.

Korea also suffers from a low birthrate. The fertility rate has been persistently low at 1.24, which is the lowest among 19 OECD countries. This again contrasts with the general pattern found in other OECD countries that have high female employment rates and also have high fertility rates.

As in Japan, the proportion of women in top management positions in Korea is also low compared with Europe and the United States, at only 1 percent of women's representation on boards and 2 percent of women's representation in executive committees (McKinsey and Company, 2012)

In contrast to Japan, however, the share of regular female workers (out of total female labor force) in Korea has been on the rise from 20 percent in 1990 to nearly 40 percent in 2010. One reason behind the increase in regular female employees is a change in the labor law. Starting in [2007], the law limits the employment period for fixed-term workers to a maximum of two years in order to encourage a conversion of non-regular workers to regular workers. If an employer employs fixed-term workers for more than two years, the workers should be considered, in principle, as workers on an open-ended contract (Korea's 7th Periodic report (2010), or Employment and Labor Policy).

2.4 Female Labor Force in the Nordics

The Nordic countries are known today for gender equality and high female participation in the labor market. This is a fruit of cumulative and deliberate efforts in the past 50 years. In Norway – where they have the highest FLFP rate among the OECD countries today—, the ideal of the housewife was strong in the 1950s and early 1960s as in Japan and Korea. Since the beginning of the 1970s, this trend had started to change. There was a rise in demand for labor alongside an increase in education attainment of women. Comprehensive parental provisions and subsidized daycare also helped boost FLFP. Parents are given a statutory right to paid leave to stay home with sick children and a right to work part-time until the youngest child turns 12 in 1998. As a result, Norway's FLFP has risen from 44 to 76 percent in 2012.³ About 83 percent of mothers with small children are employed. Fertility rates had even risen to about 1.8 percent – one of the highest fertility rates in Europe.

Finland is also a welfare state that provides relatively generous public support to families with children as other Nordic countries. Such public support is designed to reduce the incompatibility between labor force participation and childbearing for a dual-earner family. Specifically, Finland is known for a relatively high level of maternity and parental leave allowances, their long period of payment and a high level of daycare service provisions. In addition, Finland was the first Nordic country to introduce child home care allowance in the mid-1980s. The allowance is paid if the child is sick and not in public childcare. The amount of the fixed allowance varied with a means-tested supplement and a possible municipality supplement (Vikat, 2004). FLFP in Finland had risen from 44 to 73 percent in 2012 and the fertility rate was 1.8. Different from Norway, however, the proportion of part-time female employment is much smaller in Finland. Finland also stands out in the concentration of female labor in the public sector: women make up for 70 percent of public-sector employment in Finland (The Economist, 2011).⁴

³ The opportunities for part-time work and flexibility in work arrangements for women helped boost FLFP in Norway.

⁴ The studies show that the public sector employment is more attractive to women to balance work and family life as hours and conditions are usually more congenial and maternity arrangements (*The Economist* “The cashier and the carpenter”, Nov 24, 2011).

The Nordic model of female labor supply is also characterized as successful implementation of work-life balance. Flexible or part-time work arrangements are indeed helpful for women to juggle their career and family responsibilities in the short run. Yet, this can be counterproductive in the long run if women are expected to invest less in their careers. In the Nordic countries, both men and women are able to balance their careers and family life, with significantly greater paternal involvement in childrearing compared to the Asian peers.⁵ There needs to be a fundamental shift in cultural attitudes that assume women to be the only primary caregivers.

3. EMPIRICAL ANALYSIS

3.1 Data and Methodology

The non-recursive five-variable Structural Vector Autoregressive (SVAR) model is estimated for four countries – Japan, Korea, Norway and Finland— over the period of 1990 to 2012. The model includes the following variables: the female labor force participation rate (or the female regular and non-regular employment rate), child cash allowances, the gender wage gap, the fertility rate and female tertiary school enrollment rate. To ensure stationarity of the variables, we use the logarithm and first difference of these variables.

The SVAR model can be useful when we test relationships among a set of variables that shows strong co-movements (Sims, 1980; Guo, 2013). The relationship between the variables in question – child allowances, gender wage gap, female labor employment, fertility rate and female tertiary school enrollment—are endogenously determined and the direction of causality is often unclear. For example, a wide gender wage gap may discourage women from working while a lower female labor market participation rate could drive a gender-based wage wedge even wider. Cross-country studies in the presence of endogenous variables likely suffer from the mis-specification problem (Levine and Zervos, 1996; Luintel and Khan, 1999). The SVAR can remedy this problem by controlling for endogenous movements in these key variables. The SVAR also provides useful insights on how long it takes for the shocks to be transmitted to female labor employment.

The main data sources are the Statistics Bureau of Japan, CEIC Asia Database, OECD Social Expenditure Database and the World Bank. For Japan, we use annual data for 1997-2012. For Korea, we use annual data for the same variables as with Japan for 1990-2010 due to its data availability. For Norway and Finland, the data coverage is 1990-2009. The data are from OECD Social Expenditure Database and the World Bank.⁶

3.2 Literature and Explanatory Variables

Female labor force participation

As discussed earlier, cross country differences in FLFP are relatively large and persistent between Japan, Korea, and Nordic countries (Figure 3). In Finland and Norway, FLFP has been hovering

⁵ Time spent on housework and childcare by husbands with a small child averages one hour per day in Japan, whereas it is about three hours in Norway (Japan Gender Equality Bureau Cabinet Office (2013), “*Women and Men in Japan*”).

⁶ More details on data descriptions are found in Appendix 3.

above 70 percent since 1990. In contrast, FLFP in Japan and Korea has ranged from 50 to 60 percent over the past two decades. In both countries, however, FLFP has been increasing over time: from 57 to 64 percent (Japan) and from 50 to 55 percent (Korea) between 1990 and 2012. There was a slight decline in FLFP during the Asian financial crisis in Korea but after that it has been steadily increasing.

Female regular and non-regular employment

A modest level of aggregate FLFP in Japan and Korea masks the content of female labor force. Labor market duality is particularly severe in the female labor forces in Japan and Korea (Aoyagi and Ganelli, 2013; Dao and others, 2014). In both countries, women and youth make up a large part of non-regular workers. In 2012, about 55 and 60 percent of total female labor was non-regular workers in Japan and Korea, respectively.

In contrast, the share of non-regular female workers is significantly lower in Norway and Finland (Figure 4).⁷ In fact, the share of part-time female employment has been modest in Finland even in comparison with other Nordic countries (Nordic Council of Ministers, 2014). This is partly due to the large proportion of female labor employed in Finland's public sector that can offer more family-friendly work arrangements and long parental leaves without interrupting a career progression.

Child allowance

Child allowances are common in many countries. They are payable to parents with children under a certain age and the amount paid is usually dependent on the number of children and income levels. Though child support and other social benefits could increase the incentives to work, too much support can adversely affect the incentives for women to enter the labor market, especially those with a low earning capacity (Jaumotte, 2003; IMF, 2013). Here we will examine if child allowances affect regular and non-regular female labor differently.

Fertility rate

Fertility is another important factor that affects the incidence of women's labor participation.⁸ A negative relationship between fertility and FLFP has been reported in past cross-country studies (Bloom and others, 2009; Mishra and Smyth, 2010). On the other hand, other studies find that the relationship had shifted from negative to positive since the mid-1980s for OECD countries (Brewster and Rindfuss, 2000; Yamaguchi, 2006).

The changing relationship between fertility and FLFP is presented for 19 OECD countries in Figure 5. Before 1985, there was indeed a negative relationship between fertility and FLFP. After 1985, the relationship turned positive. It is interesting to note that the Nordic countries exhibit both high

⁷ Non-regular workers in Norway and Finland are those who work outside ordinary or regular working hours. The important difference of non-regular workers (including part-time employment) between Asia and the Nordics is that non-regular workers in the Nordics are generally granted a right to full benefits such as partial sickness allowances, part-time childcare benefits, and flexible care allowances. In contrast, non-regular workers in Japan and Korea have no such entitlements.

⁸ Pioneering works by Becker (1960) and Becker and Lewis (1973) have provided a foundation for empirical analyses of fertility. In the standard static models of childbearing, parents maximize a utility function that depends on quality-adjusted child quantity and all other consumption, subject to a family budget constraint. In these models, permanent changes in wages, income, and the price of children cause income and substitution effects that alter fertility decisions. In particular, a permanent decrease in male wages is predicted to decrease the total demand for children, while the competing income and substitution effects of a permanent decrease in female wages lead to an ambiguous effect on demand for children.

fertility and high FLFP for 1985-2012. This shift over time implies that the substitution effect between having children and working has more recently been offset by the income effect. That is, higher FLFP allows households to afford more children. This reflects changes in social norms towards working mothers and also the public policies, which reduce the trade-off between childbearing and female employment. These policies include more generous parental leave, greater availability of childcare, and greater opportunities with availability of flexible hours (Del Boca et al. 2003).

Wage gender gap

Gender discrimination is cited as one of the main hindrances to active economic participation of women (Saure and Zoabi, 2014). Though the gender discrimination is rather difficult to measure as it is often based on socio-cultural factors, here we use wage gender gaps as a proxy for gender inequality. Using the Japanese survey data, Yamaguchi (2014) finds that the gender wage gap in Japan is explained by the differences in job ranks. In the category of routine-work jobs (*ippan-shoku*) which are often assigned to female workers, such wage gap does not close even if women have a higher education and have worked more years than men. On the other hand, the gender wage gap was not found in the managerial positions and beyond. The author concludes that there should be an equalization of hiring and promotion policies in order to reduce the wage gender gap.

Tertiary school enrolment

Higher education is considered to be positively related to labor force participation. Eckstein and Lifshitz (2009) find that the rise in education levels account for about one-third of the increase in female employment in the US. In cross-country regressions, Steinberg and Nakane (2012) also report a positive contribution of education measured as the average number of years of female education to the increase in FLFP. In Japan and Korea, there have been significant increases in female educational attainment levels in the past. However, FLFP remains low despite this higher level education of women. Many argue that this is evidence of the underutilization of highly-educated female labor in the workforce in these countries.

3.3 Empirical Results

Female labor force participation rate

FLFP dynamics are assessed by impulse responses to various shocks. Impulse response functions trace the impact of a shock emanating from an endogenous variable to other variables. Figure 6 reports the impulse responses for each of four countries over a two-year time horizon. All shocks are standardized to a 1-percent shock and the vertical axis in the figure shows a percentage change in female labor employment given a 1-percent shock. The mid-line shows a percentage change in female labor employment given a 1-percent shock, and the upper and lower solid blue lines represent two standard confidence bands around the estimations that are constructed by Monte Carlo simulation.

The first column in Figure 6 shows the impulse responses of FLFP to the child cash allowance shock.⁹ For most countries, child allowances reduce FLFP. Though one exception is Korea, the estimate was statistically insignificant. This finding corroborates with that of Naz (2004) for Norway. He finds that child allowances for a family with children aged 1-3 are found to have a negative impact on FLFP and that women with a higher education are also found to work less when they receive child allowances. He thus argues for the provision of childcare facilities over child money in order to increase FLFP.

The second column shows that a greater gender wage gap indeed reduces FLFP while the effect of a wage gap was insignificant in Nordic countries, reflecting that the wage gaps in the Nordic countries are already very small and that they do not affect FLFP significantly. As seen in the cross-country comparison earlier, a gender wage gap is quite large in Japan (Goldman Sachs, 2014; World Economic Forum, 2013). This confirms that a relatively small proportion of the female workforce in a regular segment of Asia is a by-product of the presence of persistent gender gap.

The third column attests to the case that fertility is positively correlated with FLFP. In all countries, a higher fertility rate seems to increase FLFP, which is consistent with the post-1985 cross-country evidence.¹⁰

Regular and non-regular female employment

Japan

Now we turn to impulse responses of the different types of female employment (regular and non-regular). Figure 7 shows impulse responses to female labor in each segment in Japan.¹¹ The upper four charts show those to regular employment and non-regular employment are presented in the lower four charts.

Comparing regular and non-regular employment, we observe notable differences. First, Charts (a) and (e) show contrasting results in the impulse responses to a change in child allowances. In (a), we find that regular female employment is affected negatively by an increase in child allowances in the first year: the one-percent increase in childcare allowances reduces regular female employment by 0.42 percent. However, non-regular female employment increases by 0.38 percent when childcare allowances increases by one percent as shown in (e). These together imply that the handouts of child allowances increase non-regular female employment rather than regular employment in Japan.

One of the reasons why child allowances affect the type of employment asymmetrically is the eligibility criteria for child allowances based on the family taxation system in Japan. For example, take a family with two children. A household whose total “family” annual income is less than JPY 9.6 million (about USD 80 thousand) is eligible to receive the full amount of childcare allowance. On

⁹ The results of variance decomposition are available upon request.

¹⁰ The results on tertiary school enrollment rate turned out statistically insignificant in all countries.

¹¹ See Appendix 3 for more details on impulse responses.

the other hand, if an annual family income is greater than JPY 9.6 million, the family would receive only one-third of the full amount. This means that many married women prefer non-regular employment with lower pay so that they do not exceed the threshold level of a combined income. Thus, child allowances may indeed result in less regular employment and more non-regular employment, exacerbating the existing skewness towards non-regular female workers.

The gender wage gap shock also affects regular and non-regular employment asymmetrically (Figure 7 (b) and (f)). Not surprisingly, an increase in the gender wage gap discourages regular female employment, while it increases non-regular female employment. This is consistent with a general observation that a gender wage gap discourages well-qualified women from taking up regular employment. This result is also consistent with earlier results for FLFP shown in Figure 6.

We previously found that fertility does not always result in reducing overall female labor participation. This is particularly so in the segment of regular employment. In Figure 7 (c), the increase in fertility is likely to increase *regular* female labor participation. In the *non-regular* employment, however, this is not the case. This is partly because regularly employed workers are entitled to benefits such as paid and longer parental leave, which makes it easier for them to continue working after childbirth. Non-regular employees are entitled to fewer or no such benefits and thus childbirth (or fertility) can affect female labor participation negatively. This supports the evidence that sufficient parental benefits can lower the opportunity cost of being in the workforce for women without reducing fertility. More regular female employment can also help alleviate the pressure of the aging population indirectly.

In contrast to other three variables, tertiary school enrolment rate does not affect female labor employment significantly in Japan. In other words, the differences in education attainment are not a differentiating factor for female regular and non-regular employment. It is generally observed that non-regular female workers in Japan often have college degrees. They become non-regular workers not because of their education level but because of other factors such as a persistent gender wage gap and a lack of sufficient provisions of childcare.

Korea

Korea's impulse responses generally show a similar pattern to those of Japan (Figure 8). Both child allowances and wage gap shocks reduce the incidence of women choosing regular employment while higher fertility seems to increase regular employment. One difference between Japan and Korea is seen in tertiary school enrolment. Tertiary school enrolment helps increase regular employment significantly in Korea whereas the lack of education reduces non-regular employment. Thus, education matters in Korea as to the type of employment women choose. The other difference from Japan is that the size of impulse response is greater in Korea. Female regular employment responds negatively by 1.4 percentage points to the gender wage gap in Korea (as opposed to 0.3 percentage points in Japan). The positive impact of fertility on regular employment is 4.5 percentage points within one year, which is more than 10 times as much as in Japan.

Child allowances in Korea are on the sliding scale according to the income level of the households.¹² Child money can be a disincentive for women to work in regular employment as in Japan, especially when child allowances add to the opportunity cost of being a regular worker.

The gender wage gap shock to female regular employment and female non-regular employment is found to be asymmetric in Korea as in Japan. The gender wage gap increases female non-regular employment. However, gender wage gap and female regular employment are negatively related. Korea ranks 111th in WEF's Global Gender Gap Index. Though the causality is bi-directional in the current analysis, many Korean women opt for non-regular jobs as in Japan when there is a large gender wage gap.

The Nordics

Now we look at two Nordic countries – Norway and Finland— that are the forerunners of high female labor force participation in comparison with Japan and Korea. The results are different from Japan and Korea in a few points (Figures A.1 and A.2).

First, though the impulse responses of female employment are asymmetric between regular and non-regular types as in Japan and Korea, the signs of responses are opposite. Child allowances seem to increase the number of regular female workers while these discourage non-regular workers in Norway and Finland.

Second, the effect of gender wage gap is statistically insignificant in both countries. As seen in the Global Gender Gap Report, Finland and Norway rank high at No. 2 and 3 with regard to the gender gap, respectively. This result reflects partly that wages have been more or less equalized in these countries and that the wage gap does not affect the incidence of employment as much as in Asia.

¹² In 2009, for all families with kids aged from 0 to 5, households with income ranked among the bottom 50% are subsidized the entire costs of standard childcare; households with income ranked from the 50th to 60th percentiles are subsidized 60% of the standard childcare costs; households with incomes ranked from the 60th to 70th percentiles are subsidized 30% of the standard childcare costs (The Seventh Periodic Report (2010), Ministry of Gender Equality & Family Republic, Korea).

Third, fertility affects female labor employment in the same way as in Asia. That is, higher fertility is associated with more regular employment. It is well known that the Nordic countries are generous with parental benefits to a dual-earner family. For example, the total period of parental leave is for 49 weeks in Norway and can be extended to 3 years.¹³ Parental leave in Finland can be taken by parents until the child reaches the age of 3. For Japan and Korea, maternal and parental leave and allowance are paid for 28 weeks in Japan and the entire birth year in Korea. The fact that regular employment benefits related to childrearing are more generous than in non-regular employment is one of the reasons why the fertility rate is maintained at a moderate level when the proportion of regular employment is greater than that of non-regular employment.

Fourth, the impulse response of female regular employment to a tertiary enrolment shock shows that higher education helps increase regular employment while it reduces non-regular employment as in Korea. The magnitude of the impact, however, is much smaller in the Nordics.¹⁴

4. POLICY DISCUSSIONS

4.1 SUMMARY OF EMPIRICAL RESULTS

The VAR results in Section III presented the similarities and differences in explaining the composition of regular and non-regular female employment as well as overall FLFP among two Asian and two Nordic countries. The estimation results for the two types of employment are summarized as below (in Table 1 as well):

- Child allowances can affect regular and non-regular employment asymmetrically. In Japan and Korea, regular female employment *declines* with more child allowance while, in the Nordics, regular female employment *increases* with more child allowance,
- The increase in the gender wage gap discourages women from taking regular employment in Japan and Korea, while it tends to encourage the choice of non-regular employment,
- Higher fertility affects the incidence of regular female employment positively both in Asia and Nordics, while it affects non-regular employment negatively,
- The tertiary school enrolment rate helps increase regular employment, but not in Japan.

The estimation results show that there are notable differences between the countries in the two groups, Asia and the Nordics. Child allowance is generally found ineffective in increasing FLFP. This is particularly so in the segment of regular employment in Japan and Korea, while, in the Nordics, the decline is found in the segment of non-regular employment. Therefore, to increase the proportion of regular employment among women in Japan and Korea, handouts of child money are

¹³ The total benefit period for parental leave in the case of a birth in Norway is 49 percent at 100 percent coverage and 59 percent at 80 percent coverage. Parental leave can be extended to 54 weeks or longer with reduced benefits within 3 years.

¹⁴ It should be noted that the impact of the variables such as fertility and education on the labor market can be difficult to be captured over a two-year time horizon, which could partly explain the statistical insignificance of education in some cases.

counterproductive. Even in the Nordics, the negative impact of child benefits on non-regular employment outweighs the positive impact on regular employment.¹⁵

Table 1. Japan, Korea, Norway and Finland: Summary of the impulse responses to FLFP, regular and non-regular female employment, 1990-2010

		Child allowance shock	Gender wage gap shock	Fertility shock	Female tertiary school enrollment shock
Japan	FLFP rate	-	-	+	+
	Regular Em	-	-	+	*
	Nonregular Em	+	+	-	*
Korea	FLFP rate	*	-	+	+
	Regular Em	-	-	+	+
	Nonregular Em	+	+	-	-
Norway	FLFP rate	-	+	+	*
	Regular Em	+	*	+	+
	Nonregular Em	-	*	-	-
Finland	FLFP rate	-	+	+	-
	Regular Em	+	*	*	+
	Nonregular Em	-	*	*	-

We also find that increased FLFP does not translate into low fertility. This is particularly noticeable in regular female employment. With sufficient welfare provisions related to childbirth and assurance of returning to the same position, women can participate in the labor force and also have children. This is not unique to the Nordics but applicable to Japan and Korea.

4.2 LABOR MARKET DUALITY AND GENDER GAP

As much as Japan and Korea share commonality, there are also differences between the two countries. It is widely known that female labor is over-represented in the non-regular segment in Japan and Korea. However, the duality in the labor market does not always coincide with the gender bias. In Japan, non-regular workers are concentrated in women (and the elderly). In Korea, however, non-regular workers are found across genders, though more women tend to be in non-regular employment.

These differences in the two countries partly reflect the different evolutions of labor market institutions. Both Japan and Korea used to be known for the 'East Asia specific' labor market arrangements characterized by long-term employment, enterprise-based labor union, and seniority-based wage structure during the period of rapid growth. After the prolonged economic recession over the past decades, both countries have started to shift away from the traditional employment relations. One such manifestations is the increase in non-regular employment. The other is the change from a seniority-based pay system to a performance-based one (Kim, 2010).

¹⁵ Note that the effects of child allowance considered here are only limited to those related to the incidence of mothers' employment. Well-targeted and means-tested child allowances can still be useful for re-distributional purposes.

At the same time, despite a similar increase in the proportion of non-regular employment, the qualitative characteristics of non-regular employment differ significantly between the two countries. Most non-regular workers in Japan are characterized as ‘voluntary’ part-time non-regular workers who work less than 35 hours a week, whereas those in Korea are ‘involuntary’ full-time non-regular workers who could not secure regular jobs (Kim, 2010). Only 33 percent of non-regular workers work part-time in Korea. These differences are rooted in the different historical and institutional conditions in the two countries. In Japan, life-time and seniority-based labor institutions are a source of the efficiency of the Japanese lean production system, as the lean production system requires process flexibility and multi-skilled workers. The formation of multi-skilled workers requires long-term and stable employment relation practices. Thus, Japanese employers have a strong incentive to adhere to the current system. On the other hand, labor unions have been very powerful in Korea that strengthened the seniority wage feature and stable employment. Given that the system is not based on economic efficiency but on the social democratization, Korean employers are more likely to weaken the existing employment relation during an economic recession.

4.3 ALTERNATIVE MEASURES OF CHILD BENEFITS AND CHILDCARE

In the previous section, we show that cash allowances can affect the incidence of FLFP. However, we were constrained by data availability. That is, we used a very narrow definition of child allowances for the empirical analysis. Here we attempt to get a broader definition of child-related benefits using OECD family database. In this subsection, we will look in detail at public spending on family and child benefits. Here we define family and child benefits more broadly as *child-related cash transfer to families with children, public spending on services for families with children and financial support for families provided through the tax system*. Furthermore, there were no cross-country data available to take into account the provision of childcare facilities and early education in the previous section. This data limitation should not undermine the importance of the provisions of childcare services for women’s decision to participate in the labor market. By utilizing another database, we try to supplement the empirical analysis on the type of support the government can provide to women and families with children.

Figure 10 shows public spending on family benefits by category as a percentage of GDP. The first thing to note is that total family benefits spending is more than twice as much in the Nordics compared to Japan and Korea, which can be considered to be the main feature of a welfare state.

Norway and Finland spend more than Japan and Korea in most categories of family benefits with the one exception of financial support via the tax system. Japan spends about 0.5 percent of GDP on financial support for families through the tax system (e.g., tax breaks for households with dependents) whereas there is no such policy in Finland.

In the category of child-related transfer to families with children, Norway and Finland spend about three times as much as Japan.¹⁶ Korea spends very little in this category. In the category of spending on services for families with children (e.g., childcare and early education facilities), Korea spends

¹⁶ Note that cash transfers defined here includes cash allowance plus income support for parental leave and single parent families, different from ‘cash allowance’ used in the empirical section.

about 0.7 percent of GDP while Japan spends 0.5 percent. Both countries again fall short of the Nordic levels of about 2 percent.

We note that maternal and parental leaves and cash allowance are applied more flexibly in the Nordics than in Asian countries. The basic parental leave is 44 weeks in Norway at 100 percent replacement shared between parents, and parental leave can be extended to 54 weeks or longer with reduced benefits for up to 3 years. A similar policy can be found in Finland, parental leaves can be taken by parents until the child becomes 3 years old. Partial parental leave is also possible if parents and employers reach an agreement. Child allowance is up to a child's 9th birthday in Finland. In contrast, maternal and parental leaves and allowances are usually fixed, with payment for the entire birth year in Korea and 28 weeks in Japan.

Next, we turn to a slightly different classification of public spending on families and children, including formal education¹⁷ (Figure 11). It is interesting to note that Japan and Korea spend over 70 percent of total family-related spending on formal education compared with about 63 percent in the Nordics.¹⁸ Instead, the Nordics are more likely to spend on early education and childcare. In contrast, Japan spends only 2.4 percent of the total on childcare compared to about 13 percent in the Nordics. We can summarize that the Nordics invest more in early education (including childcare) than in the Asian counterparts. This fact corroborates with the findings by Heckman (2008) that investment in early education has a higher return and that this also contributes to narrowing of the income gap, leading to a more egalitarian society.

Figure 12 shows the breakdown of public spending by age of children. Childcare services are given generously for children of ages 0-5, with Korea topping the group. However, they drop to nearly zero in both Japan and Korea for ages 6-11. The Nordics continue to provide childcare service also for age 6-11. Norway and Finland devote 24 and 15 percent of total childcare to age 6-11. The lack of childcare services for age 6-11 partially explains why Japan and Korea spend much less on childcare than formal education as found in Figure 11. Limited availability of affordable childcare such as after-school care could make it difficult for women with younger aged school children to continue to work full-time.¹⁹

¹⁷ Education and childcare benefits are two categories within benefits in family and child policy packages.

¹⁸ Benefits in family and child policy packages include Cash benefits and tax breaks, Childcare benefits, Other benefits in-kind and Education.

¹⁹ In Japan, there are quite a few children on the waiting lists for after school programs, reflecting the shortage of such services. There is also a word 'the wall of the first grade' ('Sho-ichi no kabe') that describes the challenge for working mothers to find an after school care program for longer hours at affordable rates after the kids reach the first grade of elementary school. Some opt to work part-time or quit their job if they cannot find childcare.

Another interesting aspect of the Nordic model is the role of the fathers in childrearing. The Nordic countries offer paternity leave to the fathers of newborn children explicitly, while in most South European countries extremely limited paternity leave is provided, if at all (Del Boca et al, 2010). The studies find that families are more likely to have a second baby in cases where the father takes parental leave for the first child, suggesting that policies encouraging an active participation of the father in childcare may stimulate fertility (Olah, 1996; Andersson, 2011).

5. CONCLUSIONS

The female labor force can be the key to unlocking the growth potential in economies where there is abundant skilled female labor. This is particularly important for countries that face labor shortages due to rapidly aging population. This paper studies what could increase FLFP in two Asian economies, Japan and Korea. We compare these countries with the two Nordic countries with high FLFP, Norway and Finland and try to draw a lesson for Japan and Korea. We also pay special attention to the types of female employment – regular and non-regular— as labor market duality seems to be associated with a gender bias in these countries.

Using the SVAR model, we find that child cash allowances can discourage women from taking up a regular employment. Large wage gaps based on gender are also attributed to a smaller proportion of female labor in the segment of regular employment compared to that in non-regular work. We also find that greater FLFP does not have to come with the cost of low fertility. In the countries studied here, fertility and female employment are positively correlated. This is particularly so if women are hired as regular employees. In contrast, non-regular female labor is less likely to have children partly due to insufficient social benefits related to children.

Several differences arise between the Asian and Nordic countries in glancing at the cross-country data. First, Nordic countries provide more childcare benefits and services than in the Asian countries and their childcare system is more flexible in terms of hours and qualifications depending on the needs of parents, which decrease career breaks among employees with small children. Also, the greater proportion of public spending is devoted to early childhood education than in formal education in the Nordics than in Japan and Korea.

Second, the Nordic countries give a more equal role to fathers in childrearing. In legislation, paternity leave is explicitly directed to the fathers of newborn children, unlike in Japan and Korea in most Southern European countries (Del Boca et al, 2010). Some evidence was found that this paternal involvement may have positively influenced fertility in the Nordics. In some way, gender egalitarianism should happen at home as well as at work for women to be able to continue to work.

Finally, family-friendly policies and flexible work arrangements could enable more women (and men) to balance their work and family lives. Currently, long and inflexible working hours associated with full-time employment prevent well-qualified Japanese and Korean women from taking up regular employment. The alternative is to take up non-regular low-skilled jobs with no security and benefits despite their high potential. In contrast, Nordic women and men are given the option of different working hours depending on their needs (e.g., Norway). What is more important is that a part-time employment in Nordic countries does not compromise the benefits and promotion prospects. Rather, a Nordic part-time work is a manifestation of *flexicurity* (flexibility and security) that gives women more options depending on the stage of the life cycle without career breaks. These family-friendly

policies would be made possible not only by deregulation and tax reforms by the governments but also the private sector's efforts to promote diversity and inclusion at a corporate level. After all, greater gender equity is one of the key elements that enhance productivity and economic growth and should be on everyone's mind for better welfare of the society.

References

- Andersson, G. (2011), "Family policies and fertility in Sweden". In Takayama, N. and Werding, M. eds, *Fertility and Public Policy: How to Reverse the Trend of Declining Birth Rates*: 203-18. Cambridge MA and London: MIT Press.
- Aoyagi, C. and G. Ganelli, "Does Revamping Japan's Dual Labor Market Matter?" Forthcoming in *Economic Systems*.
- Becker, G.S. (1960), "An economic analysis of fertility," *Demographic and economic change in developed countries*, Vol. 11, pp. 209-231.
- Becker, G.S. and H.G. Lewis (1973), "On the Interaction between the Quantity and Quality of Children," *The Journal of Political Economy*, Vol. 81, No. 2, pp. 279-288.
- Bernanke, S. Ben (1986), "Alternative explanations of the money-income correlation," NBER Working Paper No. 1842, National Bureau of Economic Research, Cambridge, MA.
- Bloom, D. E. and others (2009), "Fertility, female labor force participation, and the demographic dividend". *Journal of Economic Growth* 14.2: 79-101.
- Brewster, K. and R. Rindfuss (2000), "Fertility and women's employment in industrialized countries". *Annual Review of Sociology* 26: 271-96.
- Dao, M. et al (2014), "Strategies for Reforming Korea's Labor Market to Foster Growth", IMF Working Paper, WP/14/137.
- Del Boca et al. (2003), "Labor market participation of women and fertility: the effect of social policies". Report prepared for the *Rudolf de Benedetti Benedetti Foundation Conference*, July. www.frdb.org/upload/file/copy_0_paper_delboca.pdf
- Eckstein, Z (2011). "Dynamic Female Labor Supply". *Econometrica*(0012-9682), 79(6), p.1675.
- Eckstein, Z., & Lifshitz, O. (2011). Dynamic female labor supply. *Econometrica*, 79(6), 1675-1726.
- Enders, Walter, (2010), *Applied Econometric Time Series*, John Wiley & Sons Press, Hoboken, NJ.
- Fernández, R. (2013). "Cultural Change as Learning: The Evolution of Female Labor Force Participation over a Century". *The American Economic Review* (0002-8282), 103(1), p.472.
- Goldman Sachs (2014), "Womanomics – Time to walk the talk".
- Guo, F. (2013), "What Causes China's High Inflation? A Threshold Structural Vector Autoregression Analysis", *China & World Economy*, Vol.21, pp.100-120.

Gupta, N., N. Smith, and M. Verner (2006), "Child care and parental leave in the Nordic countries: a model to aspire to?", *IZA Discussion Paper Series No. 2014*.

Gustafsson, S., and Stafford, F. (1992), "Child care subsidies and labor supply in Sweden". *Journal of Human resources*, 204-230.

Hall, A. and G. Zoega (2014), "Values and Labor Force Participation in the Nordic Countries", *Economics Discussion Papers*, No 2014-11, Kiel Institute for the World Economy.

Heckman, J. J. (2008). "Schools, skills, and synapses". *Economic inquiry*, 46(3), 289-324.

International Monetary Fund (2013), "Women, Work and the Economy: Macroeconomic Gains from Gender Equity", *IMF Staff Discussion Note*, SDN/13/10.

Ishizuka, H. (2014), "Does gender diversity in management contribute to profitability, productivity and the AA system in China and Korea?" *RIETI Discussion Paper* 14-J-029.

Jaumotte, F. (2003), "Female labour force participation: Past trends and main determinants in OECD countries", *Economics Department Working Paper*, No. 376, OECD, Paris.

Kim, J. Y. (2010). "A Comparison of Non-Regular Employment in Korea and Japan: Nature, Difference, and its Possible Reasons". *Evolutionary and Institutional Economics Review*, 6(2), 299-328.

Kogel, T. (2004). "Did the association between fertility and female employment within OECD countries really change its sign?". *Journal of Population Economics* (0933-1433), 17(1), p.45.

Mishra, V., & Smyth, R. (2010). "Female labor force participation and total fertility rates in the OECD: New evidence from panel cointegration and Granger causality testing". *Journal of Economics and Business*, 62(1), 48-64.

Ministry of Gender Equality & Family, Republic of Korea (2010), *The Seventh Periodic Report* .

McKinsey and Company. (2013), "Women Matter: An Asian Perspective".

Naz, G. (2004). "The impact of cash-benefit reform on parents' labour force participation". *Journal of Population Economics*, 17(2), 369-383.

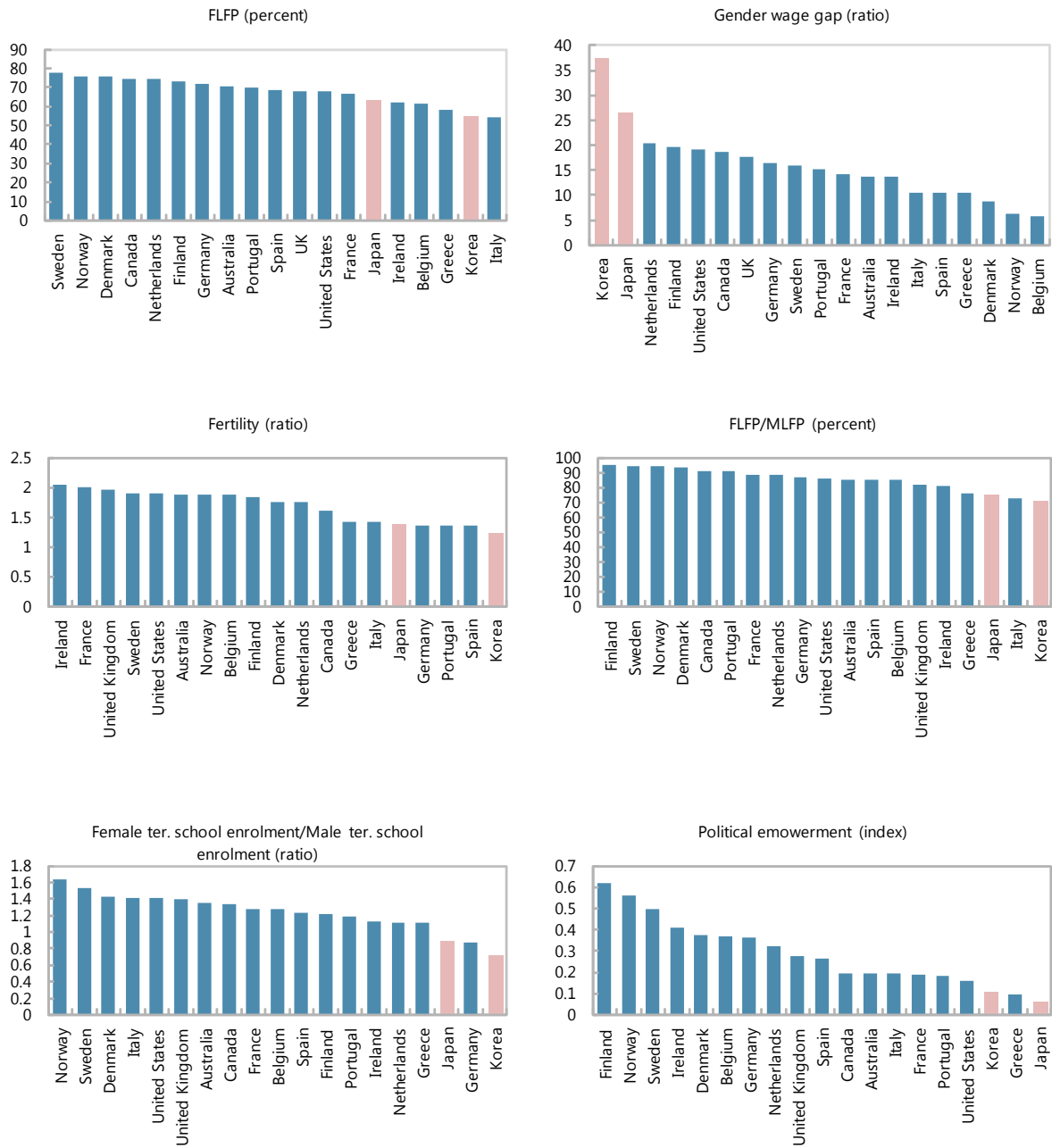
Nordic Council of Ministers (2014), *Part-Time Work in the Nordic Region: Part-Time Work, Gender, and Economic Distribution in the Nordic Countries*.

Olah, S.L. (1996), "The impact of public policies on the second-birth rates in Sweden: a gender perspective". *Stockholm Research Reports in Demography* No. 98.

Ribar, D. C. (1992), "Child care and the labor supply of married women: Reduced form evidence." *Journal of Human Resources*: 134-165.

- Sauré, P., & Zoabi, H., 2014. "International Trade, the Gender Wage Gap and Female Labor Force Participation." *Journal of Development Economics* 111, pp. 17–33
- Schwartz G. et al. (2013), "Women, work and the economy: Macroeconomic gains from gender equity", IMF Staff Discussion Note.
- Sims, A. Cristopher, (1986), "Are forecasting models usable for policy analysis?" *Quarterly Review*, Federal Reserve Bank of Minneapolis, Minneapolis, MN.
- Steinberg. C. and M. Nakane (2012), "Can women save Japan?", IMF Working Paper 12/248.
- Thévenon O, and A. Solaz (2013), "Labour Market Effects of Parental Leave Policies in OECD Countries", OECD Social, Employment and Migration Working Papers, No.141, OECD, Paris.
- Vikat, A. (2004), "Women's labor force attachment and childbearing in Finland", MPIDR Working Paper 2004-01, Max Planck Institute for Demographic Research, Rostock, Germany.
- World Economic Forum (2013), *Global Gender Gap Report*.
- Yamaguchi, K. (2006), "On the true relationship between female labor force participation and fertility rate: An analysis of OECD countries and its policy implications". *MEITI Journal 2006(4)*: 58-61
- _____, (2013), "Considering the potential side effects of employment system reform". *Nihon Keizai Shinbun Keizai Kyoushitsu Column*, July 24, 2013.
- _____, (2014), "Gender income gap of white-collar regular employees" (*in Japanese*), RIETI Discussion Paper 14-J-046.
- Yamamoto, I. (2014), "Female employment and firm performance: an empirical analysis using firm panel data" (*in Japanese*), *RIETI Discussion Paper 14-J-016*.

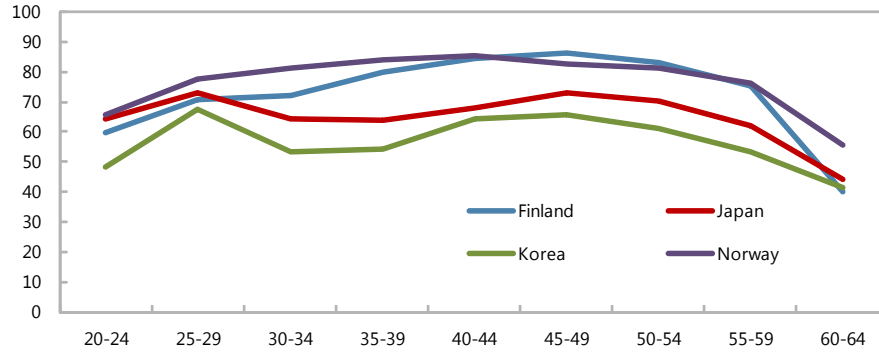
Figure 1. Selected OECD countries: Gender equality and FLFP, 2012



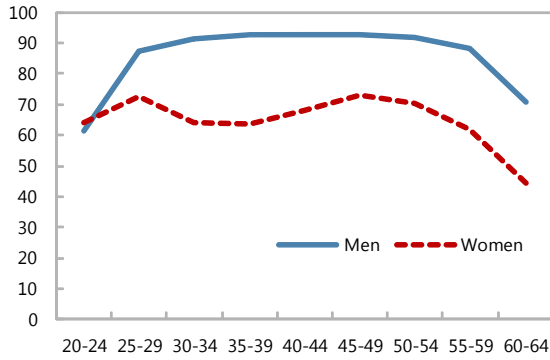
Source: OECD statistics and World Economic Forum Gender Gap Report.

Figure 2. Japan, Korea, Norway, Finland: Age-Employment Profile, 1992
(in percent)

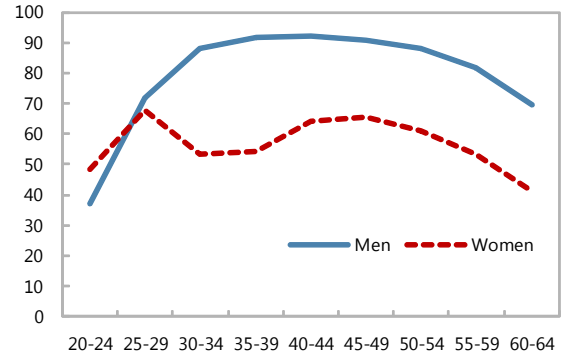
Female Employment Profile Over the Life-Course by Country



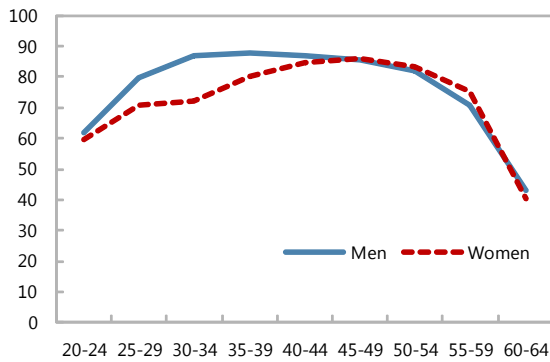
Japan



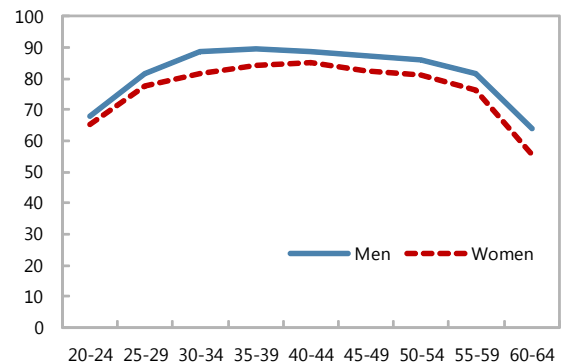
Korea



Finland

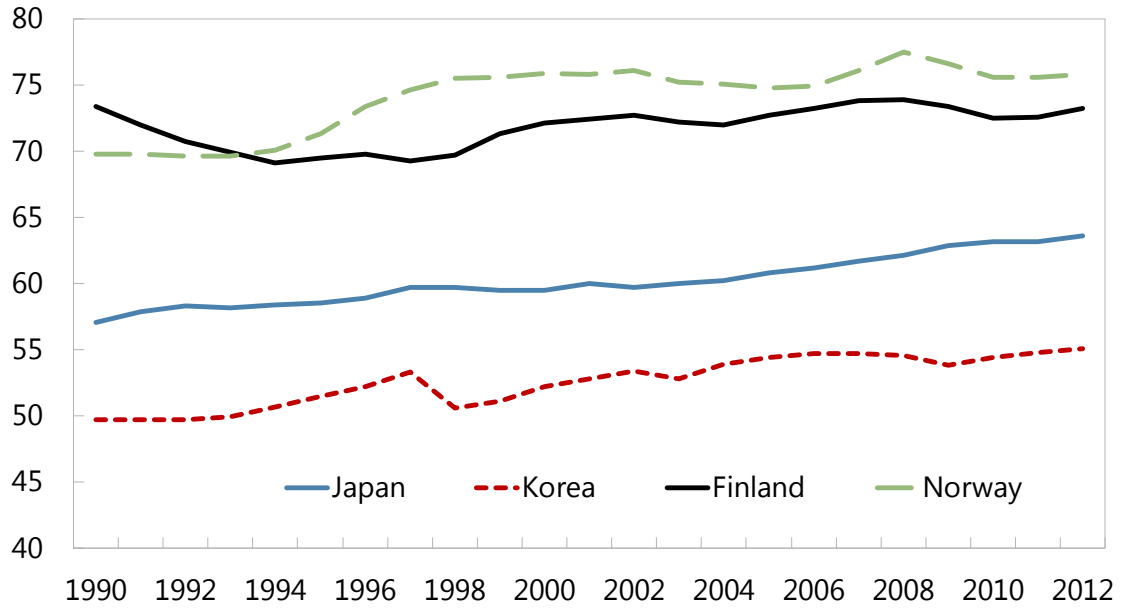


Norway



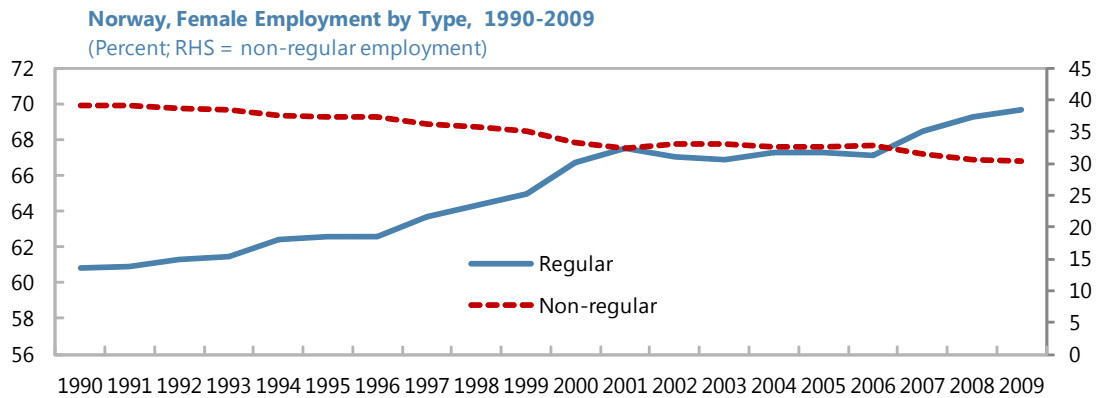
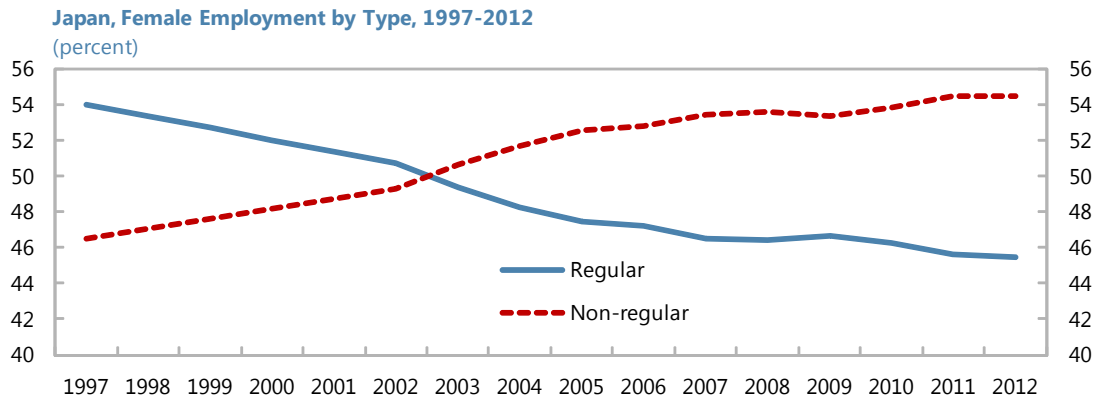
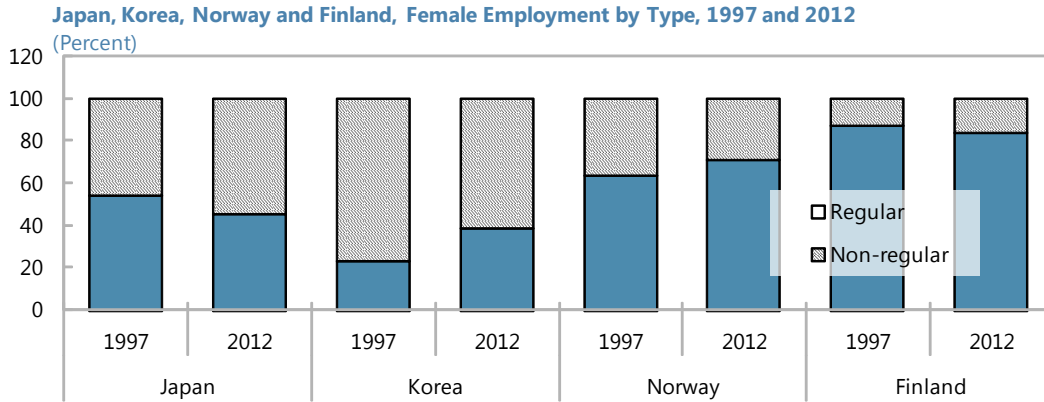
Source: OECD Family Database.

Figure 3. Japan, Korea, Norway and Finland: Female Labor Force Participation Rate, 1990-2012
(Percent)



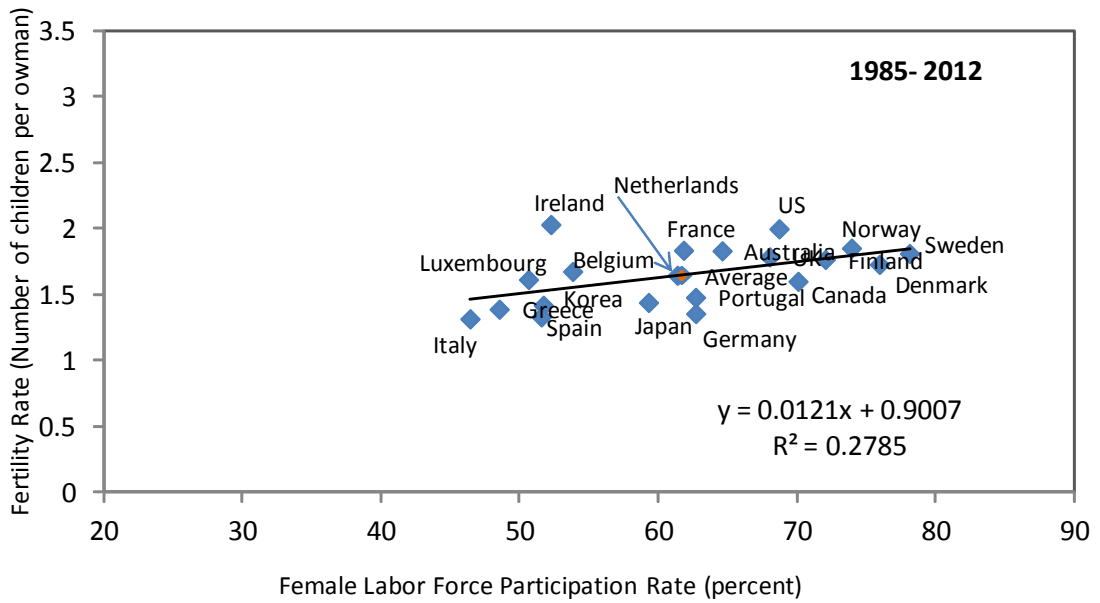
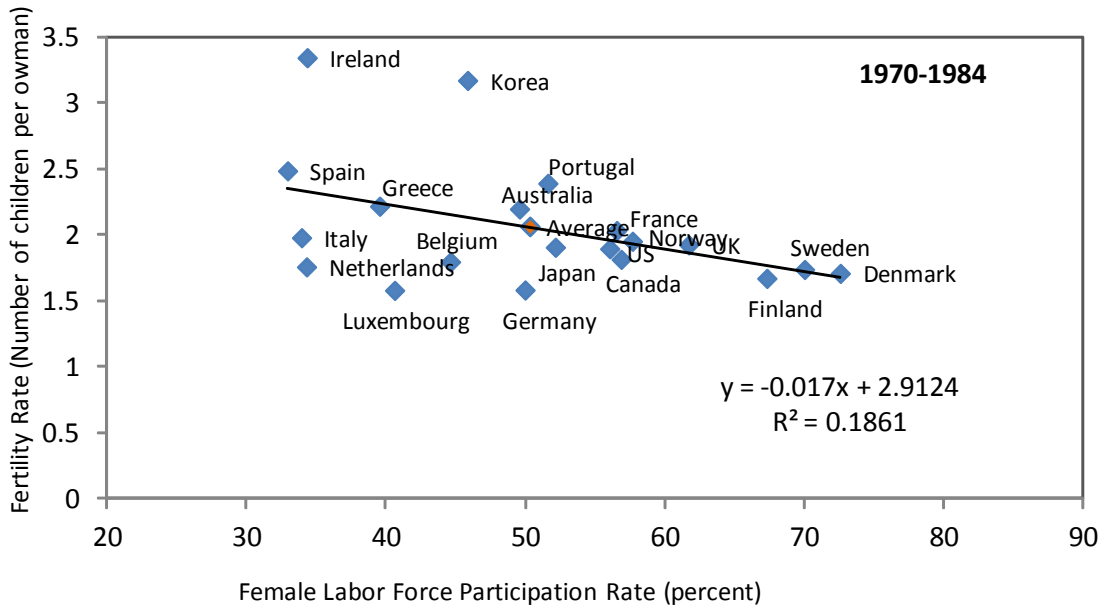
Sources: World Bank dataBank

Figure 4. Japan, Korea, Norway and Finland: Share of Regular and Non-regular Female Employment



Source: Labor Force Survey, Statistics Bureau, Japan; World Bank, CEIC and OECD.

Figure 5. Selected OECD: Female Labor Force Participation and Fertility Rate, 1970-1984 and 1985-2012

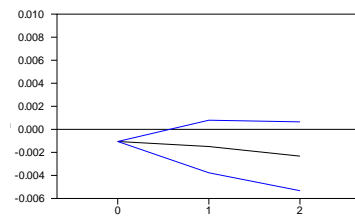


Source: OECD Labor Force Survey.

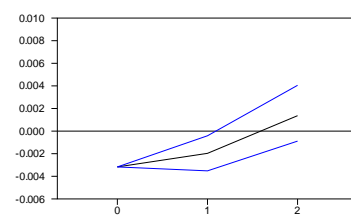
Figure 6. Japan, Korea, Norway, and Finland: The impulse response of FLFP rate to shocks, 1990-2012

Japan

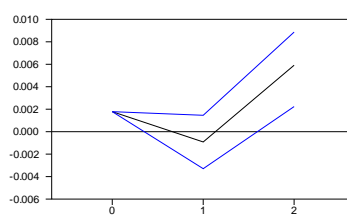
Child Allowance Shock



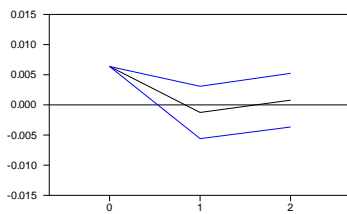
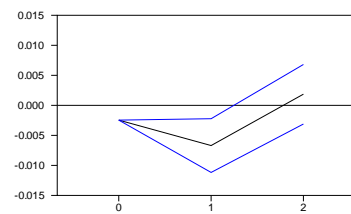
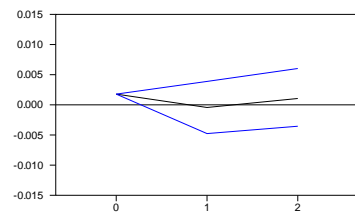
Gender Wage Gap Shock



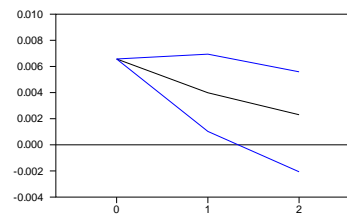
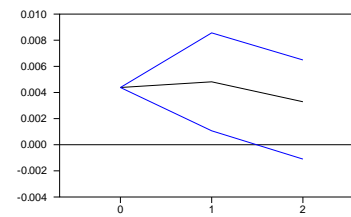
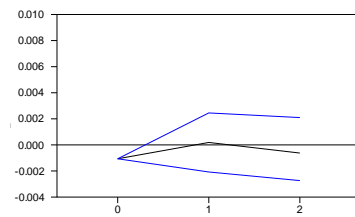
Fertility Shock



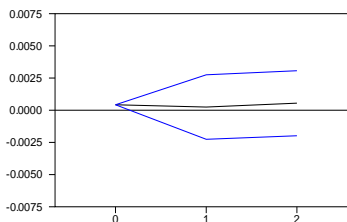
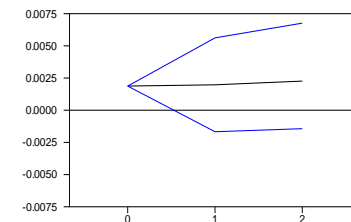
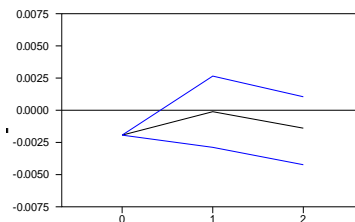
Korea



Norway



Finland



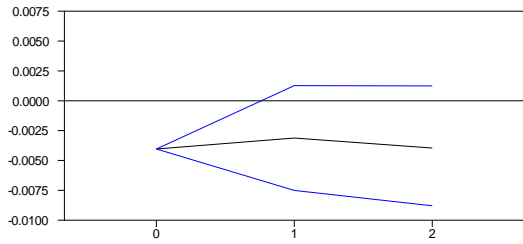
Sources: Authors' calculations based on Statistics Bureau Japan, CEIC Asia Database, OECD Social Expenditure Database and World Bank dataBank.

Notes: The impulse responses (the mid-solid line) are presented over a 3-year period along the horizontal axis. All shocks are standardized to a 1-percent shock and, hence, the vertical axis shows the approximate percentage change in macroeconomic variables with a 1-percent shock. The two upper and lower solid blue lines represent two standard confidence bands around the estimation that are constructed by Monte Carlo simulation.

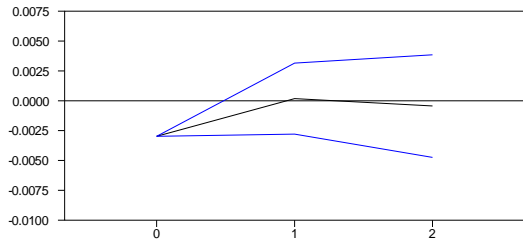
Figure 7. Japan: The Impulse Responses of Female Employment to Shocks, 1997-2012

Impulse responses of regular female employment

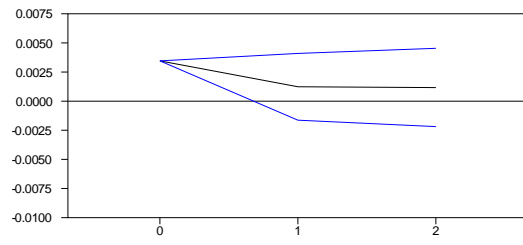
(a) Child allowance shock



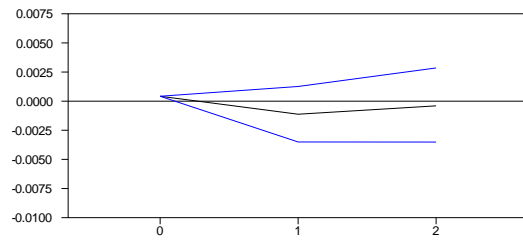
(b) Gender wage gap shock



(c) Fertility shock

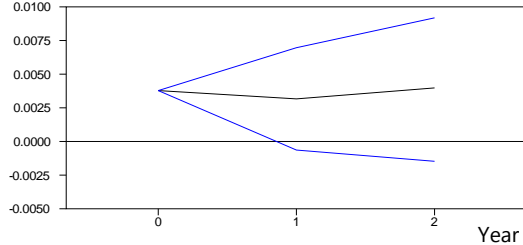


(d) Female Tertiary Enrollment Shock

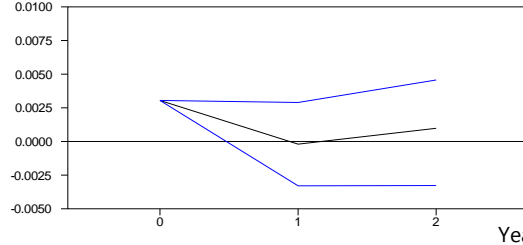


Impulse response of non-regular female employment

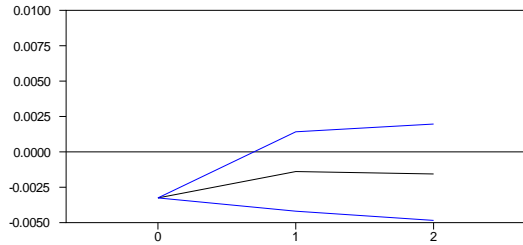
(e) Child allowance shock



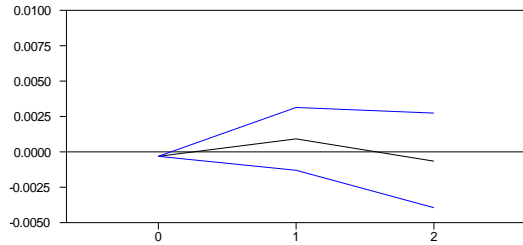
(f) Gender wage gap shock



(g) Fertility shock



(h) Female Tertiary Enrollment Shock



Sources: Authors' calculations based on Statistics Bureau Japan, CEIC Asia Database and World Bank dataBank.

Notes: The impulse responses (the mid-solid line) are presented over a 3-year period along the horizontal axis. All shocks are standardized to a 1-percent shock and, hence, the vertical axis shows the approximate percentage change in macroeconomic variables with a 1-percent shock. The two upper and lower solid blue lines represent two standard confidence bands around the estimation that are constructed by Monte Carlo simulation.

Figure 8. Korea: The Impulse Responses of Female Employment to Shocks, 1990-2010

Impulse responses of regular female employment



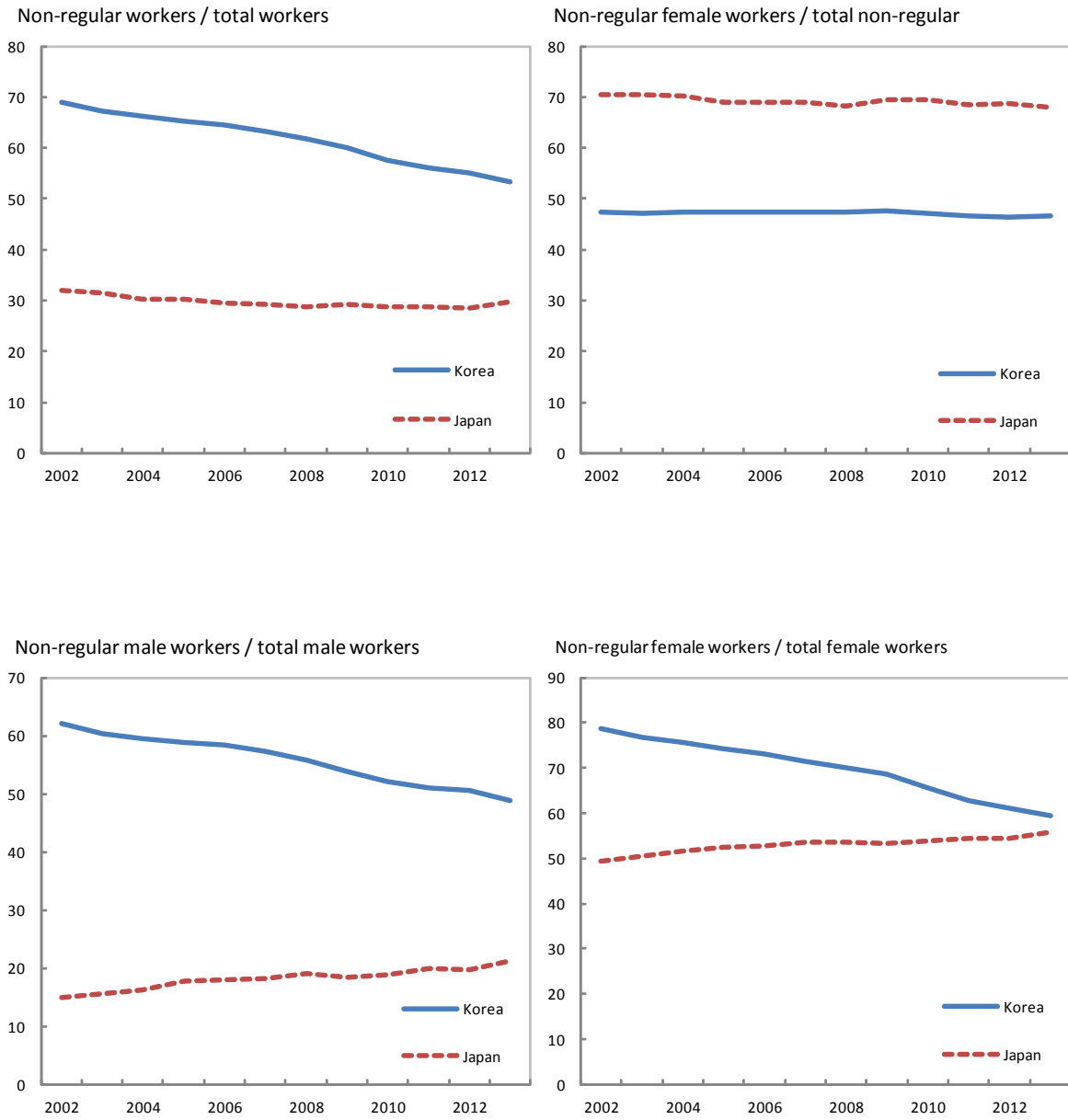
Impulse response of non-regular female employment



Sources: Authors' calculations based on CEIC Asia Database, OECD Social Expenditure Database and World Bank databank.

Notes: The impulse responses (the mid-solid line) are presented over a 3-year period along the horizontal axis. All shocks are standardized to a 1-percent shock and, hence, the vertical axis shows the approximate percentage change in macroeconomic variables with a 1-percent shock. The two upper and lower solid blue lines represent two standard confidence bands around the estimation that are constructed by Monte Carlo simulation.

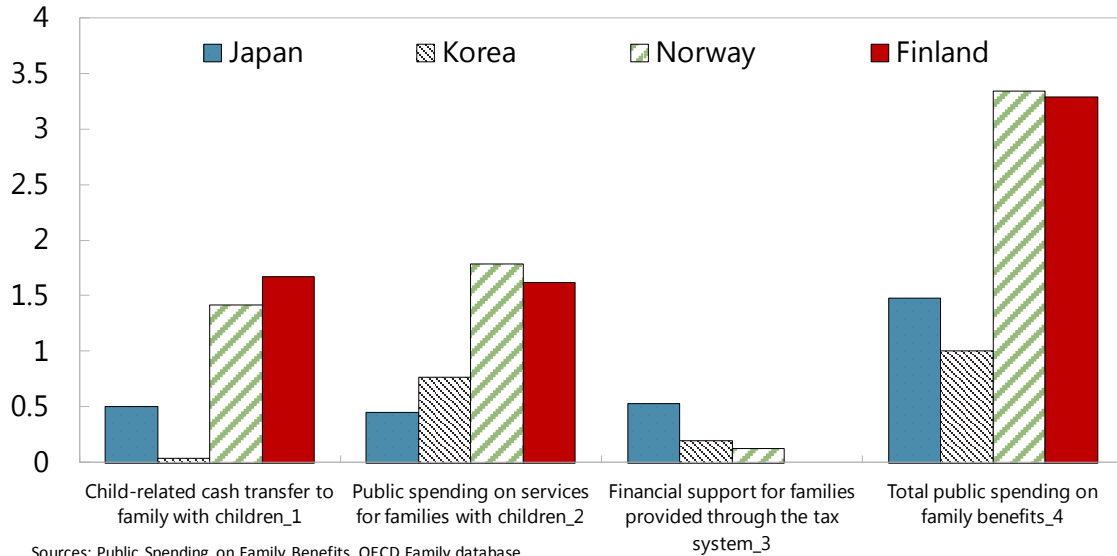
Figure 9. Japan and Korea: Labor Market Duality and Gender, 2002-13
(Percent)



Sources: Labor Force Survey, Statistics Bureau, Japan and CEIC Asia Database.

Figure 10. Japan, Korea, Norway and Finland: Public Spending on Family Benefits in Cash, Services and Tax Measures, 2009

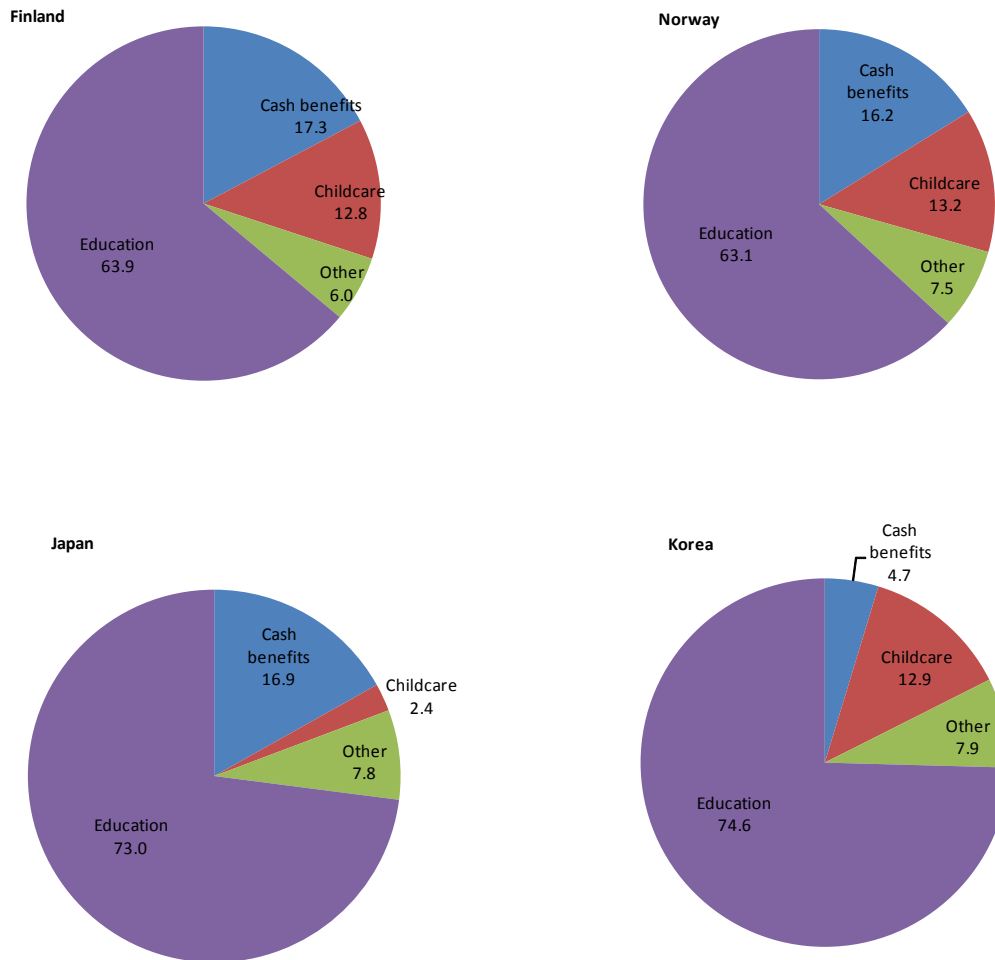
(Percent of GDP)



Sources: Public Spending on Family Benefits, OECD Family database.

Notes: 1. Child-related cash transfer to family with children contains child allowance, public income support for parental leave and sole parent families (standards vary across countries); 2. Public spending on services for families with children includes public spending on childcare and early education facilities providers, family services (home help and center-based facilities included) and institutional facilities for youth; 3. Financial support for families provided through the tax system represents financial support for families provided through the tax system contains child tax allowance, tax exemption and child tax credits; 4. Total public spending on family benefits include 1,2 and 3 above.

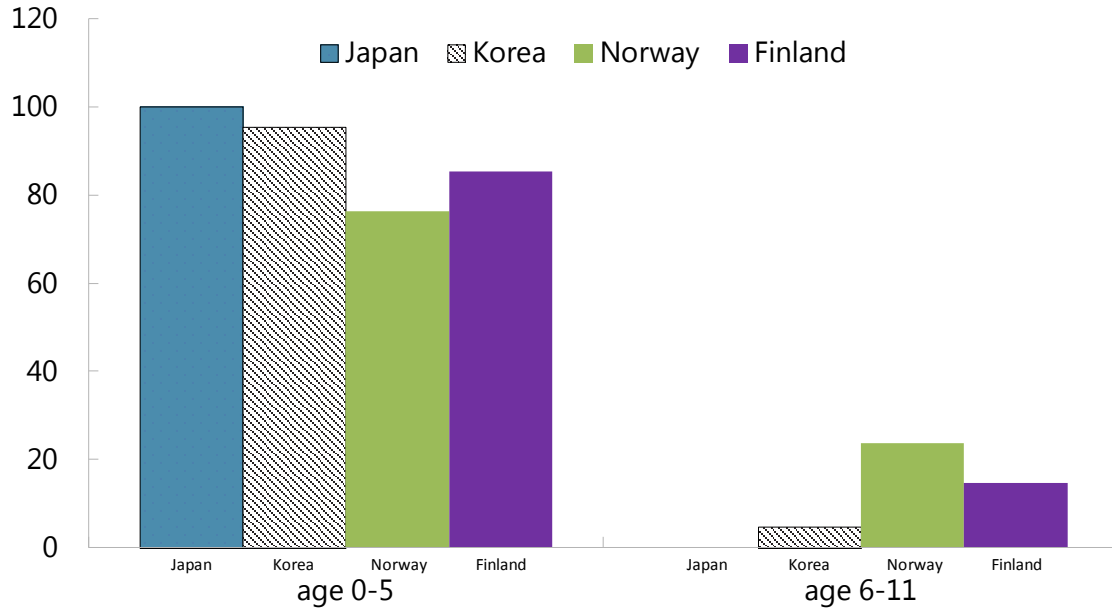
Figure 11. Japan, Korea, Norway and Finland: Public spending on families and children, 2009 (in percent)



Source: OECD Family Database, 2009.

Figure 12, Japan, Korea, Norway and Finland, Childcare, 2009

(Percent of total spending on childcare for children aged 0-11)



Source: Public Spending by Age of Children, OECD Family Database.

Appendix 1. The SVAR Model

The SVAR approach allows for contemporaneous feedback between variables while imposing the minimal structural restrictions. An analysis of contemporaneous relationships between female labor force participation and key relevant variables require restrictions on the correlation structure of the residuals based on the theory.

The nonrecursive structural VAR model is shown as follows:

$$G(L)Z_t = e_t, \quad (1)$$

where $G(L)$ is a matrix polynomial in the lag operator L , Z_t is a $n \times 1$ data vector, and e_t is a $n \times 1$ structural disturbance vector. e_t is serially uncorrelated and $\text{var}(e_t) = \Lambda$. Λ represents a diagonal matrix where diagonal elements are the variances of structural disturbance; hence, structural disturbances are assumed to be mutually uncorrelated.

The reduced-form equation can be written as:

$$Z = B(L)Z_t + \varepsilon_t, \quad (2)$$

where $B(L)$ is a matrix polynomial (without the constant term) with lag operator L . Bernanke (1986) and Sims (1986) suggest that the nonrecursive structural VAR allows the imposition of restrictions to contemporaneous structural parameters.

G_0 is a non-singular coefficient matrix of L_0 in $G(L)$, which represents the contemporaneous coefficient matrix in the structural form, and $G_0(L)$ is the coefficient matrix in $G(L)$ without contemporaneous coefficient, G_0 . This relationship can be described as:

$$G(L) = G_0 + G^0(L). \quad (3)$$

Therefore, the parameters in the reduced-form equation and those in the structural form equation can be described as:

$$B(L) = -G_0^{-1}\Lambda G_0^{-1}. \quad (4)$$

Only through sample estimates of Σ can the maximum likelihood estimates of Λ and G_0 be obtained. The right-hand side of Equation (4) has n^2 unknown parameters to be estimated. Because Σ contains $n \times (n + 1)/2$ known parameters, here at least $n \times (n - 1)/2$ need to be imposed on G_0 for the identification (In this case, $n = 5$ and we require 10 restrictions).

The vector of endogenous variables is assumed to include the following five variables: child cash allowance, gender wage gap, FLFP (or female regular employment/female non-regular employment), fertility rate, female tertiary school enrolment. We take a logarithm and the first difference of each variable to ensure stationary.

For the restrictions on the contemporaneous structural parameters, G_0 , we follow Sims and Zha (2006) and modify their model. The present paper proposes a structural VAR approach with contemporaneous restrictions. It allows modeling nonrecursive restrictions across different equations.

To identify the structural shocks, a Sims–Bernanke decomposition of the non-recursive matrix and a variance–covariance matrix of the reduced-form VAR residual (ε_t) are used to generate the structural disturbance (e_t). Hence, the contemporaneous relationships between the structural disturbances and the reduced-form VAR residuals can be shown as follows:

$$\begin{bmatrix} e_{Child\ allowance} \\ e_{Gender\ wage\ gap} \\ e_{FLFP\ or\ Female_Em} \\ e_{Fertility\ rate} \\ e_{Female\ tertiary\ enrolment} \end{bmatrix} = \begin{bmatrix} 1.0 & 0.0 & 0.0 & g14 & 0.0 \\ 0.0 & 1.0 & g23 & 0.0 & g25 \\ g31 & g32 & 1.0 & g34 & g35 \\ g41 & 0.0 & g43 & 1.0 & 0.0 \\ 0.0 & 0.0 & g53 & 0.0 & 1.0 \end{bmatrix} \begin{bmatrix} \varepsilon_{Child\ allowance} \\ \varepsilon_{Gender\ wage\ gap} \\ \varepsilon_{FLFP\ or\ Female_Em} \\ \varepsilon_{Fertility\ rate} \\ \varepsilon_{Female\ tertiary\ enrolment} \end{bmatrix} \quad (5)$$

Female_Em in equation (5) is replaced by female regular employment and female non-regular employment depending on the model specifications.

The structure of the variance-covariance matrix G in the non-recursive SVAR model is based on the following considerations. First, child allowances are included in the structural VAR model. Child allowances are generally considered to have an impact on women’s fertility decision. The policy objective of child allowances is to help alleviate the burden of cost of raising children. So we would expect that child allowances can lead to higher fertility if it works as intended. Child allowances are also expected to affect women’s labor force participation decision. As discussed in Jaumotte (2003) and Steinberg and Nakane (2012), however, the effectiveness of these allowances on participation rates is ambiguous. They are effective only for low-income households where the households’ liquidity is constrained. Under such circumstances, we would expect that child allowances (an increase in income) could lead to higher FLFP.

Second, the gender inequality is often considered to be one of the main obstacles to women’s labor force participation. We use here the gender-based wage gap as a proxy for such gender inequality and it is included in the model. There is also an argument for reverse causality: lower female labor participation leads to a widening of the gender wage gap. Thus, we impose a structure on the gender wage gap as function of FLFP and the education level in the second row.

Third, FLFP is assumed to be affected by all the relevant variables in the third row: FLFP is influenced by child allowances, the gender wage gap, FLFP itself, fertility, and the school enrollment rate.

Fourth, women’s decision to work is closely related to an alternative or competing decision to have children. In other words, women’s labor supply and fertility are simultaneously determined. By treating one or the other exogenous in the cross-country panel data, the estimates would be biased. The SVAR model is thus appropriate to treat these both as endogenous variables. We assume that the fertility rate is related to child allowances (as discussed earlier) and FLFP.

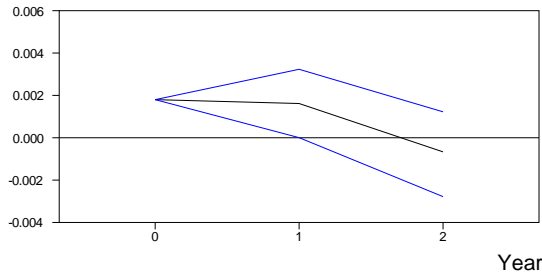
Finally, the tertiary school enrollment rate of women can be affected by FLFP as there is a tradeoff between attending school and working and/or having children.

Appendix 2. The Nordics: Impulse Responses of Female Employment

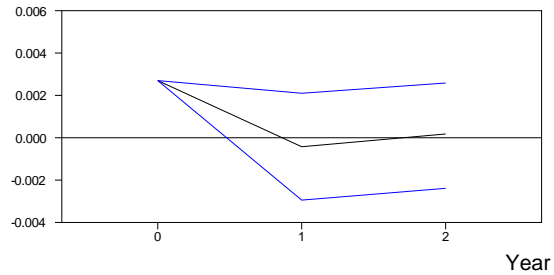
Figure A-1. Norway: Impulse Responses of Female Employment to Shocks, 1990-2009

Impulse responses of regular female employment

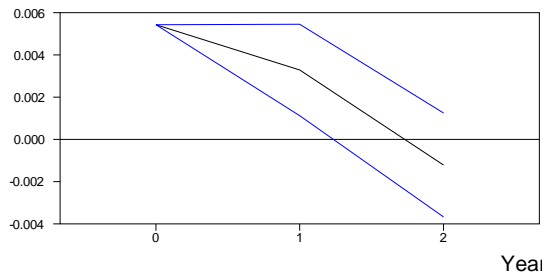
(a) Child allowance shock



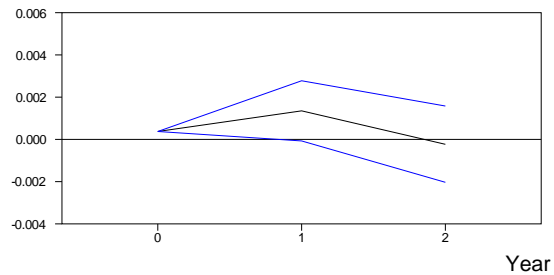
(b) Gender wage gap shock



(c) Fertility shock

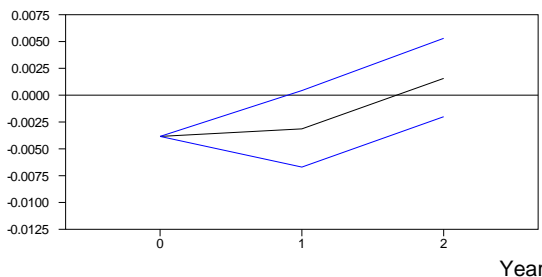


(d) Female Tertiary Enrollment Shock

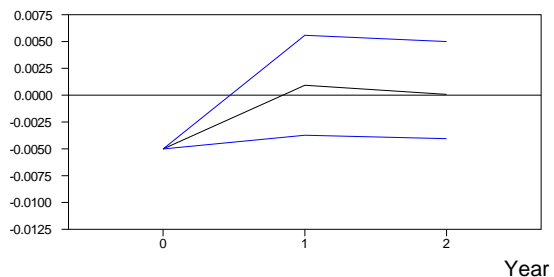


Impulse response of non-regular female employment

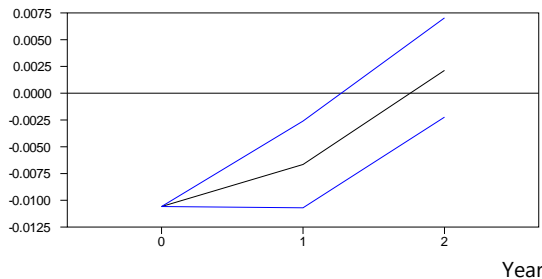
(e) Child allowance shock



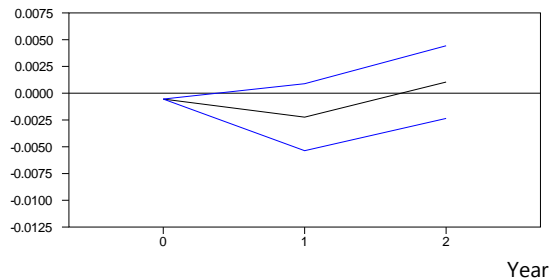
(f) Gender wage gap shock



(g) Fertility shock



(h) Female Tertiary Enrollment Shock



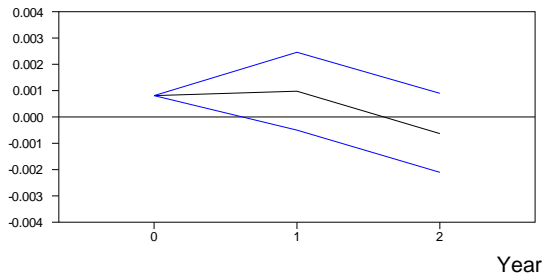
Sources: OECD Social Expenditure Database and the World Bank.

Notes: The impulse responses (the mid-solid line) are presented over a 3-year period along the horizontal axis. All shocks are standardized to a 1-percent shock and, hence, the vertical axis shows the approximate percentage change in macroeconomic variables with a 1-percent shock. The two upper and lower solid blue lines represent two standard confidence bands around the estimation that are constructed by Monte Carlo simulation.

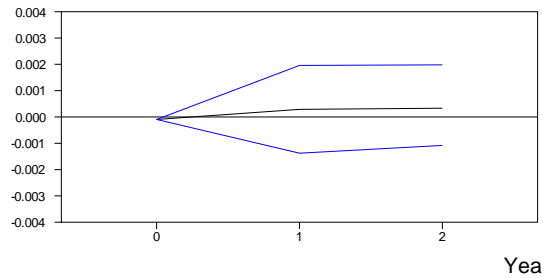
Figure A-2. Finland: Impulse Responses of Female Employment to Shocks, 1990-2009

Impulse responses of regular female employment

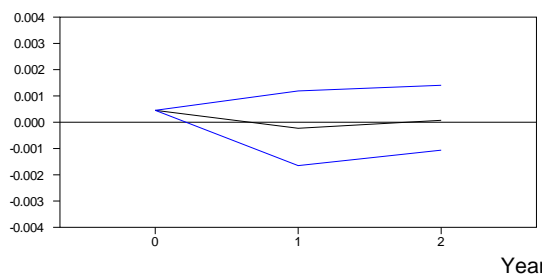
(a) Child allowance shock



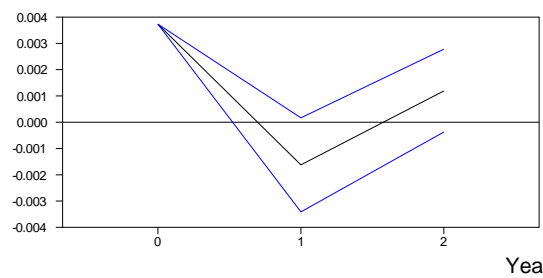
(b) Gender wage gap shock



(c) Fertility shock

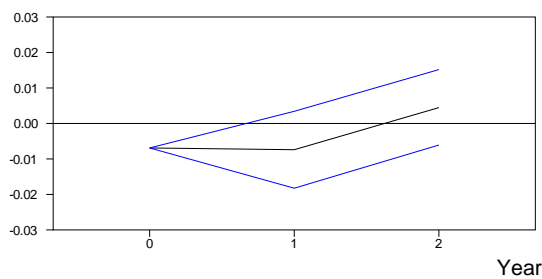


(d) Female Tertiary Enrollment shock

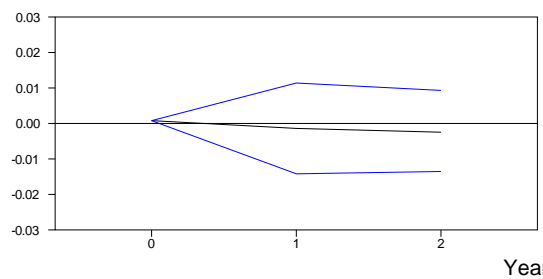


Impulse response of non-regular female employment

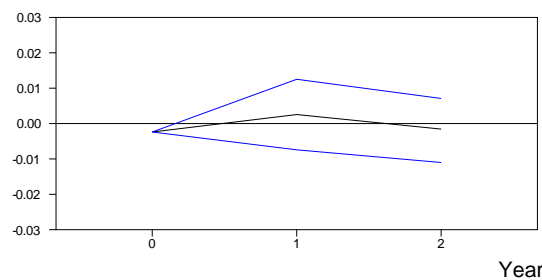
(e) Child allowance shock



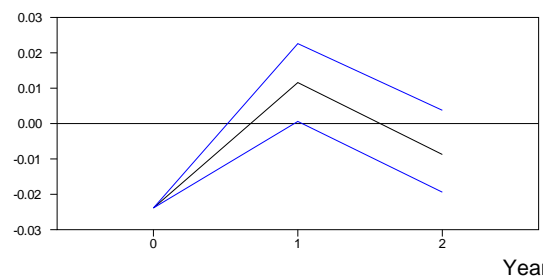
(f) Gender wage gap shock



(g) Fertility shock



(h) Female Tertiary Enrollment Shock



Sources: OECD Social Expenditure Database and World Bank.

Notes: The impulse responses (the mid-solid line) are presented over a 3-year period along the horizontal axis. All shocks are standardized to a 1-percent shock and, hence, the vertical axis shows the approximate percentage change in macroeconomic variables with a 1-percent shock. The two upper and lower solid blue lines represent two standard confidence bands around the estimation that are constructed by Monte Carlo simulation.

Appendix 3. Japan, Korea, Norway, and Finland: Impulse Response of Female Employment to Shocks

Table A-1. Japan: Percentage Change of Female Employment to Shocks, 1997-2012

<i>Impulse response of regular female employment</i>	
Child allowance shock (1% ↑)	-0.42%
Gender wage gap shock(1%↑)	-0.29%
Fertility shock(1%↑)	0.29%
Female tertiary enrollment shock(1%↑)	0.00%
<i>Impulse response of nonregular female employment</i>	
Child allowance shock(1%↑)	0.38%
Gender wage gap shock(1%↑)	0.33%
Fertility shock(1%↑)	-0.33%
Female tertiary enrollment shock(1%↑)	0.00%

Table A-2. Korea: Percentage Change of Female Employment to Shocks, 1990-2010

<i>Impulse response of regular female employment</i>	
Child allowance shock (1% ↑)	-0.33%
Gender wage gap shock(1%↑)	-1.50%
Fertility shock(1%↑)	0.33%
Female tertiary enrollment shock(1%↑)	2.00%
<i>Impulse response of nonregular female employment</i>	
Child allowance shock(1%↑)	0.13%
Gender wage gap shock(1%↑)	0.63%
Fertility shock(1%↑)	-0.13%
Female tertiary enrollment shock(1%↑)	-0.38%

Table A-3. Norway: Percentage Change of Female Employment to Shocks, 1990-2009

<i>Impulse response of regular female employment</i>	
Child allowance shock (1% ↑)	0.20%
Gender wage gap shock(1%↑)	0.00%
Fertility shock(1%↑)	0.55%
Female tertiary enrollment shock(1%↑)	0.03%
<i>Impulse response of nonregular female employment</i>	
Child allowance shock(1%↑)	-0.38%
Gender wage gap shock(1%↑)	0.00%
Fertility shock(1%↑)	-1.06%
Female tertiary enrollment shock(1%↑)	-0.05%

Table A-4. Finland: Percentage Change of Female Employment to Shocks, 1990-2009

<i>Impulse response of regular female employment</i>	
Child allowance shock (1% ↑)	0.08%
Gender wage gap shock(1%↑)	0.00%
Fertility shock(1%↑)	0.03%
Female tertiary enrollment shock(1%↑)	0.37%
<i>Impulse response of nonregular female employment</i>	
Child allowance shock(1%↑)	-0.67%
Gender wage gap shock(1%↑)	0.00%
Fertility shock(1%↑)	-0.25%
Female tertiary enrollment shock(1%↑)	-2.50%

Appendix 4. Definition and Sources of Data

Japan	Definition	Available Period	Source
Female regular employment	Female regular employment out of total female employment	1997-2012	Labor Force Survey, Statistics Bureau, Japan
Female nonregular employment	Female nonregular employment out of total female employment (<i>Part-time worker, Arbeit (temporary worker), Entrusted employee Dispatched worker from temporary labor agency, Contract employee, Other</i>)	1997-2012	Labor Force Survey, Statistics Bureau, Japan
Child benefits	Child benefits allowance	1997-2012	CEIC Asia Database
Gender wage gap	Japanese male wage minus Japanese female wage	1997-2012	CEIC Asia Database
Fertility rate	Total birth per woman	1997-2012	World Bank databank
Female tertiary school enrollment	Female tertiary school enrollment out of all tertiary enrollments	1997-2012	World Bank databank
Korea	Definition	Available Period	Source
Female regular employment	Female regular employment out of total female employment	1990-2010	CEIC Asia Database
Female nonregular employment	Female nonregular employment out of total female employment (<i>Self-employed, Unpaid family worker, Temporary employee, Daily worker</i>)	1990-2010	CEIC Asia Database
Child benefits	Cash benefits plus Benefits in kind (Public expenditure on family)	1990-2010	OECD Social Expenditure Database
Gender wage gap	Difference between male and female median wages divided by the male median wages	1990-2010	OECD Social Expenditure Database
Fertility rate	Total birth per woman	1990-2010	World Bank databank
Female tertiary school enrollment	Female tertiary school enrollment out of all tertiary enrollments	1990-2010	World Bank databank
Norway	Definition	Available Period	Source
Female regular employment	Female regular employment out of total female employment	1990-2009	World Bank databank
Female nonregular employment	Female nonregular employment out of total female employment	1990-2009	World Bank databank
Child benefits	Cash benefits plus Benefits in kind (Public expenditure on family)	1990-2009	OECD Social Expenditure Database
Gender wage gap	Difference between male and female median wages divided by the male median wages	1990-2009	OECD Social Expenditure Database
Fertility rate	Total birth per woman	1990-2009	World Bank databank
Female tertiary school enrollment	Female tertiary school enrollment out of all tertiary enrollments	1990-2009	World Bank databank
Finland	Definition	Available Period	Source
Female regular employment	Female regular employment out of total female employment	1990-2009	World Bank databank
Female nonregular employment	Female nonregular employment out of total female employment	1990-2009	World Bank databank
Child benefits	Cash benefits plus Benefits in kind (Public expenditure on family)	1990-2009	OECD Social Expenditure Database
Gender wage gap	Difference between male and female median wages divided by the male median wages	1990-2009	OECD Social Expenditure Database
Fertility rate	Total birth per woman	1990-2009	World Bank databank
Female tertiary school enrollment	Female tertiary school enrollment out of all tertiary enrollments	1990-2009	World Bank databank

Notes:

The definition of non-regular workers vary slightly according to the data source. For Japan, non-regular employee can further be categorized as part-time worker, *Arubaito* (temporary worker), dispatched worker from temporary labor agency, entrusted employee, contract employee and other. For Korea, non-regular employees include self employed, unpaid family workers, temporary employee and daily workers.