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The Changing Relationship between Fertility and Female Emplyment

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Shastri, Viraj, "The Changing Relationship between Fertility and Female Emplyment" (2015). *CMC Senior Theses.* Paper 1094.
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CLAREMONT MCKENNA COLLEGE

The Changing Relationship between Fertility and Female Employment

SUBMITTED TO

Professor Heather Antecol

AND

DEAN NICHOLAS WARNER

BY

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for

SENIOR THESIS

Spring 2015
April 27, 2015

Acknowledgments

First and foremost I would like to thank my thesis reader Professor Heather Antecol. Without her constant support, help and encouragement I would not have been able to complete this project. Secondly, I would like to thank Dean Mary Spellman who was very supportive regarding my medical condition over the semester. Lastly, I would like to thank my family and suitemates for their consistent support.

Abstract

Recent literature finds that in OECD countries the cross- country correlation between the total fertility rate and the female labor force participation rate has changed from negative till the mid-1980s to positive afterwards. In sharp contrast, other studies show that this negative relationship continues to exist, however the magnitude of the effect is lower. In this paper I look at a panel of 23 OECD aggregate fertility and labor market data from 1965 – 2013 and account for country as well as year fixed effects. My findings document that there exists a negative relationship between fertility and female employment for the years 1965 – 1985, as there existed a high level of incompatibility between mother and worker roles at that time. After this time period no relationship between fertility and employment exists. The presence of a number of other country and year specific factors affects the level of labor force participation and fertility decisions of a woman. When accounted for, the cross-country time-series association between fertility and female employment seems to fade away and does not exist any longer after the mid-1980s.

Table of Contents

I. Introduction

For a number of years, female employment has been a crucial topic of discussion for governments and economists. An increase in the female employment rate and women's working hours has a substantial impact both on house-hold earnings and the overall economy. According to the Center of American Progress, Middle-class households would have substantially lower earnings and the gross domestic product (GDP) in 2012 would have been 11 percent lower if women's employment and working hours had remained unchanged (Appelbaum 2014). Fertility has been one of the biggest constraints on female employment, due to the high level of incompatibility between female child caring and worker roles (Bowen & Finnegan 1969; Brewster & Rindfuss 2000). The question of a relationship between female employment and fertility is of considerable importance for both sociologists and economic planners (Stycos & Weller 1967). For sociologists, restriction of fertility among working women would be consistent with the theory of role incompatibility as the family's productive functions decline and as responsibilities of childcare become heavily focused on the mother. For planners this negative relationship is related to rate of population and economic growth and is therefore, worth of high priority in development strategy (Stycos & Weller 1967).

Earlier studies provide substantial evidence to suggest that fertility decreases female labor force participation; see for example; Rindfuss et al. 2003; Bernhardt, 1993; Brewster & Rindfuss 2000 who argue that the high level of incompatibility is the primary reason for this negative relationship. However recent studies find that this relationship continues to exist but at much smaller magnitudes (Kögel 2004) or has actually reversed

overtime (Ahn & Mira 2002; Rindfuss el at. 2003). Furthermore it is argued that, pre-existing differences in labor market arrangements and the policy choices of national governments can modify the terms of the trade-off between work and maternity and, hence, potentially influence fertility and female participation behavior of a given country (Castles 2003).

The existing literature is however limited because of time and number of countries used in their respective studies. Ahn & Mira (2002) and Rindfuss el at. (2003) use data from 21 OECD countries from 1970 -1995 and 22 OECD countries from 1960 – 1977, respectively. Kögel (2004) looks at 21 OECD countries, but uses quinquennial data from 1960 – 2000. By accounting for country fixed effects, he states that this negative relationship continues to exist and does not switch signs. To expand on the existing literature, I look at a longer time horizon and more countries; I use a panel of 23 OECD countries and collect data annually for the years 1965 – 2013. In order to check whether the relationship between fertility and female employment is negative before 1985 and positive afterwards, I further divide my data into two sub-samples: 1965 – 1985 and 1986 – 2013. The cross-sectional time series data allows me to look at differences between the countries and the changes within countries over time.

The purpose of my study is to add to the existing literature, in order to check whether a relationship between fertility and female labor participation even exists over a long period of time. If, the relationship does exist I further investigate whether there is a change in sign of the relationship from negative to positive after the mid-1980s. I hypothesize that a negative correlation exists between fertility and female employment for the years (1965 -1985), and there is no relationship between the two variables after.

To test my hypothesis, I use panel data techniques to pool cross-country and time series data from OECD countries and account for country specific effects as well as year specific effects in order to pick up time invariant country characteristics. Additionally, I look at the time trend in order to check the difference in the effect of fertility over the two time periods.

Figure 1 reveals that the average total fertility rates and female participation rates since 1965 are consistent with the well-known historical pattern. Throughout these years the average OECD fertility rate decreased from 2.94 in 1965 to 1.72 in 2013 while the female participation rate increased from 43.4% in 1965 to 70.8% in 2013. As mentioned above, this is consistent with the theory that a negative relationship exists between fertility and female employment. However, Figure 1 shows that the average fertility rate seems to be leveling out and becomes steady after 1985 whereas female participation rate continues to maintain its upward trend.

In the paper I find that fertility is negatively correlated with female labor force participation during the years 1965 – 1985, and that afterwards there is no relationship between the two. The high level of incompatibility between worker and mother roles were the primary reason for this negative relationship. 1985 onwards, there are a number of other factors that changed within countries that effect the childbearing and participation decisions of women. The presence of these factors and their increasing effect on female employment, caused the existing negative relationship to fade away completely (no relationship) for the years 1985 – 2013.

II. Literature Review

Over the past decade labor economists have been involved in a heated argument based on their differing views regarding the possible reversal in the effect of fertility on female labor supply overtime. A number of studies show that after the mid1980s the relationship between fertility and female employment changed from negative to positive (Ahn & Mira 2002; Rindfuss et al. 2003). In sharp contrast Kögel (2004) argues that there is no reversal in sign, however the magnitude of the negative correlation decreases over time. Furthermore, country specific factors including the labor market institution, government policies and unemployment rate affect the relationship between fertility and female employment differently within countries. In other words, the wide range of labor market arrangements found across OECD countries molds the childbearing and participation decisions of women (Adserá 2004).

A basic understanding of childbearing and its impact on the daily decisions of the mother would lead one to believe that fertility impacts the female labor supply decision negatively. It is generally held to be an indisputable fact that there is a negative relationship between fertility and (women's) employment, at least in modern, industrialized societies where employment normally means paid work outside home (Bernhardt 1993). No doubt, fertility exerts a negative influence on work-force participation, in the sense that a new-born baby has a dramatic and immediately inhibiting effect on work-force participation for the woman who has just become a mother (Bernhardt, 1993). The arrival of a newborn would induce the mother to reduce her labor supply in order to allocate sufficient time to the process of childbearing. This

association between fertility and women's labor force activity reflects the incompatibility between caring for children and participating in economically productive work that typifies industrialized societies (Brewster & Rindfuss 2000). Jobs in industrial and postindustrial societies do not permit women to care for their children and perform their job simultaneously. This incompatibility has been used to explain the negative relationship between female labor force participation and fertility (Rindfuss et al. 2003). In addition, existing religious issues, legal issues, labor-market issues, educational policies and opportunities and family roles also put constraints on female employment (Rindfuss et al. 2003).

Early studies and research confirm the above idea about the negative relationship and that a woman's responsibilities of childbearing and motherhood constrain her active participation in the labor force (Bowen & Finnegan 1969). Furthermore, Bhrolcháin (1986) states that it is not known to what extent, if any, female labor-force participation has a negative effect on family size though the reverse effect is beyond doubt: in developed societies the presence of children places a fairly major constraint on the labor-market activity of their mothers.

More recent studies document a dramatic change in the relationship between and association of fertility levels to women's levels of labor force participation (Ahn & Mira 2002; Rindfuss et al. 2003). Their studies show that during the late 1980's the correlation between the total fertility rate (TFR) and female labor force participation (FLP) changes from negative and significant to positive and significant. They show a reversal in sign of the relationship in The Organization of Economic Co-operation and Development (OECD) countries.

Ahn and Mira (2002) look at a panel of 21 OECD countries from 1970 – 1995 and find that the correlation between TFR and FPR across these countries was negative and strongly significant up until the early 1980's. However, by the late 1980's they find that this correlation had become positive and significant.

They provide three main explanations for the sign reversal. Specifically, they argue that as the world modernized and economies started to grow and integrate with each other; female real wages, child care and unemployment rates caused the change. As wages increase, more women are induced to enter the work space. Therefore, wage increases for a working woman induce both income and substitution effects on fertility. According to the labor supply theory, a wage increase is likely to lead to an increased labor supply at low wages as the substitution effect dominates over the income effect, fertility would drop considerably for new entrants as labor-supply increases from no work to full-time work; inducing a negative correlation between fertility and participation. However, at fairly high levels of female wage, a further increase in wages creates an income effect which results in an increased demand for children. Wage increases under fixed hours restrictions (hours of work are unchangeable) for a working woman has an income effect only; resulting in higher fertility and a positive association between fertility rate and female labor participation.

Second is the availability of market childcare. Women can use market childcare to substitute for their own time, reducing the degree of incompatibility and making it easier for them to fertilize without leaving the workforce for a long period of time. Higher the price of childcare the lower the fertility rate keeping the negative relationship between fertility and female employment consistent. However, in recent times, the general

awareness of female participation has put greater political pressure for more generous childcare subsidies making them more affordable. With increased demand for jobs by women, jobs are becoming more flexible with hours of work, work done at home etc. Additionally, the price of childbearing depends less on the mother's wage and more on the price of market childcare. Therefore, at higher wages (in the 90's) the direct effect of higher female wages on fertility, becomes less negative when we consider affordable market childcare (both for working women and new entrants), facilitating the reversal of correlation between fertility and female participation (Ahn & Mira 2002).

Lastly, the sharply rising rates of unemployment (i.e., 'zero-earnings') since the mid-1980s and the business cycle have an effect on fertility. Unemployment effects fertility negatively as more wives will participate in the labor market as an insurance strategy against negative shocks to their husband's wage or employment. Also fewer, women would quit their jobs to have children since an exit from the labor market could seriously damage their future labor market prospects (Ahn & Mira 2002). Ahn & Mira (2002) argue that countries with lower wages and female participation rates experience a higher incidence of households in the 'zero-earnings' state, with devastating effects on fertility. This could contribute to a positive correlation between fertility and participation (Ahn & Mira 2002).

Rindfuss et al. (2003) also report a change in the association between fertility and female levels of labor force participation. They use data from 1960 – 1997 for 22 OECD countries and to show that cross-country correlation has reversed signs from negative to positive after the 1980s. The basic idea is that if a women drops out of the work force even for a short period of time, she forgoes the opportunity cost to earn income during

that period of time, and this, in turn raises the cost of child bearing (Rindfuss et al. 2003). The authors argue that a high level of incompatibility between the mother and the worker roles for females, in addition to societal, family and institutional settings that assign adult men the principle role of the provider and adult women the roles of house maker and child-rearer, were the primary reasons for the negative relationship between fertility and female labor force participation. Overtime the level of incompatibility has been decreasing; Rindfuss, et al. (2003) relate this decreasing level of incompatibility to several factors that changed over the years; better availability and accessibility to market childcare. Changing nature of the job market in the sense that working hours for women are more flexible and a change in family roles where men stayed more at home to take care of the child so that women could spend more time in the labor force. They argue that this decreasing level of incompatibility accompanied with changing societal and institutional settings caused this reversal in the association from strongly negative in the 60s and 70s to strongly positive and consistent from the mid-80s.

Similar to Ahn and Mira (2002) and Rindfuss et al (2003), Apps and Rees (2001) argue that since the late-1980s, the inverse relationship between female labor supply and fertility has reversed signs and is now positive. They relate this change to an improved childcare system with increasing childcare subsidies. Martinez and Iza (2004) also observe this change in the association and relate it to higher availability of affordable health care caused by rising real wages for females. They argue that the price per unit of childcare services has decreased relatively to the average woman's wage (Martinez and Iza 2004) reducing the level of incompatibility and causing a reversal in sign.

Alícia Adserá (2004) looks at a panel of OECD countries for the years 1960-1977 and finds that whichever country has low unemployment and institutions that easily accommodate the entry-exit of the labor market, fertility rates are around replacement levels and female labor participation is high. The rising rate of unemployment effects fertility both positively and negatively; temporary spells of unemployment can be viewed as a cheap time to have children, however high and persistent unemployment rates can lead to a trap and have substantial income effects (Adserá 2004). Additionally, institutional settings and labor market arrangements effect fertility and female participation decisions. Different types of labor market institutions have different levels of effects on women's entry-exist decisions; rigid institutional settings such as absence of part-time schemes, moderate benefits intensify the negative effect of unemployment. Conversely, nations with highly flexible settings women can temporarily leave employment to have children being highly certain about their prospects of re-entering the labor force once the childbearing years are completed (Adserá 2004). Unemployment rates and institutional settings greatly vary across OECD countries, contributing to different levels of fertility and female participation within these countries, respectively.

Adserá (2004) in her study is consistent with the theory that the correlation between fertility and female participation has changed signs and is now positive. However, she makes a very interesting observation; she believes that this correlation may fade away over time (Adserá 2004). Female participation rates will start to converge overtime across OECD countries as more females enter the labor force in the lowest participation rate countries. However, if labor institutions do not change and fertility does

not increase, the relation between fertility and participation in the cross-section of OECD countries should become flat (move towards zero) in the near future (Adserá 2004).

In sharp contrast to Ahn & Mira (2002) and Rindfuss et al. (2003), Kögel (2004) does not find that the time-series association between total fertility rate and female employment rate changes sign after the mid-1980s. He argues that the reversal in sign of cross-country association between TFR and FLP, showed by Ahn and Mira (2002) and Rindfuss et al. (2003) was due to a combination of two factors. The presence of unmeasured country-specific effects and country-heterogeneity in the magnitude of the negative time-series association between fertility and female employment (Kögel 2004), are the two factors. To test his hypothesis, Kögel uses panel data techniques to pool cross-country and time-series data from OECD countries. He applies an econometric model that accounts for country specific factors, by including country fixed effects and assumes country-heterogeneity. He collects data points for 21 OECD countries for the years 1960 – 2000, though he only uses quinquennial data (data points for 1960, 1965, ….., 2000). In order to check whether the association between TFR and FLP changes signs and became positive after 1985, Kögel divides his data into two sub-samples; 1960 – 1985 and 1985 – 2000. Though his results do not show a change in sign, his results do depict a falling magnitude and significance level of this correlation between fertility and female employment.

This conflict and debate over whether there is a reversal in sign of the relationship between fertility and female employment from negative until the mid-1980s to positive afterwards (Ahn & Mira 2002, Rindfuss et al. 2003) or not (Kögel 2004), motivated me to investigate the history and nature of this relationship. Ahn & Mira (2002) and Rindfuss

et al. (2003) provide clear and effective reasoning for the reversal in sign and the positive correlation between fertility and female employment over the past three decades. An increase in female real wage, improved market childcare, changing societal and family institutions and the increase in general awareness of women labor force participation has considerably reduced the level of incompatibility between mother and worker roles over the three decades; the primary reason for the negative relationship. On the other hand, despite these changes, Kögel (2004) does not find a reversal in sign of the relationship when he includes country specific effects. However, in his study he uses quinquennial data for 21 OECD developed countries for the years 1960 – 2000. None of these studies take into account year specific effects. As mentioned in the above literature countries unemployment and labor market institutions, both effecting fertility and labor force participation decisions, vary greatly among OECD countries itself. This should effect the cross-country time series correlation between fertility and labor market participation between these countries, respectively. In order to investigate this relationship and check for the reversal in sign between the two periods (1965-1985 & 1986-2013); I extend the existing literature by looking at data from the years 1965 – 2013 and use panel data techniques to pool cross-country and time series data from 23 OECD countries. I account for country fixed effects as well as year fixed effects in my regression.

III. Data

I create a panel data set for 23 OECD developed countries from 1965 to 2013, total of 49 years. The aim is to observe the changing relationship, if any, between fertility and female employment across the world's most advanced and developed countries. From the group of 34 member OECD countries, Mexico, Chile, and Turkey are immediately excluded as they are still in the developing stage. Since I split the data sample into two sub-samples 1965 – 1985 and 1986 – 2013, both samples should contain the same countries. Therefore, OECD member countries which only have data after the 1980s for my variables are excluded from my analysis. Table 1 shows the list of countries included in my analysis. Additionally, countries that were part of the former Soviet Union are excluded (Estonia), and former communist countries are excluded for a variety of reasons (Poland & Hungary); numerous border changes in recent years and different definition of work under the former communist system, compared to the market system for countries under consideration here (Rindfuss 2003).

My dependent variable, female labor force participation rate, which is the proportion of the female population between the ages 15 – 64 who are economically active; either working for pay or seeking paid employment. The data for this variable for all 23 OECD countries is collected annually from the OECD Labor Force Statistics for the years 1965 – 2013. Spain, Portugal and Luxembourg had data missing from 1965 – 1969, for these countries I use only data since 1970. Furthermore data for Greece and the Netherlands is missing from 1965 – 1974, for these countries I use only data since 1975.

My independent variable and control variable are, total fertility rate and Gross Domestic Product respectively. TFR represents the average number of children a woman would bear if she were to live to the end of her childbearing years conforming to the current age-specific fertility rates. To control for development I use GDP which is the standard measure of the value of final goods and services produced by a country during a specific period of time, it is the single most important indicator to capture economic growth of a country. The data for both variables is collected from the World Bank – World Development Indicators. These measures are available for all countries for all the years. Table 2 contains the descriptive statistics of the data collected for my study.

IV. Empirical Model

In order to determine the effect of the total fertility rate on female labor force participation, I estimate a panel regression model of the following form:

$$FLP_{ct} = \alpha + \beta TFR_{ct} + \delta GDP_{ct} + \gamma_c + X_t + \varepsilon_{ct}$$

Where FLP is the female labor force participation rate, TFR is the total fertility rate, and GDP is the Gross Domestic Product. ε_{ct} is an error term with the usual properties and γ_c represents the control for country specific factors. The Subscript t denotes the time period and X_t represents the control for year fixed effects to pick up time invariant country characteristics. In my third regression, I use the same empirical model and generate a dummy variable 'PERIOD' which is set to equal 1 when the years are before 1986 and equal to zero otherwise. I do this in order to check the difference in the effect of fertility specifically over the two periods. Here, I use all the data (1965 – 2013) and do not divide it into two sub-samples to investigate the time trend.

V. Results & Interpretation

In this section, I present the results obtained from the estimation of the model described above. Table 3 (appendix) shows the estimation results for my first sub sample 1965 – 1985. The second column in this table shows the results for the regression where I do not account for country and year fixed effects. In this column we find that there is a negative and significant correlation between fertility and female employment. The correlation coefficient is -4.49 and is significant at the 99% significance level. The third column of table 3 shows the results of pooled least squares estimation with country fixed effects. Similar to column 2, there is a negative and significant correlation between fertility and female employment. The correlation coefficient is -3.3 and is significant at the 99% level. These results are significant with the above literature that there is a pre-existing negative relationship between FLP and TFR (Brewster & Rindfuss 2000; Rindfuss et al. 2003; Ahn & Mira 2002; Kögel 2004). High levels of incompatibility between caring for children and participating in economically productive work that typifies industrialized societies, made it extremely difficult for women to efficiently perform both roles simultaneously. Decisions regarding fertility and employment were extremely difficult for women to make, as they were made to substitute one for the other. The control variable GDP, in both columns, is also positively correlated with FLP (0.00079 and 0.0008, respectively) and highly significant. Since GDP is the single most important indicator to capture economic growth of a country, an increase in GDP increases participation rates; as the economy grows and develops more job opportunities are created for both men and women.

The fourth column shows the results for the regression where I account for country as well as year fixed effects. Surprisingly, though the correlation coefficient is negative, it is not significant in this column. Results from this column are the most relevant to my study, as I control to pick up time invariant country characteristics that may affect the cross country time series relationship between fertility and female employment. The results here suggest that there is no relationship between fertility and female employment at all, when year fixed effects are brought into the equation. Country specific effects such as societal, family and institutional settings in addition with religious, legal and labor-market issues, also affect the relationship between fertility and female employment. The effects are not consistent over each year for all 23 OECD countries; they greatly vary within each country yearly, making the cross-country time series correlation coefficient between fertility and female participation across the OECD countries insignificant. These results, however, are not consistent with my hypothesis that a negative correlation between fertility and female employment exists during these years.

Table 4 (appendix) shows the estimation results for my second sub sample 1986 – 2013. Similar to table 3, the second column in table 4 shows the results for the regression where I do not account for country and year fixed effects. The third column of table 4 shows the results of pooled least squares estimation with country fixed effects. The fourth column shows the results for the regression where I account for country as well as year fixed effects. The results in column 2 show that the sign of the relationship between TFR and FLP has changed and is positive now. The correlation coefficient is 5.49 and is statistically significant at the 1% level. These results are consistent with the studies of Ahn & Mira (2002) and Rindfuss et al. (2003), which provide clear and effective

reasoning for the reversal in sign and the positive correlation between fertility and female employment over the past three decades. Results in Column 3, which controls for country fixed effects, show that the relation between FLP and TFR is still negative with a greater magnitude. The correlation coefficient is -3.65 and is significant at the 5% level. This is not consistent with Kögel's (2004) results; who, by controlling for fixed effects, finds that there is no actual change in sign between the association of FLP and TFR. Additionally, his results show that there is a falling magnitude of the negative time series association between FLP and TFR. The results of the fourth column, similar to that of the one in table 3; the correlation coefficient between FLP and TFR is insignificant when I account for year fixed effects, depicting that there is no relationship between the two variables in the second period. This result is consistent with my thesis, which states for the years 1985 – 2013 there is no relationship between fertility and female employment when country and yearly fixed effects are accounted for.

The fourth columns of both tables, present insignificant correlation coefficients between FLP and TFR. As stated above, there are a number of country specific and year specific factors that affect female labor force participation rates other than fertility; Rigidity/flexibility of labor market institutions, availability and accessibility of market childcare, maternity benefits as well as female real wages effect a woman's decision of whether she enters the market place or bears a child. Now I use the same empirical model to check for the difference in the effect of fertility over the two time periods and investigate the difference in the time trend.

The results of the above regression, investigating the difference in the effect of fertility on female employment over the entire time period, are shown in table 5

(appendix). The second column shows the results of for the regression where I account for country specific effects only. The results show a negative and significant correlation between FLP and TFR during the first time period (1965-1985, period=0). The correlation coefficient is -4.37 and is significant at the 5% level. The results for the PERIOD (1986-2013) are insignificant depicting that there is no relationship during those years. The third column in table 5 shows the results for the regression where I account for country specific as well as year fixed effects. The results represent a negative correlation between FLP and TFR during the first time period; the correlation coefficient is -3.47 and is significant at the 10% level. Similar to column 2, the correlation coefficient for the PERIOD is insignificant. In this column even though I controlled for year fixed effects, there exists a negative relationship between fertility and female employment for the time period (1965 – 1985). The fourth column shows the results for the regression where I investigate the time trend by creating a dummy variable and accounting for country and year fixed effects. The correlation between FLP and TFR is negative and marginally significant at the 10% level with a p-value of 0.104. The correlation between FLP and TFR for the PERIOD is insignificant in this column as well.

The results in this regression are consistent with my hypothesis; that a negative correlation exists between fertility and female employment for the years (1965 -1985), and there is no relationship between the two variables after. As mentioned above the high level of incompatibility during this time period (1965 – 1985), was the primary reason for this negative relationship. In more recent times after the mid-1980s there were a number of changes in other factors effecting female employment, other than fertility, that greatly

varied yearly over each country causing there to be no relationship between the two variables during the period 1986 – 2013.

A country characterized with flexible labor market institutions, better availability and accessibility of market childcare, more generous maternity benefits as well as higher female real wages, will have higher fertility and female labor force participation. For example, United States. Countries with large government sectors also have a positive effect on female participation, whose liberal leave programs and job security partially reduce the opportunity costs of childbearing (Adserá 2004). Additionally, this period saw an unprecedented increase in unemployment rates. As mentioned in the above literature the level and time period of unemployment rates also have devastating effects on fertility and female employment; high and persistent rates decreases the expected income of a family and discourages temporary exit of the labor market (to have children). (Adserá 2004; Ahn & Mira 2002). These factors reduce the level of incompatibility within a country, however are not consistent over all 23 OECD countries. For example, Southern European countries are still characterized with rigid labor market institutions; the size of the public sector is moderate and part-time is uncommon. The combination of these institutional features along with the prevailing high unemployment rates do not decrease the level of incompatibility in these countries and has a depressing effect on fertility.

VI. Conclusion

Over the past 50 years labor economists have been involved in a heated argument based on their differing views on the relationship between fertility and female employment. Economists have similar and consistent views regarding this relationship during the early years (1965-1985), after the mid-1980s their results and findings differ. Ahn & Mira (2002) and Rindfuss et al. (2003) find that this relationship is negative during the years 1965 – 1985, due to high levels of incompatibility between mother and worker roles. They argue that this existing negative correlation turns to positive after the mid-1980s. The authors provide clear and effective reasoning for the reversal of the relationship between fertility and female employment over the past three decades. An increase in female real wage, improved market childcare, changing societal and family institutions and the increase in general awareness of women labor force participation has considerably reduced the level of incompatibility; making a woman's decision between childbearing and employment easier. In sharp contrast, Kögel (2004) argues that when you control for country specific effects the time-series association between total fertility rate and female employment rate does not change sign after the mid-1980s.

Previous studies in this area have been largely inconclusive; none of them take into account year specific effects. I expand on the existing study by looking at a longer time horizon and more countries; I use a panel of 23 OECD countries and collect data annually for the years 1965 – 2013. I control for country fixed effects as well as year specific effects and check for the difference in the time trend. My results are consistent with the findings of the above literature that there exists a negative relationship between

fertility and female employment during the time period 1965 – 1985. However, there is no significant relationship between these two variables in the years after 1985. The presence of a number of other country and year specific factors affects the level of labor force participation and fertility decisions of a woman. When accounted for, the cross-country time-series association between fertility and female employment seems to fade away and does not exist any longer after the mid-1980s.

Further research on the relationship between fertility and female employment can be done by incorporating unemployment rates and the combination of institutional features, such as maternity benefits, flexible/rigid labor-market institutions and availability and accessibility to market childcare, to see the level of effect each of these factors have on female labor force participation rates. This should give me a better idea about the insignificant relationship between the two variables present in the years after the mid-1980s.

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Appendices

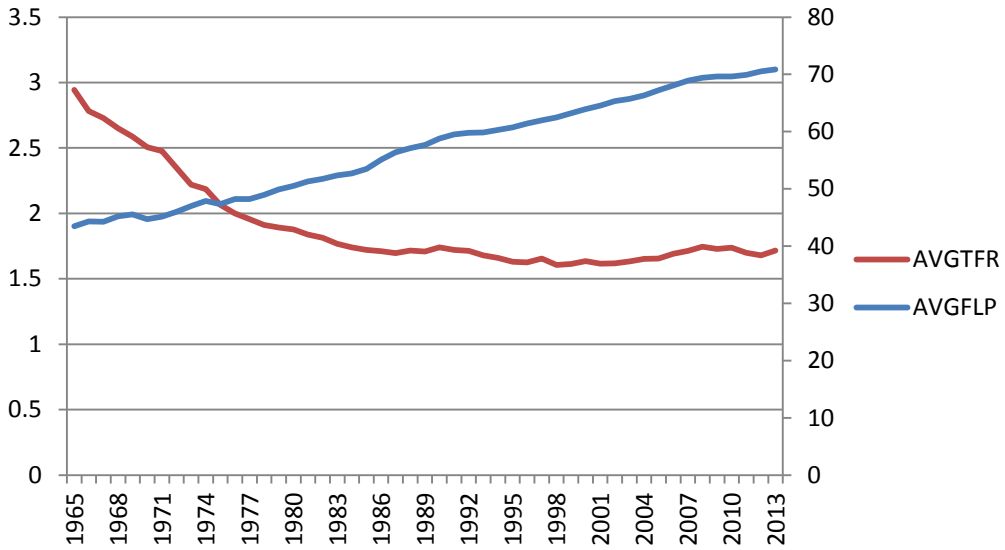

Fig 1. OECD Avg. fertility and female participation rates

Table 1: List of all OECD countries used in the regression

Australia	Finland	Italy	New Zealand	Switzerland
Austria	France	Japan	Norway	United Kingdom
Belgium	Germany	Korea	Portugal	United States
Canada	Greece	Luxembourg	Spain	
Denmark	Ireland	Netherlands	Sweden	

Table 2: Statistical description of the variables used in the model

Variable	Mean	Std. Dev.	Observations
FLP	57.45	13.44	1086
TFR	1.89	0.515	1127
GDP	25028.05	22239.35	1122

Table 3: Panel regression results for the model estimating the effect of fertility on female employment for sub sample 1 (1965 – 1985).

	Panel 1: 1965 – 1986		
	Dependent Variable: FLP		
	Specification (1)	**Specification (2)**	**Specification (3)**
TFR	- 4.49*** (0.99)	-3.3*** (0.52)	-3.26 (3.16)
GDP	0.00079 (0.00014)	0.0008 (0.00006)	0.002 (0.0006)
Country-fixed effects	No	Yes	Yes
Year fixed effects	Yes	No	Yes

Table 4: Panel regression results for the model estimating the effect of fertility on female employment for sub sample 2 (1986 - 2013).

	Panel 2: 1986 - 2013		
	Dependent Variable: FLP		
	Specification (1)	**Specification (2)**	**Specification (3)**
TFR	5.49*** (1.31)	-7.38** (3.50)	-3.65 (4.44)
GDP	0.0004 (0.00002)	0.00035 (0.00008)	0.003 (0.0002)
Country-fixed effects	No	Yes	Yes
Year fixed effects	Yes	No	Yes

Table 5: Panel regression results for the model estimating the effect of fertility on female employment for the entire sample (1965 – 2013).

	Panel: 1965 - 2013		
	Dependent Variable: FLP		
	Specification (1)	**Specification (2)**	**Specification (3)**
TFR	-4.37**	-3.47*	-3.5*
	(1.56)	(1.83)	(2.05)
GDP	0.0005	0.0002	0.0003
	(0.0002)	(0.0002)	(0.0003)
PERIOD	4.1	1.44	4.54
	(7.17)	(7.13)	(11.75)
TFR*PERIOD	0.75	0.72	1.4
	(4.19)	(4.02)	(4.33)
GDP*PERIOD	-0.0001	-4.54e-06	0.00002
	(0.0003)	(0.0003)	(0.0003)
Country-fixed effects	Yes	Yes	Yes
Time trend	No	No	Yes