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GENDER DIFFERENCES IN THE EFFECT OF MONETARY POLICY ON EMPLOYMENT: THE CASE OF NINE OECD COUNTRIES[+]

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In many countries, low and stable inflation is the focus of monetary policy as price stability provides many benefits to the economy. The existing empirical evidence indicates that the costs of inflation reduction are inequitably distributed by gender in *developing* countries. This paper addresses employment costs of inflation reduction in *developed* countries. Using quarterly data for 1980-2006, we examine gender and country differences in the effects of interest rate on employment in nine OECD countries. We look at total employment, as well as employment disaggregated by three sectors: agriculture, industry and services. We utilize two estimation methodologies: a single equation and a vector autoregression. We find that the link between monetary policy instruments (short-term interest rates) and employment in the industrial countries under investigation is neither strong nor varies by gender.

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1. Introduction

In many countries, low and stable inflation is the focus of monetary policy as price stability provides many benefits to the economy (Frederic Mishkin 2007, John Taylor 2000). However, some researchers question whether such focus on price stability can potentially lead to undesirable outcomes in other important variables, such as exchange rates, output or employment and whether these vary across groups or sectors. In developing countries, for example, there is evidence that employment costs of inflation reduction are different for women and men (Elissa Braunstein and James Heintz 2008). The research on the distributional effects of monetary policy on labor market outcomes in industrial countries is very limited and dated. Nevertheless, the existing evidence in the US suggests that in the past there did exist an asymmetry in the response of unemployment to monetary policy changes for some demographic groups (John Abell 1991).

Are there reasons to believe that monetary policy in other industrialized countries has a differential effect on the employment of males and females? We show that differential employment outcomes for men and women (such as, employment segregation and differences in labor market attachment of men and women) could serve as a mechanism by which gender differences arise in the employment sensitivity to changes in monetary policy. To our knowledge this issue has not been investigated for a group of OECD countries.

Developing an understanding of gender differences in bearing the burden of economic insecurity resulting from economic downturns and gaining clarity on whether economic prosperity affects women and men differently would allow one to determine whether there is room for addressing gender differences with direct policies. For example, if gender asymmetries are found in bearing the burden during a slowdown due to a higher probability of job loss

(resulting from the occupation choice, for example), then it may be socially desirable to improve the social safety net to protect disadvantaged families. We may also want to know if economic prosperity is sufficient for closing the gender employment gap or whether additional interventions are necessary.

At the same time it is important to bear in mind that monetary policy is "blind." Monetary policy is a national policy (or in the case of ECB is made in the interests of a group of countries), and it cannot be used to address interests of one particular group or one particular region. Additionally, high inflation has considerable costs (covered in most macroeconomics textbooks), as does deflation (as the recent Japanese experience reminds us, where somewhat moderate deflation has been association with painful years of weak growth, rising unemployment and financial problems in the banking and financial sector). Thus, in our opinion, abandoning the current focus of central banks on low and stable inflation is not a solution even if it is uncovered that different groups are affected by monetary policy differently. Yet, it is important to be aware of asymmetry in employment response to monetary policy changes, as policies other than monetary policy might be suited to address such problems.

To examine gender-specific asymmetries in the effects of monetary policy on employment in nine OECD countries, we use quarterly data for 1980-2006. The Euler equation for output serves as a base for our empirical investigation. However, we use employment rather than output as a measure of economic activity. We derive a relationship between employment and the interest rate. In addition, employment in our empirical model is also affected by the real exchange rate (to account for open economies).

To control for varying interest-rate sensitivity of sectors, we use employment data disaggregated by three sectors: agriculture, industry and services. As a robustness check, we

look at two sub-periods: 1980-1992 and 1993-2006 (to account for a possibility in the structural break in the relationship between employment and interest rate that could have occurred as a result of the 1992 European Exchange Rate mechanism crisis). We find weak evidence that the employment costs of tighter monetary policy are inequitably distributed across genders in the chosen group of OECD countries.

2. Gender Differences in Employment and Macroeconomic Policy

The question we pose in this paper is whether monetary policy changes have a gender specific effect on employment. That is, when monetary policy tightens (or eases), does one gender's employment suffer (gain) more? Some researchers looked into this question using data for developing countries (Braunstein and Heintz 2008), and found that employment costs of inflation reduction are inequitably distributed by gender. Their finding opened the discussion to whether the focus of monetary policy on low and stable inflation brings about asymmetric responses in key variables (such as employment) and potentially higher costs than generally thought (Ibid). As far as we know our paper is the first to examine whether these asymmetries exist in OECD countries. Our variable of interest is male and female employment responses. In this section, we discuss the link between monetary policy tools and the labor market, and then outline the potential reasons for expecting differential employment responses among women and men resulting from monetary policy in OECD countries[1].

For many central banks (including for those in all the countries used in this study), the short-term interest rate is the primary tool of monetary policy. Changes in interest rates may

[1] For a detailed survey of evidence on gender differences in relation to macroeconomic policy see Janet Stotsky 2006.

affect labor market performance through many channels. In the short-run, the effect of short-term interest rates on employment can be observed through aggregate demand. For example, lower short-term interest rates result in a lower cost of borrowing and saving, which could have an increasing effect on aggregate demand and investment expenditure. Less expensive money can entice consumers to increase their spending, consequently, increasing aggregate demand, which in turn will be translated into job creation. For the purpose of this paper, our attention rests on the short-term effect of interest rates on employment. Whether monetary policy affects employment in the long run is debatable and is beyond the scope of this paper[2].

Why would one expect for interest rates to have a gendered effect on employment in the short term? We discuss several possible reasons: employment and occupation segregation, labor market attachment, job tenure, and gender discrimination.

Employment segregation

Empirical evidence in OECD countries indicates that women tend to work in a different and narrower range of occupations than men, leaving the possibility of unevenly distributed gains (losses) from changes in employment due to changes in the interest rate.[3] Men,

[2] The theory of money neutrality tells us that monetary policy cannot influence long-run employment. Yet, some authors suggest that monetary policy may have long-run impact on the real economy and, therefore, on employment (see, for instance, Laurence Ball 1999a).

[3] According to economic theory there exist both demand and supply explanations for the existence of employment segregation. On the demand side, we could observe discrimination against women and the employers' perception that women are on average less qualified, which will result in a greater willingness to hire men (or greater willingness to let go of women first when employment reduction is necessary). On the supply side, the standard explanation is that women self-select into occupations that require smaller human capital investment, which have

traditionally, have been more likely to be employed in manufacturing and agricultural professions, while women tend to concentrate in administrative, public and service sector occupations in a more restricted range of professions. In OECD countries, this has been changing to a small extent, with both women and men increasing their employment in managerial and professional occupations. In terms of industries, about two-thirds of men have been employed in manufacturing, trade, and services since the 1970s. This number is close to 80% for women with less women working in the manufacturing sector, and more in the service sector (Francine Blau, Marianne Ferber and Anne Winkler 1998). In the 1990s technological change that allowed substituting male and female workers, the rise of the service sector and the decline of the production sector, increased education levels of women, and effective anti-discrimination policy measures changed the relative demand of skilled workers resulting in a greater demand for women in the labor market. As discussed in the next section, although women's labor market attachment increased, occupation and industry segregation (although declining) remained an issue (Juan Dolado, Florentino Felgueroso and Juan Jimeno 2002).

Given the existence of occupational and industry segregation a differential employment effect across men and women due to changes in monetary policy can be expected since change in interest rates that causes a change in demand for various goods and services can be transferred into an uneven change in employment across sectors, if employment in some sectors is more sensitive to interest changes than in others.

Cyclical properties of certain industries and occupations could also result in a gendered employment effect. For example, women's relative lower unemployment rates in the past have

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lower penalties for breaks in their career, due to "societal discrimination (the latter is an expectation that women have less continuous careers and are forced to choose jobs that require greater flexibility).

been attributed to labor shifts from manufacturing to the service sector-- seen as being less affected by the business cycle. Hence, women, by concentrating in industries less sensitive to business cycle swings, shelter themselves from (both negative and positive) business cycle effects (Hielke Buddelmeyer Gilles Mourre, and Melanie Ward 2004a). More recently, the influences of changes in occupational distribution, rather than distributions by industry have been highlighted as having a greater effect. Janet Rives and Kim Sosin (2002) show in the UK that although at times of recession unemployment rises for both genders, the occupational distribution favors women's employment. More specifically, within occupations, women's unemployment rates are consistently higher than males, but the distribution of occupations favors women, because low unemployment occupations have relatively higher proportions of women. This evidence supports the fact that we could expect a gender-specific effect of interest rates on employment. Although with different forces in place it is difficult to predict the direction of the effect.

Labor market attachment

A differential sensitivity of employment between men and women to interest rates can also result from gender differences in the division of part-time and full-time work and labor market attachment and its correlation with occupational segregation. In both Europe and the US, women are found to have a significantly lower percentage of preference for full-time work compared to men (Rebecca Blank 1998; Hielke Buddelmeyer, Gilles Mourre, and Melanie Ward 2004b; Elena Bardasi and Janet Gornick 2008, for example). As a result, women concentrate more in temporary and part-time jobs, which are more sensitive to economic downturn and

upswings. Occupation segregation is also positively correlated with the share of part-time jobs, as these jobs tend to be in occupations traditionally held by women.

Job Tenure

A third reason we could expect monetary policy to exert a differential employment response for men and women is the differences in job tenure (Lalith Munasinghe and Tania Reif 2004). Women have been known to have shorter tenure and consequently be laid off faster than men (see Alison Booth, Marco Francesconi, and Carlos Garcia-Serrano 1999 for the case of the UK.).[4] As a result, in times of economic downturns male and female employment can respond differently. Christopher Ruhm (1987) finds that although the inverse relationship between job duration and turnover rates holds in the US, workers with substantial tenure in recently held jobs are more vulnerable during cyclical fluctuations. This effect is strengthened in sectors, which are particularly hit by recessions.

Gender discrimination

Employer gender discrimination can also result in employment segregation and be the cause of a gendered employment effect resulting from changes in interest rates. Employers may perceive the productivity of men and women differently and prefer to hire one of them over the

[4] The disparity in tenure rates has been decreasing in the US with male tenure decreasing since the late 1990s and female tenure remaining more or less stable since the early 1980s (see Craig Copeland 2007, Figure 2 and Figure 3). Booth, Francesconi, and Garcia-Serrano 1999 find that in the UK although women are more likely to be laid off, the termination rates among men and women are similar. Men are more likely to quit, while women are more likely to be terminated for other reasons. They also find that occupation significantly affects termination of the first job, but by the fifth job their impact is no longer statistically significant. It is also interesting to note that men and women display similar job separation behavior particularly by the time they are in their fifth job.

other, either in hiring/firing the more productive or hiring/firing the seemingly less productive and offering a lower wage. This type of behavior may not be evident when the economy is operating close to full employment, but can certainly be in effect at times of economic downturns.

Although, the argument of employer discrimination is difficult to maintain with the existence of widespread occupation segregation, there is empirical evidence in the US showing that in male dominated occupations and industries, in the past, the unemployment rate for women increased more at the cycle troughs (See literature review in Rives and Sosin 2002; Ghazala Azmat, Maia Guell and Alan Manning 2006). More recently, Ajit Singh and Anne Zammit (2002) find that women in developing countries were fired at significantly higher rates than men after the Asian financial crisis. It has also been found that employers in developing countries may prefer to employ men as a means of reducing costs in recessionary times given that women are more likely to be on leave due to maternity leave or illness despite the fact that they are perceived as reliable employees (Stephanie Seguino 2003).

In Summary

Given the empirical evidence on employment segregation, gender differences in tenure and possibly employer gender discrimination discussed above, there are reasons to believe that gender differences in the effect of monetary policy changes on employment may exist in OECD counties. However, the overall direction of these effects is difficult to predict. As previously mentioned, there is some evidence that this is true for developing countries. Braunstein and Heintz (2008) examine a set of low- and middle-income countries and find evidence that periods of inflation reduction have a disproportionately negative effect on female employment. One

could argue that in OECD countries male and female employment and unemployment rates move so closely together that there is no reason to expect gender differences in employment response to monetary policy changes. Yet, as our discussion shows, occupation and industry segregation and the variation in labor market attachment for men and women still exist in some high-income countries and so employment response differences between men and women are worth investigating.

3. Theoretical Framework

In all the countries in this study, the short-term interest rate is the preferred monetary policy instrument. Thus, to quantify the effect of monetary policy on employment we use a theoretical framework that links short-term interest rate to employment. We choose the IS curve as the basis for the empirical model, as it relates aggregate output to interest rates.[5]

In its most general form, the IS curve can be written in the following way (see, for example, David Romer 2006 or Olivier Blanchard and Stanley Fischer 1989):

$$Y = f(Y, i - \pi^e, F), \tag{1}$$

where Y is real output, π^e is expected inflation, i is the nominal interest rate, and F is index of fiscal policy. We assume that expected inflation is a four-quarter inflation average (this treatment

[5] One alternative to our approach would be to do an exercise similar to that of Braunstein and Heintz (2006) – i.e. identify deflationary episodes for a selected set of countries and then look at actual employment trends during each deflationary episode, comparing these actual employment trends to long-run employment trends. However, in that case it would be necessary to take a stand on our choice of deflationary episode methodology. Additionally, we would not be able to control for changes in other macroeconomic variable that can also affect employment (such as real exchange rate fluctuations, for example).

is similar to Glenn Rudebusch and Lars Svensson 1999 and Laurence Ball and Gregory Mankiw 2002):

$$\pi^e = \frac{1}{4}\sum_{i=0}^{3}\pi_{t-i} \quad , \tag{2}$$

Equation (2) can be interpreted as the case of adaptive expectations. Many students of inflation dynamics use models of rational expectations. While appealing on theoretical grounds, rational expectations models of inflation have some drawbacks as they do not capture inflation inertia, which put them at odds with the data (a detailed discussion of rational expectations models and some of the challenges these models present for empirical research can be found in Laurence Ball 2000). Although it would be unreasonable to assume adaptive expectations regardless of the inflation process, this assumption is plausible for the time period considered in this paper (Ball and Mankiw 2002 discuss this in detail). During this period, inflation has been following a process close to a random walk (Robert Barsky 1987, Ball 2000). When inflation follows a random walk, forecasting future inflation using past inflation (the assumption of adaptive expectations models) is close to rational.

Another issue to consider is whether it is past or future output that should affect current output in the IS curve. While a lot of authors have devoted their attention to the relative importance of current and future inflation in current price determination, very little work has been done on the relative importance of past and future output in determining current output. Glenn Rudebusch and Jeffrey Fuhrer (2004) estimate a forward looking IS curve using alternative estimation techniques and find that expectations of output have a relatively modest effect on current output, while the effect of lagged output is sizeable and empirically robust. As a result, we work with a purely backward looking equation specification.

To extend the model to open economies, we also include the real exchange rate as an additional term in our aggregate demand equation (see Ball 1999b and Lars Svensson 2000). Since we use quarterly data, we include four lags of dependent variables in our equation. The aggregate demand curve that serves as a basis to our empirical model is of the following form:

$$y_t = \sum_{i=1}^{4} \alpha_i y_{t-i} + \sum_{i=1}^{4} b_i (i_{t-i} - \pi^e_{t-i}) + \sum_{i=1}^{4} \delta_i e_{t-i} + \varepsilon_t , \quad (3)$$

where y is (log) real output, i is a short-term interest rate, $\pi^e$is expected inflation as defined above, and e is the (log) real exchange rate.

We are ultimately interested in the link between interest rates and employment. To formally make that link, we assume a simple production function:

$$Y = L^{\theta},$$

where L is employment, Y is output and $\theta \in (0,1)$. Taking logs of the above, we get the link between employment and output:

$$y = \theta l. \quad (4)$$

Finally, we substitute equation (4) into equation (3) to capture the relationship between employment and short-term interest rates:

$$l_t = \sum_{i=1}^{4} \alpha_i l_{t-i} + \sum_{i=1}^{4} \frac{b_i}{\theta} (i_{t-i} - \pi^e_{t-i}) + \sum_{i=1}^{4} \frac{\delta_i}{\theta} e_{t-i} + \varepsilon_t ,$$

Finally, let $\frac{b_i}{\theta} = \beta$ and $\frac{\delta_i}{\theta} = \gamma$:

$$l_t = \sum_{i=1}^{4} \alpha_i l_{t-i} + \sum_{i=1}^{4} \beta_i (i_{t-i} - \pi^e_{t-i}) + \sum_{i=1}^{4} \gamma_i e_{t-i} + \varepsilon_t . \quad (5)$$

The gender-specific equivalent of (5) is:

$$l^x_t = \sum_{i=1}^{4} \alpha^x_i l^x_{t-i} + \sum_{i=1}^{4} \beta^x_i (i_{t-i} - \pi^e_{t-i}) + \sum_{i=1}^{4} \gamma^x_i e_{t-i} + \varepsilon^x_t , \quad (5')$$

where $x = m$ or f, and m=male, f= female . We will use this equation as a base for our empirical investigation.

The partial relationship of changes in the real interest rate with changes in employment is captured by the coefficients on the real interest rate (β_i). The total effect is given by the following relationship (that takes into account employment inertia):

$$\varphi^x = \frac{\sum_{i=1}^{4} \beta_i^x}{1 - \sum_{i=1}^{4} \alpha_i^x}, \tag{6}$$

Equation (6) is the total elasticity of employment with respect to short-term interest rate, and we this parameter is the focus of our empirical results.

4. Data

We use quarterly data from 1980-2006 for Canada, Finland, Italy, Japan, Norway, Spain, Switzerland, the US and the UK. These are the OECD countries for which gender-specific employment and real effective exchange rate data are available from the 1980s and thus allow a reasonable time span for analysis.

Gender-specific employment data is available from OECD's Quarterly Labor Force Statistics Database (OECD 2007). The employment series are also disaggregated by sector: agriculture, industry and services. We seasonally adjust employment series using the Census X11.2 methods (multiplicative), which is a standard method used by the US Census Bureau to seasonally adjust publicly released data.

We use the private consumption deflator (PCD) from the OECD Economic Outlook 80 database. We chose the PCD index over the popular Consumer Price Index (CPI), because it is a chain price index (while CPI is a fixed price index). Therefore, the PCD index represents true

changes in the consumer's cost of living more accurately. From this prices index, we compute the annualized inflation rate as $\pi_t = 400*(\ln P_t - \ln P_{t-1})$, where P is PCD.

Real effective exchange rate data come from the OECD Main Economic Indicators (MEI) database. We use the CPI-based real effective exchange rate index. This exchange rate index is a chain-linked index.[6]

The data on interest rates comes from the International Financial Statistics (IFS) database provided by the International Monetary Fund (IMF 2007). Our goal was to use interest rate that is directly influenced by monetary policy of a given country (or interest rate that is closely tied to the interest rate influenced by the monetary authority). Thus, we used money market rates from the World Tables in IFS.[7]

Selected summary statistics of our data can be found in Tables 1a and 1b. The tables show summary statistics for the whole sample, as well as for two sub-samples: 1980:1-1992:4 and 1993:1 – 2006:4 (The reasons for considering two sub-samples and the choice of the break date are discussed in the next section of the paper). Table 1a shows the ratios of female-male employment shares. A ratio greater than 1 indicates the sector mostly employs females; a ratio less than 1 indicates the sector is male dominated. The trend over the whole sample period can

[6] Percentage changes in the index are calculated by comparing the change in the index based on consumer prices for the country concerned (expressed in US dollars at market exchange rates) to a weighted average of changes in its competitors' indices (also expressed in US dollars), using the weighting matrix of the current year. The indices of real effective exchange rates are then calculated from a starting period by cumulating percentage changes. This gives a set of real effective exchange rates based on moving weights.

[7] The money market rate for Canada is the overnight money market rate; for Finland it is the average cost of central bank debt; for Italy and Switzerland the money market rate; for Japan, Norway and Spain, the call money rate; for the UK the overnight interbank rate; and the federal funds rate for the US.

be found in Figure 1. We find that in all countries, agriculture and industry are male-dominated sectors and, for the most part, increasingly so over time. In all countries, women are increasingly and mostly concentrated in the service sector[8]. In Canada, Finland, Norway, Switzerland, the UK and the US services are female-dominated. In Italy, Japan and Spain all sectors are male dominated. Although this is changing, as these countries exhibit the biggest increase in female concentration in the service sector among the sample OECD countries.

For all the countries in the sample, short-term interest rates and inflation are much lower in the 1993-2006 period than in the 1980s and early 1990s (Table 1b and also Figure 2). Interest rates and inflation are less volatile in the later sub-sample. This recent reduction in macroeconomic volatility has been observed by several authors (Ben Bernanke 2004).

We examine the sensitivity of employment sectors and interest rates by looking at their significant correlation coefficients in Appendix Table A.1a and A.1b. We find that while agriculture is generally not sensitive to changes in interest rates, industry and services are to some extent. Industry is most sensitive in Spain, Japan, Canada and Finland in the whole sample and also in the UK for the earlier period. Services are most sensitive in Spain, Norway, Finland and UK. In Table A.1b we find male employment in the industry sector to be sensitive to changes in interest rates in Canada, Finland, (Japan but opposite sign), and Spain. In Spain, the UK and the US (with a positive sign) female employment also exhibits this sensitivity. For services the sensitivity is present for both gender groups in Italy, Norway and Spain; and also female employment in Finland and male employment in the UK.

[8] Total employment in Table 1a also observes a similar trend of having an increased share of women in employment compared to men.

5. Estimation Methodology

5.1 Single Equation Estimation

First, we look at the relationship between employment and interest rate for total employment, as well as for employment decomposed by gender and by sector (agriculture, industry and services). We compare and test the difference in the employment elasticity with respect to short-term interest rates (parameter φ given by equation 6) for males and females. We estimate the equation for each individual country in the sample, using the Newey-West covariance estimator—known to be consistent in the presence of both heteroskedasticity and autocorrelation of unknown form.

Since the employment and real exchange rate series used are non-stationary,[9] we estimate our model in first differences (except for the interest rate, which is in percentage differences)[10].

$$\Delta l_t^x = \sum_{i=1}^{4} \alpha_i^x \Delta l_{t-i}^x + \sum_{i=1}^{4} \beta_i^x \Delta(i_{t-i} - \pi_{t-i}^e) + \sum_{i=1}^{4} \gamma_i^x \Delta e_{t-i} + \varepsilon_t^x . \quad (7)$$

First, we estimate equation (7) for each country and the whole sample period (1980-2006). Next, we examine parameters in the pre- and post-ERM crisis sub-periods: 1980:1-1992:4 and 1993:1-2006:4 and test their stability.

[9] We performed an augments Dickey-Fuller unit root test on all the series, and experimented with three different versions of the equation by including a constant, a constant and linear trend, or neither. We could not reject the null hypothesis in most cases for the employment and real exchange rate series.

[10] Estimating an equation relating employment to other macroeconomic variables in log differences is standard in the literature (see, for instance, the 2001 study by Jose Manuel Campa and Linda Goldberg, who examine the effect of exchange rate on employment or the 2005 study by William Nordhaus who looks at the relationship between employment growth and productivity growth).

Only three out of the nine countries in our sample were ERM participants prior to 1992[11]. However, the crisis certainly hit other financial markets and its effects were felt globally (see Truman 2002). In fact, it can be argued that the crisis affected other economies to a larger extent than it affected the ERM members themselves. For instance, the UK's (who exited the ERM mechanism in 1992) real GDP *rose* by 2.2% in the year following the crisis (1992), but for the European Union as a whole real GDP *contracted* by 0.4 %. Finland and Sweden (at the time, not members of the EU) also experienced a year of real GDP decline (Ibid)[12].

The single equation approach differs from those utilized by others studying the link between gender-specific employment and interest rates. Braunstein and Heintz (2008), for example, borrow from the literature on "sacrifice ratios" (the loss of output associated with a given reduction in inflation). Following the methodology of Laurence Ball (1993), they identify disinflationary periods and then examine changes in employment across inflation reduction episodes. Our approach does not call for taking a stand on a methodology to identify disinflationary episode (necessary to follow the approach of Braunstein and Heintz).

VAR Estimation

The estimation methodology discussed above draws on theoretical ideas on the relationship of variables in the equation and, therefore, allows us to put economic interpretation

[11] See Eurostat data at http://europa.eu.int/estatref/info/sdds/en/ert/ert_erm_sm.htm.

[12] GDP growth in the UK was 0.21% in 1992 (year of the crisis), 2.27% in 1993, 4.32% in 1994. In Finland growth rates were -3.85%, -0.85% and 3.57 % in 1992, 1993 and 1994 respectively. For Sweden it was -1.18% (1992), -2% (1993) and 3.82%. (1994). These growth rates are computed using real GDP data from OECD Economic Outlook No 82 (GDP, volume, at the price levels and PPPs of 2000)

on estimated coefficients. However, as discussed above, there is a potential exogeneity problem, particularly between interest rates and exchange rates. When one is in doubt regarding the exogeneity of variables, one solution is to treat each variable symmetrically. This is the advantage of a vector autoregression (VAR) analysis. VAR analysis is currently the predominant approach in identifying the effect of monetary policy shocks on other key variables. For example, VAR approach has been used by those interested in the effect of monetary policy on gender-specific employment (Abell 1991) or labor market outcomes of minorities and less-skilled (Willem Thorbecke 2001 and Seth Carpenter and William Rodgers 2004)

A reduced-form VAR (proposed by Sims 1980) is a regression of a vector of variables describing the general state of the economy, Z_t, on lags of this vector. The reduced-form VAR can be written in a matrix form as

$$Z_t = \gamma + \Gamma_0 Z_{t-1} + ... + \Gamma_k Z_{t-k} + u_t , \tag{8}$$

where γ is the vector of constants, $\Gamma_1 \ldots \Gamma_k$ are matrices of coefficients, and u_t is a vector of uncorrelated white-noise disturbances. The estimates of γ, $\Gamma_1 \ldots \Gamma_k$ are obtained applying the ordinary least squares (OLS) to each part of equation (8) separately, and the estimate of the variance-covariance matrix of the residuals, Σ_u, is given by the sample covariance of OLS residuals.

Identification of structural monetary policy shocks in both closed- and open-economy VAR analysis is controversial, however, as there are few highly credible identifying assumptions. Open economy VARs (which are appropriate for our analysis) are particularly problematic due to simultaneity issues. At a minimum, the open economy VAR must include short-term interest rates for each country and the exchange rate. Researchers have yet to find satisfactory identifying restrictions for sorting out the contemporaneous movements in these

variables. It is due to this difficulty associated with VAR analysis; we opted to utilize both single-equation and VAR methodology.

The specific VAR we estimate contains the log of domestic output (measured as real GDP), the log of domestic price level (measured by personal consumption deflator), the log difference between male and female employment in a particular sector (we use total employment, as well as employment in agriculture, industry and services), the short-term interest rate, and the real effective exchange rate[13]. This ordering implies that actions of the central bank are informed by developments in the economy (i.e. output, prices, and labor market outcomes), but policy affects these variables with a lag. Ordering exchange rate last is standard to the literature (see, for instance, Martin Eichenbaum and Charles Evans 1995 or Jon Faust, John Rogers, Eric Swanson and Jonathan Wright 2003). Each VAR includes a constant and 4 lags.

6. Estimation Results

6.1 Single Equation Estimation

The elasticity of employment with respect to the short-term interest rate over the whole sample period (calculated from estimating equation (7) as given by equation (6)) can be found in Tables 2a – 2d. Each of the four tables reports estimation results for a different employment measure (total employment, employment in agriculture, employment in industry and

[13] There is a debate about whether the variables in a VAR need to be stationary. Some (Christopher Sims 1980, Thomas Doan 1992) argue against differencing (even if the variables contain a unit root), as differencing "throws away" information concerning co-movements in the data. A similar argument applies to de-trending the variables. We have attempted to run the VAR with both de-trended and differenced variables, and the results are qualitatively similar to those obtained to series that have neither been de-trended nor differenced. Thus, we will only present one set of results.

employment in services) and reports the employment elasticity of males (denoted with φ^{M}) and females (denoted with φ^{F}) and the standard errors for these estimates (in parenthesis). The last row of each table shows the p-value for testing the hypothesis that there is no difference in the employment elasticity of men and women.

Estimation results indicate that, with the exception of total employment in Norway, there are no significant differences in male and female employment elasticity. For total employment in Norway, the sensitivity of male employment to interest rate is significantly higher than that of female employment. It is important to note that in most cases our estimates of the employment elasticity with respect to the interest rate are not significantly different from zero, which implies that the transmission channel from the short-term interest rate to employment is generally rather weak and suggests that the employment costs of monetary policy changes in industrialized countries may be rather small with no significant gender differences in these employment costs.

Next, we estimate the same model in equation (7) for two sub-samples: 1980:Q1 – 1992:Q4 and 1993:Q1 – 2006:Q4 (the choice of 1993:1 as a break date is discussed in methodology section)[14]. The results for the four employment groups (total, agriculture, industry and services) are presented in Tables 3a-3d. The first two columns report male employment elasticity for the two sub-samples (designated with φ_1^M and φ_2^M), and the next two columns show the employment elasticity for females (denoted with φ_1^F and φ_2^F). The next four columns report p-values for testing various null hypotheses. The fist two columns of p-values correspond to the null hypotheses that male and female interest rate elasticity of employment is the same for a

[14] The ERM brake data also coincides with large differences that have occurred in the labor market in the 1980s and 1990s particularly for women, but men as well.

given period ($\varphi_1^M = \varphi_1^F$ and $\varphi_2^M = \varphi_2^F$). The last two columns report whether the elasticities for males and females have changed over time ($\varphi_1^M = \varphi_2^M$ and $\varphi_1^F = \varphi_2^F$).

We begin by discussing the results reported in the first two columns with p-values. Looking at total employment elasticity (Table 3a), we see no significant differences between male and female employment elasticity for either sub-period (none of the reported differences between male and female employment elasticity are significantly different from zero).

Aggregate employment numbers may mask gendered differences in employment sensitivity to short-term interest rates that are present in other sectors. Thus, we proceed to look into employment data disaggregated by three sectors. We find that within each sector, there are no signs of significant gendered differences in employment elasticity. This confirms the conclusion we reached when we estimated the model for the whole sample.

The p-value results of within-gender comparisons of employment elasticities over time are in the last two columns. We find that there are no significant changes of the employment elasticity for total employment (Table 3a) for both men and women. For employment in agriculture (table 3b), we find significant changes in employment elasticity over time for males in Italy and Norway and females in Spain. In Italy and Norway, the employment sensitivity to interest rate in agriculture for men declines over time. In Spain it is unclear what happens to the elasticity sensitivity over time for females.

In the industry sector (Table 3c), we find no significant changes in employment elasticity for males, but we do find significant changes for females in Norway, the U.K. and the U.S.. In Norway, we find a decline in the employment sensitivity to short-term interest rates for women and an increase in the U.S.. It is unclear, in which direction the females' sensitivity of employment moved in the UK

The within-gender sensitivity in the employment elasticity in the services sector (Table 3d) occurred only in Japan for men, but it is unclear in which direction.

To summarize, our main conclusion from estimating a single equation is that we find no evidence of significant differences in gender-specific employment responses to short-term interest rates in any of the three sectors we have investigated (agriculture, industry and services). This is true for both 1980s and 1990s. We find some evidence of within-gender changes in employment elasticity across time, but the changes are not systematic and exist for only a few countries in the sample.

These results are in contrast with the conclusions reached in Braunstein and Heintz (2008), which provide evidence that in developing countries the costs of monetary policy aimed at inflation reduction are gender-specific and may be higher than generally presumed.[15]

While the investigation of the reasons behind the differences in employment responses to interest rate fluctuations between countries is beyond the scope of this paper, we believe that the finding of no gendered differences in interest rate elasticity of employment is an important one. As discussed in the introduction, there is a concern that the focus on low and stable inflation may lead to undesirable outcomes in employment at times of monetary policy

[15] The countries under investigation in Braunstein & Heintz (2008) differ to a great extent from countries in our study in terms of labor market institutions, occupational segregation and labor market attachment for a start. With a larger employment and occupation segregation and lower labor market attachment for women in developing countries then in industrialized countries combined with less imposing labor market institutions it is plausible that asymmetric differences in unemployment responses to monetary policy exist in these countries. Additionally, many of the countries discussed by Braunstein and Heintz (2008) have experienced periods of large changes in inflation, whereas inflation fluctuations for the countries in our sample have been modest in comparison (please refer to Figure 2 for inflation series for the countries in our sample).

changes (among other variables). Our finding indicates that the link between employment and short-term interest rates in developed countries is neither strong, nor varies by gender.

6.2 VAR Estimation Results

Next, we step away from our single equation approach and move to a recursive VAR. As discussed in the methodology section, the variables in our VAR are ordered as following: log of real GDP, log of personal consumption deflator, log difference between male and female employment, short-term interest rate, and the log of real exchange rate. We call a shock to the short-term interest rate a monetary policy shock (a positive innovation to the short-term interest rate is a contractionary monetary policy shock).

Figures 3-6 depict the response of the log difference between male and female employment to a contractionary monetary shock. A negative response indicates that the employment of males falls by more (is more sensitive) than that of females following a negative monetary policy shock. As can be seen from the Figure 3, Italy is the only country in the sample for which the response of female total employment to a contractionary monetary policy shock exceeds that of male. For the rest of the countries, it is male employment that drops more following a negative monetary policy shock than female employment. The impulse response functions for the employment differential for Canada, Finland, Spain, U.K., and the U.S. indicate that the difference in male and female employment response is significantly different from zero.

We repeat the above exercise for sector-specific employment. Figure 4 presents impulse response functions for employment differentials in agriculture. None of the estimates suggest that the response of employment differential to negative monetary policy shock is significantly

different from zero. Only in Japan the response of female employment to monetary policy shock is stronger than that of male employment.

Figure 5 shows results for employment differential in industry. Although, none of the impulse responses suggest that the difference between male and female employment is significantly different from zero, in Canada and Switzerland, the impulse responses suggest that the sensitivity of female employment to a negative monetary policy shock is larger that that of male.

Figure 6 shows results for employment differential in services. For Italy, Japan, and Spain, the estimation results suggest that female employment in services is more responsive to shock than male employment. For the remainder of the countries, the response of male employment exceeds that of female. However, as with the employment differential for the other two sectors, we cannot reject the hypothesis that male and female responses to a contractionary monetary policy shock are equal.

To summarize, our VAR estimation results support the conclusion reached when a single equation model was estimated. We do not find strong evidence in support of the claim that there exists a significant gender difference in employment sensitivity to monetary policy shocks.

7. Summary and Conclusions

This paper looks into differential effects of interest rate changes on gender-specific employment. Existing research indicates that such differential effects exist in developing countries. Recent evidence suggests that in industrialized countries women tend to work in a different and narrower range of occupations than men, have shorter tenure than men and have different labor market attachment. Given this evidence from industrialized countries and the

transmission mechanism of monetary policy into employment, it is reasonable to expect gender differences in monetary policy effects on employment in these countries as well.

To formally investigate into differences in employment sensitivity to monetary policy, we employ two methodologies— single-equation estimation and VAR — and use quarterly aggregate data for 1980-2006 for nine OECD countries. Our single-equation empirical model is based on Euler equation for output. Employment in this model is affected by interest rate fluctuations, real exchange rates and is assumed to be persistent. The VAR approach, we utilize, where all variables are treated as endogenous reconfirms our results from the single equation approach. We find that the link between short-term interest rates and employment is rather weak for the majority of countries. The estimation results do not lend support to the hypothesis of gender differences in interest rate employment elasticity, nor do they lend support to the claim that employment costs of inflation reduction are high. Our results are robust to stratifying by employment sectors (total, agriculture, industry and services).

We believe that our main finding is important, as the monetary authorities of all the countries we have investigated have signaled that low and stable inflation is on top of their list of priorities (if not their only priority). The focus on price stability appears to have intensified during the 1990s yet, we have not found much evidence of significant changes of employment responsiveness to short-term interest rate between the 1980s and 1990s.

Perhaps, the recent volatility in financial markets that started in August of 2007 and threatens global economic growth will serve as an additional test to this finding in the future. In the event of a much feared global slowdown, will the labor markets in the United Kingdom and the euro zone suffer more than the US labor market because the Bank of England and the European Central Bank are committed to low inflation while the Fed has two goals of monetary

policy (maximum sustainable employment and price stability)? Will we see signs of the gender gap in employment sensitivity to recent monetary policy decisions?

We see several possible venues for future research. One would be to stratify our result of gender asymmetries in the responsiveness of employment to interest changes by age and education with the use of microdata. Mary Daly, Osborne Jackson and Robert Valletta (2007), for example, find that when it comes to unemployment and inflation tradeoff modeled by the Philips curve, college-educated workers face a sharper trade-off than their less educated counterparts. Another possible extension of this project would be to continue working with aggregate data, but use a consistent methodology to estimate employment sensitivity to monetary policy changes in both developing and developed countries and to compare gendered differences between employment responses for these two groups of countries. Lastly, investigating into reasons behind between-country differences in interest rate employment elasticity using data on labor market institutions seems like a fruitful venue for future research.

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Figure 1. Relative female and male employment rates by sectors (1980-2006).

Figure 2. Inflation rate and money market interest rate (1980-2006).

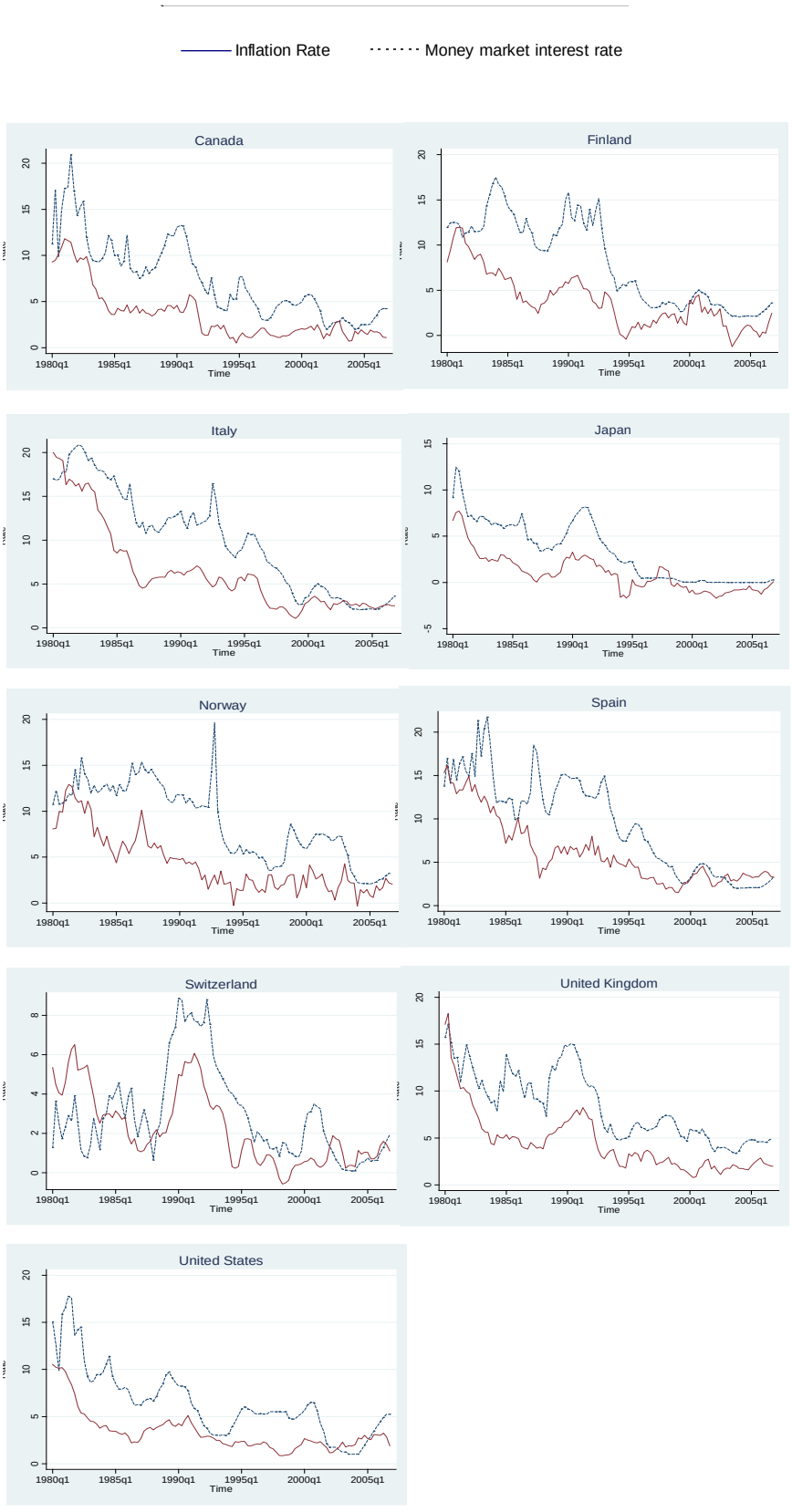


Figure 3. Effect of a 1 Standard Deviation Positive Innovation to the Short-Term Interest Rate on the Difference Between Male and Female Employment in all Sectors.

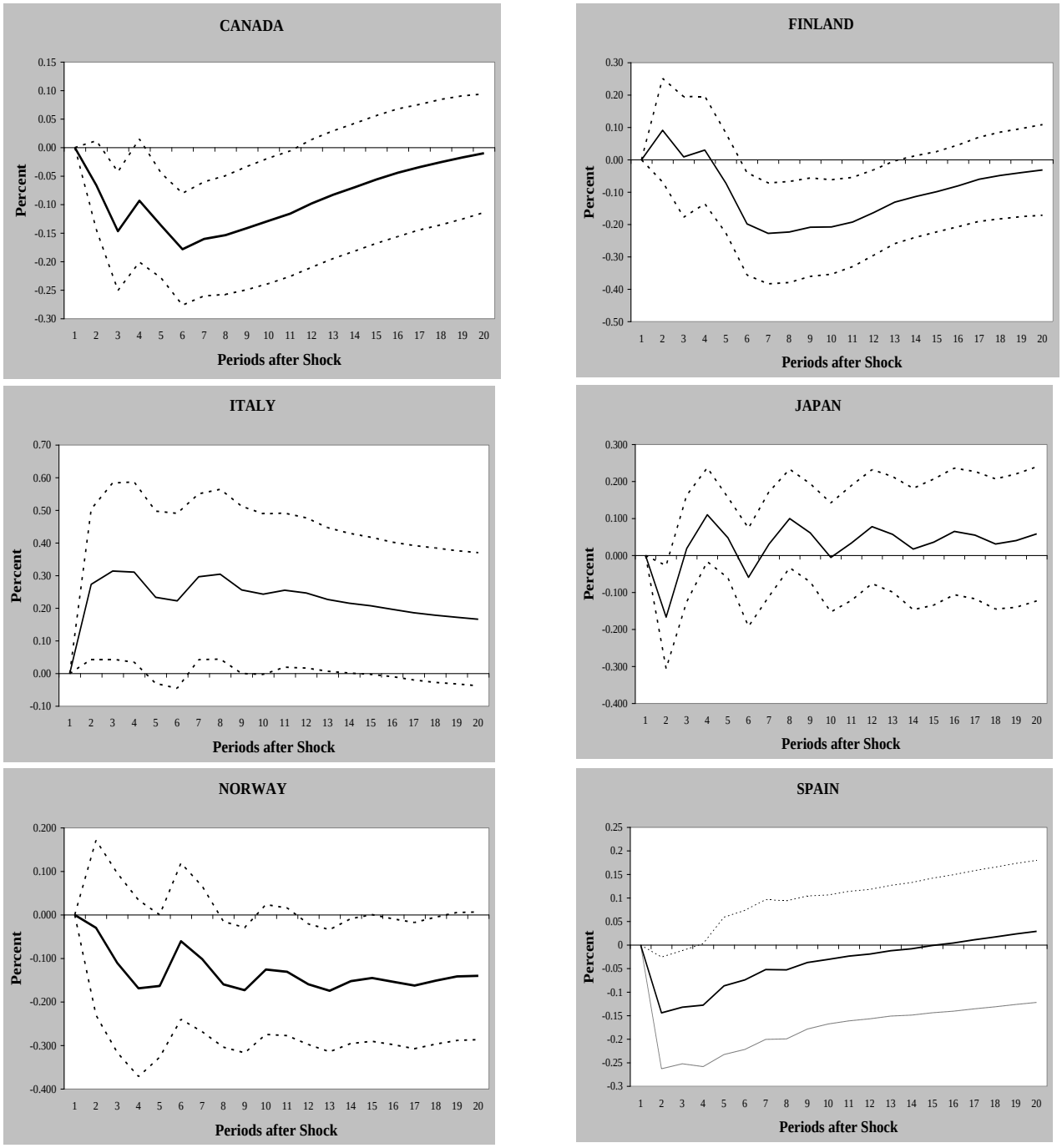
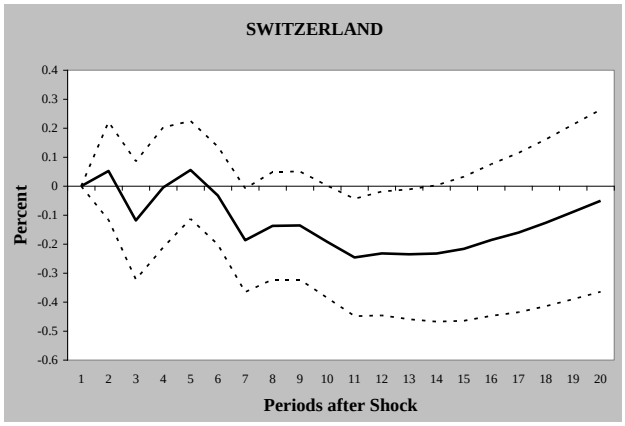
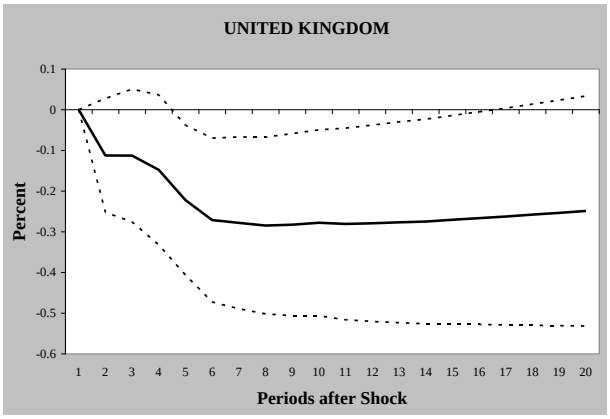


Figure 3. Effect of a 1 Standard Deviation Positive Innovation to the Short-Term Interest Rate on the Difference Between Male and Female Employment in all Sectors (Cont.)





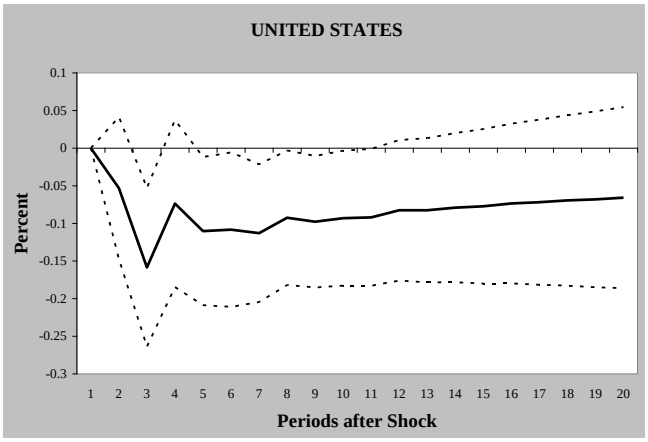


Figure 4. Effect of a 1 Standard Deviation Positive Innovation to the Short-Term Interest Rate on the Difference Between Male and Female Employment in Agriculture

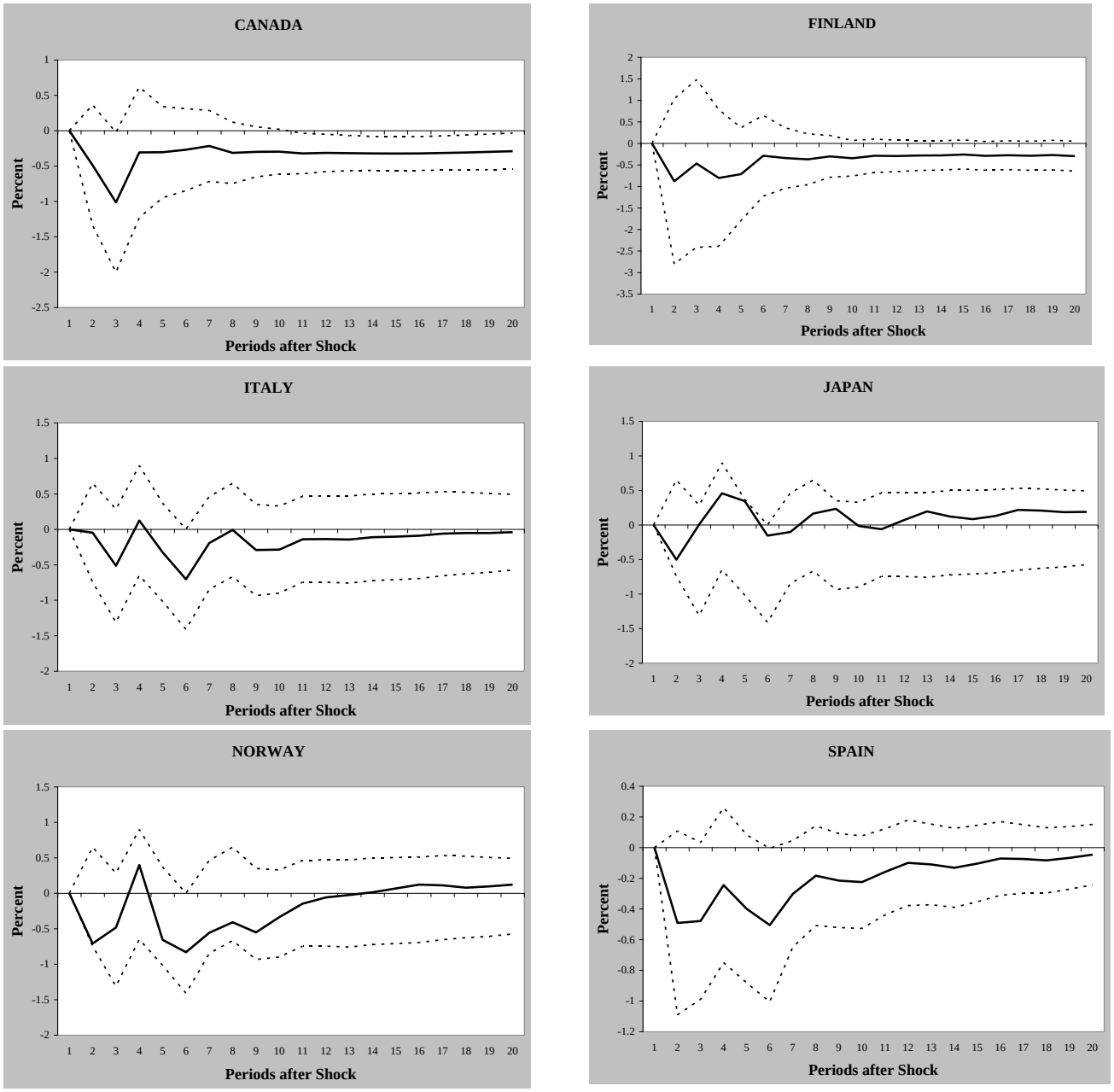
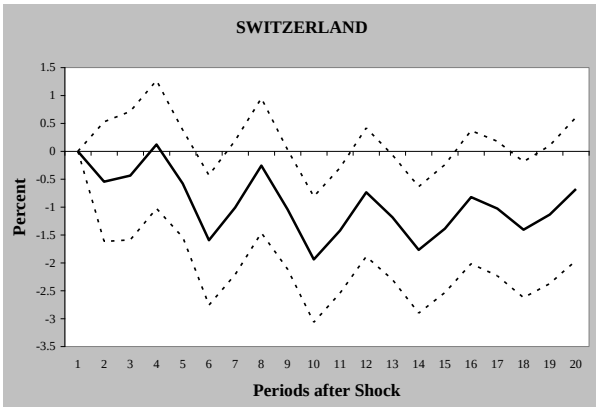
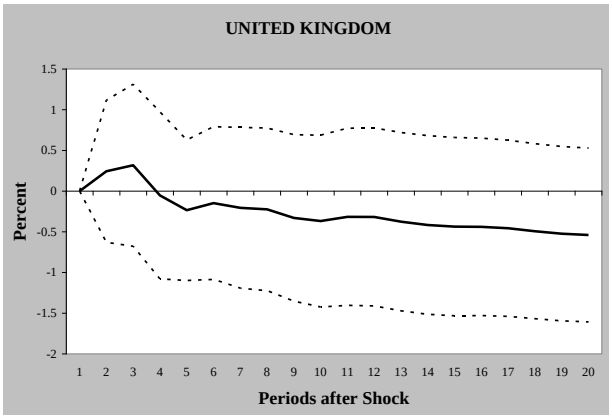


Figure 4. Effect of a 1 Standard Deviation Positive Innovation to the Short-Term Interest Rate on the Difference Between Male and Female Employment in Agriculture (cont.)





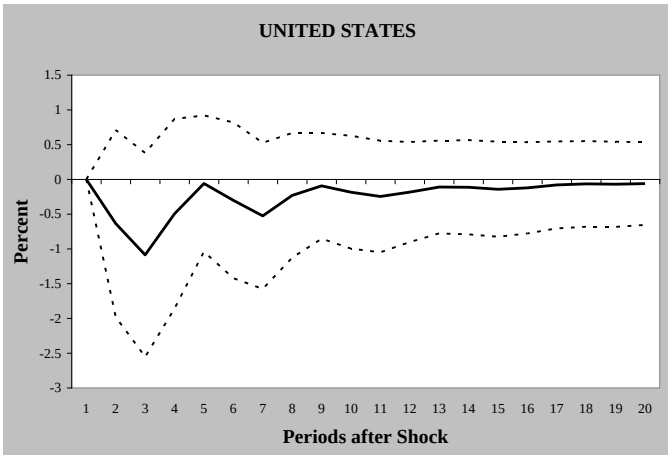


Figure 5. Effect of a 1 Standard Deviation Positive Innovation to the Short-Term Interest Rate on the Difference between Male and Female Employment in Industry

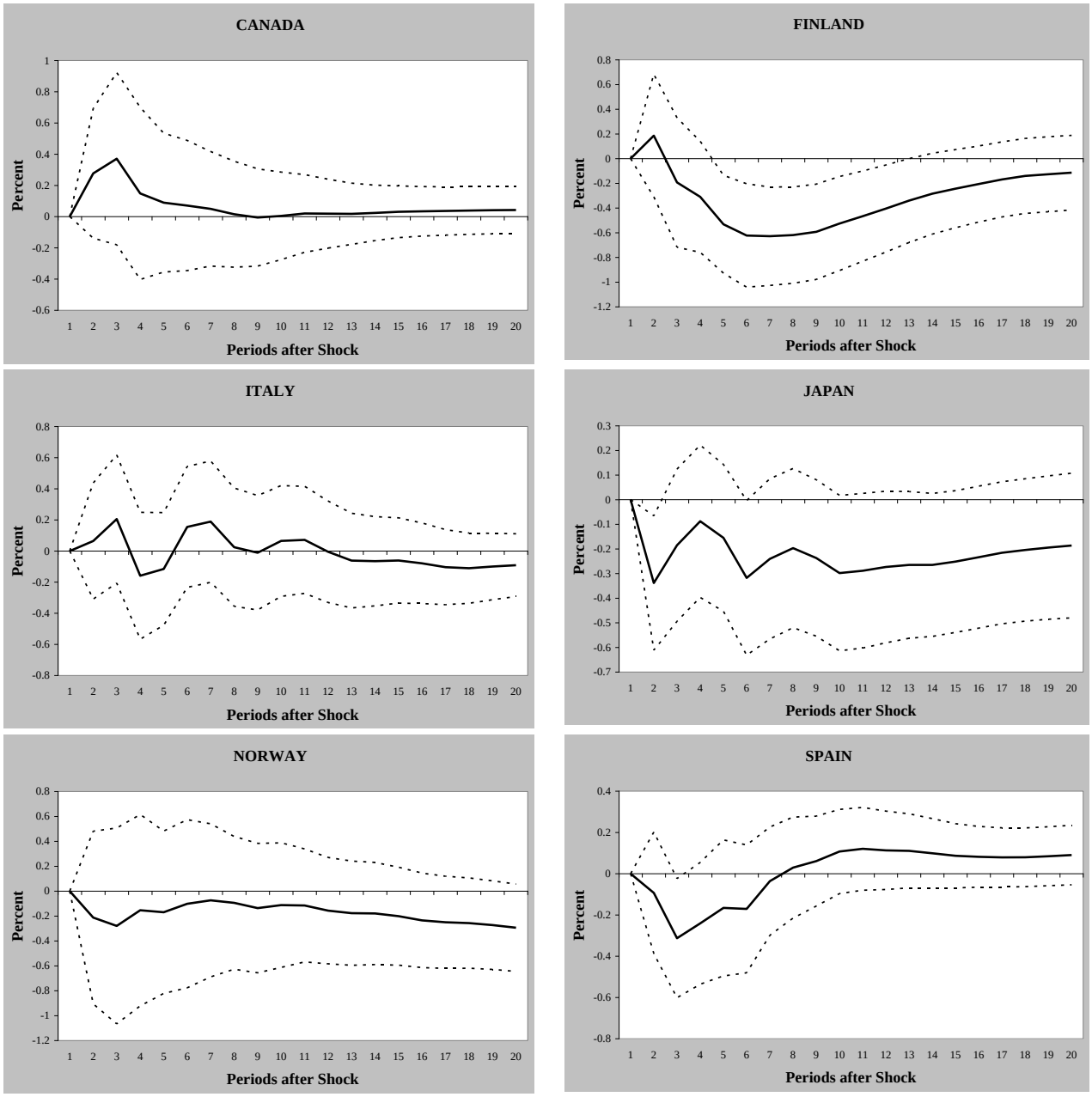
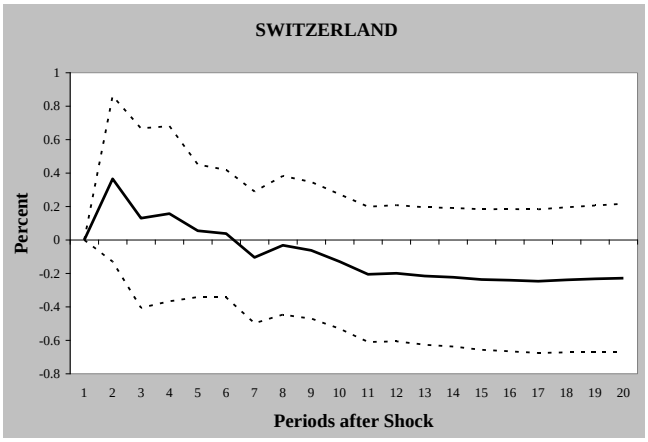
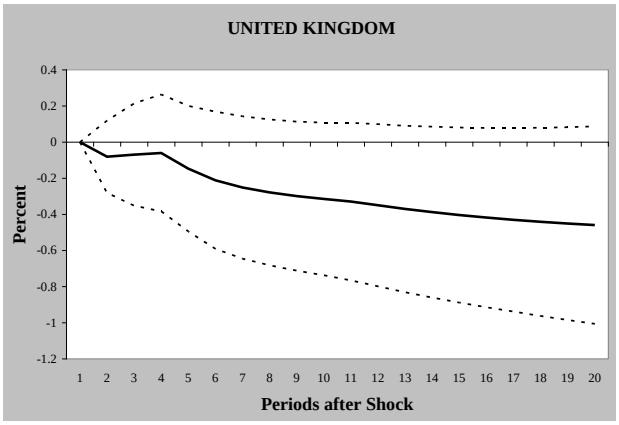


Figure 5. Effect of a 1 Standard Deviation Positive Innovation to the Short-Term Interest Rate on the Difference between Male and Female Employment in Industry (cont.)





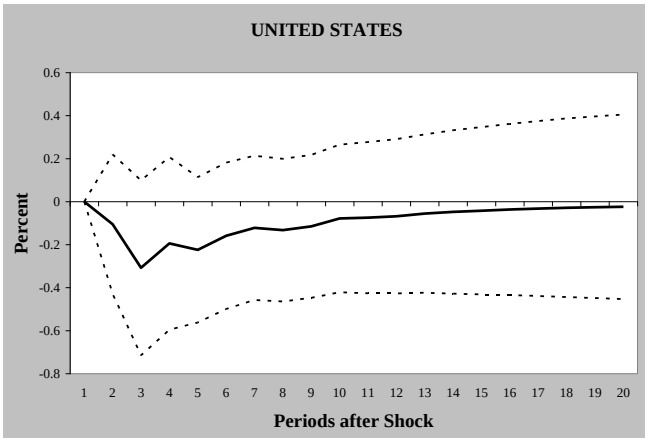
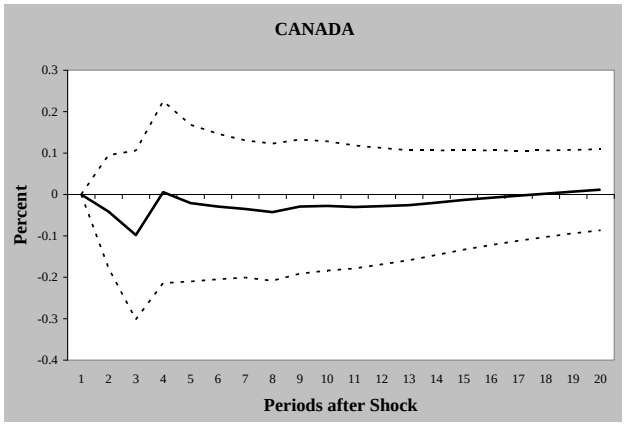
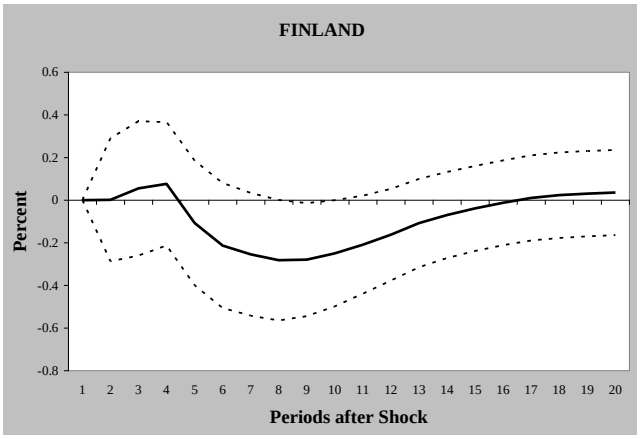
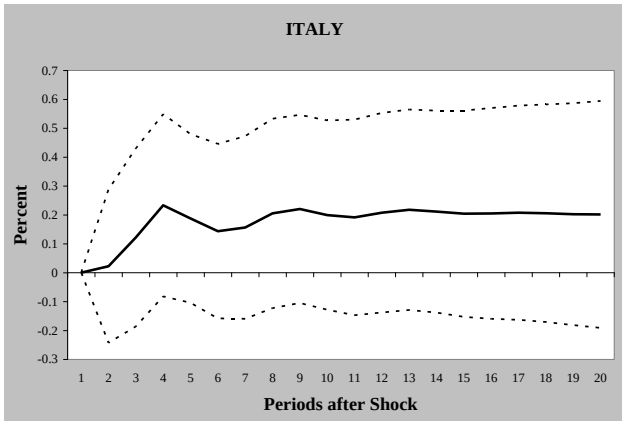
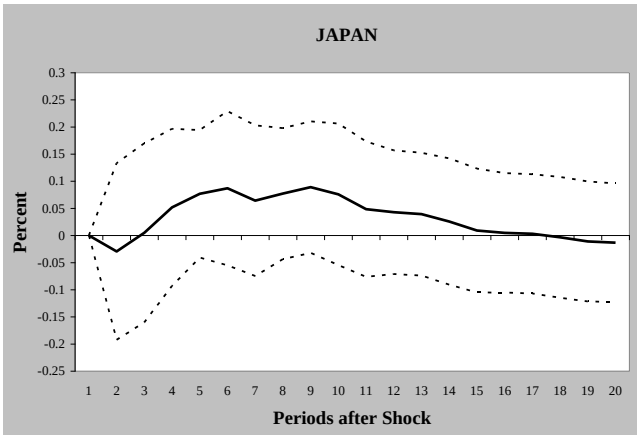


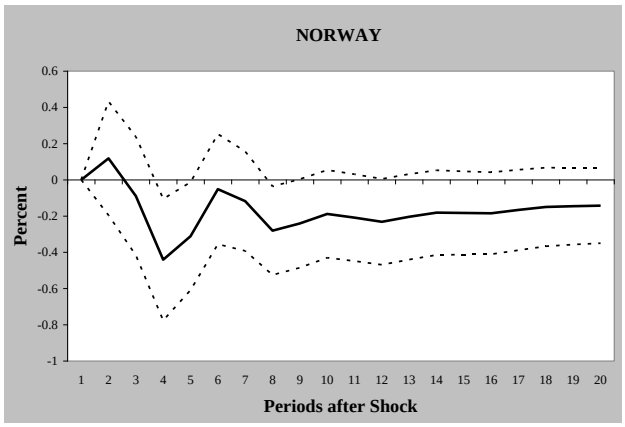
Figure 6. Effect of a 1 Standard Deviation Positive Innovation to the Short-Term Interest Rate on the Difference between Male and Female Employment in Services.











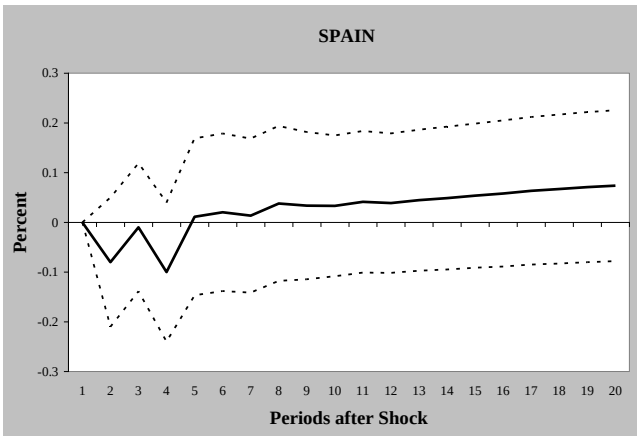
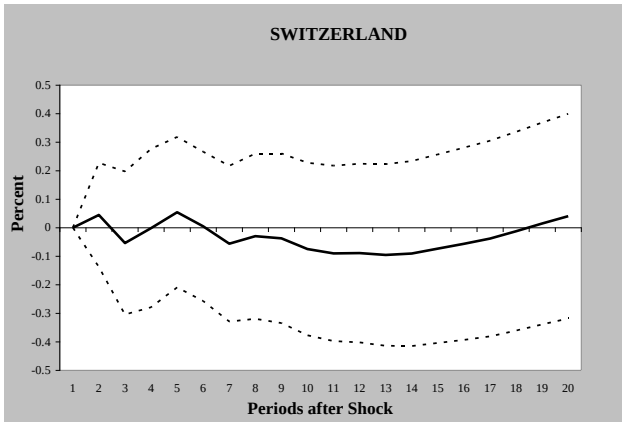
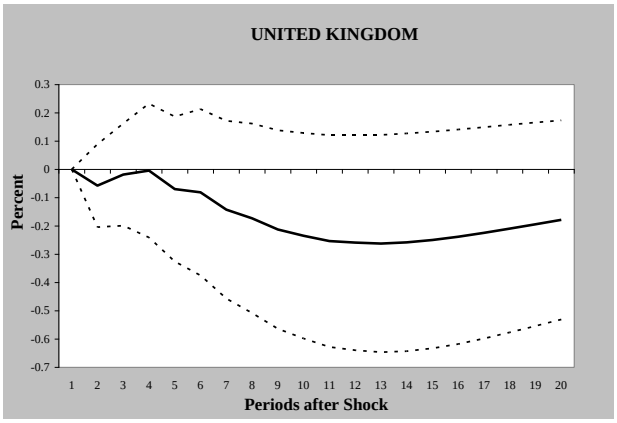


Figure 6. Effect of a 1 Standard Deviation Positive Innovation to the Short-Term Interest Rate on the Difference between Male and Female Employment in Services (cont.)





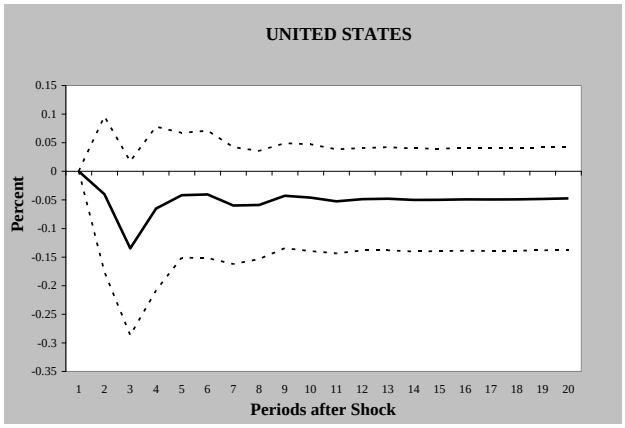


Table 1. Summary statistics for the whole sample and two sub-samples (1980-1992 and 1993-2006).

A. Average Employment Growth Rate

	Female						Male						Population					
	Overall		Sample 1		Sample 2		Overall		Sample 1		Sample 2		Overall		Sample 1		Sample 2	
		sd		sd		sd		sd		sd		sd		sd		sd		sd
Pooled	0.191%	0.047	0.378%	0.012	-0.006%	0.064	-0.166%	0.057	0.039%	0.009	-0.374%	0.078	0.248%	0.008	0.174%	0.009	0.298%	0.008
Canada	0.574%	0.006	0.600%	0.007	0.544%	0.006	0.272%	0.008	0.109%	0.009	0.412%	0.007	0.402%	0.007	0.316%	0.008	0.474%	0.006
Finland	0.113%	0.011	-0.015%	0.010	0.208%	0.011	0.049%	0.011	-0.201%	0.012	0.241%	0.009	0.080%	0.009	-0.108%	0.010	0.224%	0.009
Italy	-0.620%	0.097	0.206%	0.014	-1.451%	0.134	-0.937%	0.096	-0.061%	0.006	-1.760%	0.133	0.102%	0.007	0.027%	0.008	0.110%	0.008
Japan	0.216%	0.010	0.418%	0.010	0.048%	0.010	0.095%	0.004	0.248%	0.003	-0.038%	0.004	0.142%	0.005	0.314%	0.005	-0.004%	0.005
Norway	0.340%	0.014	0.321%	0.017	0.346%	0.010	0.123%	0.010	-0.085%	0.011	0.275%	0.009	0.217%	0.010	0.092%	0.012	0.307%	0.008
Spain	0.812%	0.011	0.375%	0.012	1.173%	0.009	0.285%	0.008	-0.058%	0.007	0.563%	0.007	0.465%	0.008	0.074%	0.008	0.786%	0.007
Switzerland	-0.414%	0.098	0.788%	0.016	-1.501%	0.133	-0.748%	0.097	0.329%	0.011	-1.722%	0.133	0.315%	0.011	0.507%	0.011	0.129%	0.010
U.K.	0.268%	0.007	0.225%	0.008	0.293%	0.006	-1.058%	0.105	-0.155%	0.008	-2.230%	0.159	0.138%	0.006	0.007%	0.007	0.284%	0.005
U.S.	0.440%	0.006	0.487%	0.006	0.385%	0.005	0.284%	0.006	0.222%	0.007	0.337%	0.006	0.355%	0.006	0.341%	0.007	0.361%	0.006

B. Average Explanatory Variables

	Interest Rates - Money Market Rates						Inflation - PCD (annualized)						Growth Rate of the Real Effective Exchange Rate Index					
	Overall		Sample 1		Sample 2		Overall		Sample 1		Sample 2		Overall		Sample 1		Sample 2	
		sd		sd		sd		sd		sd		sd		sd		sd		sd
Pooled	7.214	4.885	10.742	4.332	4.029	2.680	3.788	3.965	5.887	4.361	1.855	2.178	0.071%	0.027	0.132%	0.029	-0.054%	0.026
Canada	7.428	4.227	10.986	3.244	4.184	1.443	3.598	3.249	5.505	3.315	1.825	1.910	0.043%	0.021	0.010%	0.018	0.003%	0.024
Finland	8.104	4.784	12.683	2.016	3.993	1.901	3.658	3.642	6.155	3.534	1.360	1.679	-0.101%	0.022	-0.070%	0.024	-0.287%	0.024
Italy	9.993	5.767	15.025	3.192	5.484	3.232	5.775	4.867	9.028	5.185	2.791	1.379	0.113%	0.021	0.251%	0.020	-0.204%	0.026
Japan	3.320	3.235	6.269	1.978	0.642	1.034	1.178	2.823	2.368	3.104	0.096	1.987	0.328%	0.046	0.926%	0.045	-0.139%	0.047
Norway	8.840	4.113	12.593	1.747	5.548	2.744	4.326	4.076	6.779	4.019	2.039	2.502	0.073%	0.019	0.130%	0.015	-0.007%	0.022
Spain	9.509	5.501	14.339	2.730	5.185	3.277	5.795	4.422	8.560	4.300	3.245	2.617	0.027%	0.020	0.036%	0.023	-0.098%	0.018
Switzerland	2.943	2.305	4.109	2.516	1.931	1.496	2.241	2.615	3.582	2.615	1.042	1.934	0.015%	0.023	0.115%	0.026	-0.058%	0.019
U.K.	8.390	3.681	11.677	2.344	5.320	1.106	3.904	4.357	6.198	4.982	1.783	2.062	0.101%	0.033	-0.109%	0.043	0.074%	0.026
U.S.	6.428	3.684	8.997	3.501	4.024	1.720	3.618	2.736	4.810	3.182	2.517	1.592	0.039%	0.025	-0.099%	0.030	0.230%	0.021

Note: PCD-Personal Consumption Deflator. Sample 1 refers to the period 1980-1992. Sample 2 refers to the period 1993-2006.

Table 2. Elasticity of Employment with Respect to Short-Term Interest Rate (sample period 1980:1-2006:4)

***, **, * significantly different from 0 at a 1%, 5% or 10% level respectively — Standard errors in parenthesis

φ^X is elasticity of employment with respect to interest rate for gender X — p-value is for H0: $\varphi^M = \varphi^F$

Table 2a. Using employment in all three sectors as a dependent variable

	Canada	Finland	Italy	Japan	Norway	Spain	Switz.	U.K.	U.S.
φ^M	-1.79	-0.08	-0.34	0.07	-0.54 *	-0.91	0.05	-0.80 *	-0.51
	(2.24)	(0.44)	(0.25)	(0.25)	(0.30)	(0.73)	(0.25)	(0.48)	(0.40)
φF	-0.67	-0.76	-0.70	-0.04	0.07	-0.27	0.21	-0.22	-0.06
	(0.58)	(0.51)	(0.46)	(0.27)	(0.13)	(0.41)	(0.25)	(0.40)	(0.19)
p-value	0.63	0.31	0.49	0.76	0.07	0.45	0.64	0.35	0.31

Table 2b. Using employment in agriculture as a dependent variable

	Canada	Finland	Italy	Japan	Norway	Spain	Switz.	U.K.	U.S.
φ^M	-0.69 **	0.07	-0.81 **	-0.14	-0.03	-0.09	-0.84	-0.27	0.17
	(0.34)	(0.19)	(0.36)	(0.28)	(0.18)	(0.25)	(0.62)	(0.42)	(0.37)
φF	-0.66	-0.03	-0.98 **	-0.36	0.25	0.35	-0.70	-0.68	0.49
	(0.57)	(0.31)	(0.42)	(0.41)	(0.45)	(0.43)	(0.57)	(0.79)	(1.04)
p-value	0.96	0.80	0.75	0.66	0.56	0.38	0.87	0.64	0.77

Table 2c. Using employment in industry as a dependent variable

	Canada	Finland	Italy	Japan	Norway	Spain	Switz.	U.K.	U.S.
φ^M	-3.20	-0.25	0.25	0.14	-0.46	-1.46	0.78	-0.32	-0.50
	(3.23)	(0.29)	(0.49)	(0.48)	(0.36)	(1.13)	(0.74)	(0.45)	(0.71)
φF	-0.24	-0.10	0.10	0.07	0.22	0.01	0.84 *	-0.13	0.48
	(0.53)	(0.31)	(0.22)	(0.77)	(0.28)	(0.55)	(0.51)	(0.60)	(0.51)
p-value	0.37	0.74	0.78	0.94	0.13	0.24	0.94	0.80	0.26

Table 2d. Using employment in services as a dependent variable

	Canada	Finland	Italy	Japan	Norway	Spain	Switz.	U.K.	U.S.
φ^M	0.06	0.05	-0.79	-0.01	-0.10	0.10	-0.05	0.23	-0.07
	(0.07)	(0.30)	(1.82)	(0.13)	(0.15)	(0.16)	(0.34)	(0.71)	(0.09)
φF	-0.09	-0.38	-0.80	0.10	-0.02	0.02	0.25	-0.05	0.01
	(0.20)	(0.29)	(1.16)	(0.17)	(0.11)	(0.26)	(0.34)	(0.50)	(0.12)
p-value	0.47	0.31	0.99	0.57	0.67	0.79	0.53	0.75	0.59

Table 3. Elasticity of Employment with Respect to Short-Term Interest Rate (sample period 1980:1-2006

***, **, * significantly different from 0 at a 1%, 5% or 10% level respectively

φ^{X}_{T} is elasticity of employment with respect to interest rate for gender X and sub-period T

Table 3a. Using employment in all three sectors as a dependent variable

	Employment Elasticity Estimates				p-values			
	φ^{M}_{1}	φ^{M}_{2}	φ^{F}_{1}	φ^{F}_{2}	$\varphi^{M}_{1}=\varphi^{F}_{1}$	$\varphi^{M}_{2}=\varphi^{F}_{2}$	$\varphi^{M}_{1}=\varphi^{M}_{2}$	$\varphi^{F}_{1}=\varphi^{F}_{2}$
Canada	-2.17	-0.15	-1.50	0.01	0.86	0.53	0.57	0.47
	(3.56)	(0.19)	(2.09)	(0.17)				
Finland	1.11	0.05	-1.35	-1.14	0.84	0.17	0.72	0.99
	(2.93)	(0.41)	(11.59)	(0.80)				
Italy	-0.36	0.04	-0.41 *	-0.05	0.89	0.82	0.30	0.27
	(0.24)	(0.32)	(0.23)	(0.25)				
Japan	-0.01	-0.22	-0.08	-0.20	0.81	0.96	0.34	0.75
	(0.13)	(0.17)	(0.27)	(0.27)				
Norway	-0.45	-1.81	0.41	-0.06	0.15	0.62	0.70	0.43
	(0.39)	(3.45)	(0.49)	(0.26)				
Spain	-0.53	-0.66 ***	0.10	-0.75	0.70	0.85	0.94	0.17
	(1.58)	(0.20)	(0.38)	(0.47)				
Switz.	-0.09	0.12	-0.03	-0.03	0.90	0.62	0.55	0.99
	(0.26)	(0.25)	(0.48)	(0.17)				
U.K.	-0.82	-0.06	-0.46	-0.30 **	0.66	0.33	0.24	0.81
	(0.60)	(0.20)	(0.59)	(0.15)				
U.S.	-0.90	0.20	-0.75	0.18	0.89	0.97	0.14	0.25
	(0.71)	(0.20)	(0.76)	(0.24)				

Table 3b. Using employment in agriculture as a dependent variable

	Employment Elasticity Estimates				p-values			
	φ^{M}_{1}	φ^{M}_{2}	φ^{F}_{1}	φ^{F}_{2}	$\varphi^{M}_{1}=\varphi^{F}_{1}$	$\varphi^{M}_{2}=\varphi^{F}_{2}$	$\varphi^{M}_{1}=\varphi^{M}_{2}$	$\varphi^{F}_{1}=\varphi^{F}_{2}$
Canada	-0.77 **	-0.41	-0.55	-1.01	0.73	0.66	0.61	0.74
	(0.39)	(0.60)	(0.54)	(1.24)				
Finland	0.26	0.15	0.60 **	-1.02	0.44	0.32	0.83	0.18
	(0.34)	(0.41)	(0.26)	(1.15)				
Italy	-1.02 **	0.37	-1.49 ***	0.60	0.44	0.88	0.02	0.19
	(0.51)	(0.39)	(0.48)	(1.45)				
Japan	0.32	-0.04	-0.21	0.05	0.56	0.88	0.60	0.76
	(0.59)	(0.35)	(0.68)	(0.53)				
Norway	-0.52	0.21	0.91	0.06	0.30	0.69	0.04	0.53
	(0.34)	(0.15)	(1.32)	(0.34)				
Spain	-0.46	-0.15	0.76	-1.08	0.26	0.24	0.76	0.05
	(0.89)	(0.42)	(0.62)	(0.67)				
Switz.	-1.42	0.29	-0.29	-8.51	0.36	0.61	0.42	0.63
	(1.29)	(1.76)	(0.93)	(17.20)				
U.K.	-0.53	-0.90	-0.68	-1.24	0.89	0.93	0.79	0.88
	(0.82)	(1.27)	(0.77)	(3.64)				
U.S.	0.01	0.67	-0.15	3.03	0.69	0.53	0.66	0.35
	(0.31)	(1.48)	(0.23)	(3.35)				

Table 3c. Using employment in industry as a dependent variable

	Employment Elasticity Estimates				p-values			
	φ^M_1	φ^M_2	φ^F_1	φ^F_2	$\varphi^M_1 = \varphi^F_1$	$\varphi^M_2 = \varphi^F_2$	$\varphi^M_1 = \varphi^M_2$	$\varphi^F_1 = \varphi^F_2$
Canada	-15.36	0.05	-0.72	0.72	0.76	0.33	0.75	0.18
	(48.52)	(0.28)	(0.87)	(0.61)				
Finland	-0.02	0.21	0.05	-0.95	0.89	0.39	0.78	0.41
	(0.41)	(0.72)	(0.44)	(1.14)				
Italy	0.02	0.23	0.52	0.27	0.48	0.92	0.70	0.71
	(0.43)	(0.33)	(0.59)	(0.26)				
Japan	-0.24	0.05	-0.24	0.32	1.00	0.80	0.65	0.61
	(0.42)	(0.46)	(0.50)	(0.99)				
Norway	0.53	-1.32	1.33 *	-0.23	0.45	0.31	0.19	0.03
	(0.82)	(1.05)	(0.70)	(0.18)				
Spain	-0.24	-1.98 *	0.50	-0.39	0.60	0.38	0.22	0.61
	(1.03)	(1.02)	(0.97)	(1.41)				
Switz.	0.47	1.97	0.92	0.28	0.70	0.35	0.42	0.57
	(0.94)	(1.61)	(0.75)	(0.83)				
U.K.	-0.60	0.12	-0.70	0.98	0.88	0.33	0.31	0.07
	(0.51)	(0.45)	(0.52)	(0.75)				
U.S.	-1.42	0.48	-0.10	2.08 **	0.32	0.12	0.17	0.03
	(1.22)	(0.62)	(0.57)	(0.81)				

Table 3d. Using employment in services as a dependent variable

	Employment Elasticity Estimates				p-values			
	φ^M_1	φ^M_2	φ^F_1	φ^F_2	$\varphi^M_1 = \varphi^F_1$	$\varphi^M_2 = \varphi^F_2$	$\varphi^M_1 = \varphi^M_2$	$\varphi^F_1 = \varphi^F_2$
Canada	0.09	-0.06	-0.03	-0.02	0.59	0.85	0.32	0.96
	(0.09)	(0.11)	(0.20)	(0.18)				
Finland	0.51	-0.08	-0.06	-0.21	0.41	0.78	0.31	0.81
	(0.44)	(0.35)	(0.54)	(0.33)				
Italy	-1.44	0.11	-0.47	0.01	0.84	0.84	0.75	0.59
	(4.86)	(0.30)	(0.93)	(0.33)				
Japan	0.15	-0.33 ***	0.09	-0.25	0.83	0.74	0.04	0.27
	(0.18)	(0.12)	(0.20)	(0.23)				
Norway	-0.12	-0.02	-0.02	0.08	0.80	0.63	0.74	0.78
	(0.25)	(0.16)	(0.32)	(0.15)				
Spain	0.19	0.15	0.31	-0.29	0.76	0.35	0.88	0.27
	(0.25)	(0.18)	(0.32)	(0.42)				
Switz.	0.17	-0.35	-0.18	-0.10	0.58	0.48	0.35	0.90
	(0.45)	(0.29)	(0.61)	(0.22)				
U.K.	0.87	-0.15	-0.18	-0.28 *	0.62	0.75	0.49	0.95
	(1.41)	(0.38)	(1.64)	(0.16)				
U.S.	-0.12	0.02	-0.28	0.03	0.66	0.98	0.66	0.44
	(0.12)	(0.30)	(0.35)	(0.18)				

Appendix

Table A.1a Correlation coefficents for interest rate and change in employment for the whole sample and two sub-samples (1980-1992 and 1993-2006).

	Canada	Finland	Italy	Japan	Norway	Spain	Switzerland	UK	US
Agriculture									
Whole sample	0.05	0.01	-0.04	-0.05	0.04	-0.05	0.07	0.05	0.11
Sample 1	0.11	0.09	-0.06	-0.15	0.12	0.27 **	0.12	0.02	0.01
Sample 2	-0.11	-0.09	-0.05	-0.08	-0.01	-0.04	-0.02	-0.16	0.17
Industry									
Whole sample	-0.26 ***	-0.21 **	-0.13	0.33 ***	-0.11	-0.41 ***	0.06	-0.16	-0.02
Sample 1	-0.22	-0.02	-0.16	0.05	0.06	-0.09	0.00	-0.23 **	-0.05
Sample 2	0.02	-0.15	-0.24	0.11	-0.16	-0.58 ***	0.11	0.11	0.19
Services									
Whole sample	-0.04	-0.08	-0.03	0.17	-0.08	-0.32 ***	0.17 *	-0.22 **	0.02
Sample 1	-0.11	-0.06	0.06	0.01	0.03	-0.13	0.07	-0.17	-0.07
Sample 2	-0.11	-0.28 ***	-0.24	0.06	-0.29 **	-0.54 ***	-0.18	0.05	0.01

Note: *, **, * designate significance at 1%, 5% and 10% levels respectively**

Sample 1 refers to the period 1980-1992. Sample 2 refers to the period 1993-2006.

Table A.1b Correlation Coefficents of the interest rate and change in employment among men and women for the whole sample and two sub-samples (1980-1992 and 1993-2006).

	Canada		Finland		Italy		Japan		Norway		Spain		Switz.		UK		US	
	Male	**Fem.**	**Male**	**Fem.**	**Male**	**Fem.**	**Male**	**Fem.**	**Male**	**Fem.**	**Male**	**Fem.**	**Male**	**Fem.**	**Male**	**Fem.**	**Male**	**Fem.**
Agriculture																		
Whole sample	0.01	0.09	0.00	0.02	-0.05	-0.01	-0.06	-0.03	0.08	0.04	-0.10	0.01	0.04	0.08	0.06	0.04	0.11	0.04
Sample 1	0.04	0.22	0.01	0.15	-0.02	-0.07	-0.10	-0.16	0.12	0.06	0.21	0.28 **	0.07	0.12	0.05	-0.05	0.01	0.00
Sample 2	-0.09	-0.09	-0.03	-0.05	-0.20	-0.16	-0.08	-0.03	0.06	0.05	0.01	-0.05	0.10	0.03	-0.18	-0.17	0.15	0.16
Industry																		
Whole sample	-0.23 **	-0.13	-0.18 *	-0.12	-0.14	-0.03	0.24 **	0.35 ***	-0.12	-0.02	-0.39 ***	-0.25 ***	0.02	0.09	-0.17	-0.07	-0.05	0.18
Sample 1	-0.21	-0.12	-0.01	-0.04	-0.16	-0.11	0.01	0.11	0.03	0.08	-0.10	0.00	-0.03	0.06	-0.22	-0.25 *	-0.06	0.00
Sample 2	-0.02	-0.02	-0.27 *	-0.17	0.06	0.11	0.15	0.03	-0.21	-0.11	-0.62 ***	-0.41 ***	0.00	0.33 **	0.06	0.23	0.12	0.29 **
Services																		
Whole sample	-0.13	0.11	-0.09	-0.06	0.05	-0.08	0.12	0.14	-0.13	0.00	-0.20 **	-0.33 ***	0.09	0.20 **	-0.25 **	-0.13	-0.06	0.13
Sample 1	-0.15	-0.01	0.00	-0.09	0.09	0.02	0.03	-0.02	-0.05	0.08	-0.20	-0.01	-0.08	0.14	-0.09	-0.23	-0.14	0.00
Sample 2	-0.14	-0.08	-0.17	-0.26 *	-0.37 **	-0.44 *	0.13	0.10	-0.47 *	-0.25 **	-0.49 ***	-0.61 ***	-0.18	-0.19	-0.11	-0.02	-0.02	0.06

Note: *, **, * designate significance at 1%, 5% and 10% levels respectively**
Sample 1 refers to the period 1980-1992. Sample 2 refers to the period 1993-2006.

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