Fertility and Women's Employment: A new look through Meta-analysis

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Abstract

Our research objective was to systematise the existing literature on the relation between fertility and women's employment at the micro-level. Instead of carrying out a traditional literature review, we conducted a meta-analysis. This allowed us to compare estimates from different studies standardised for the country analysed, the method applied, control variables used, or sample selected. We focused on two effects: the impact of work on fertility and the impact of young children on employment entry. First, we found a high variation in the studied effects among the institutional settings, reflecting the existence of a north-south gradient. Second, we observed a significant reduction in the impact of women's work on fertility but an increase in the effect of children on employment entry over time. Finally, we demonstrated that a failure to account for the respondent's social background, partner and job characteristics tends to produce a bias to the estimated effects.

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[*] The names are listed in alphabetical order.

1. Introduction

Since recent decades, period total fertility has been decreasing in almost all industrialised countries, reaching values well below the replacement level. It has often been argued that an increase in women's labour-force participation has largely contributed to the change in reproductive behaviour. Since the mid-1980s, however, the European countries with the highest women's labour-force participation have been showing the highest fertility, too, and vice versa. This phenomenon is explained by different levels of incompatibility between work and motherhood across countries, depending on their legal and cultural frameworks. In this context, the question emerges whether women's employment and fertility are indeed correlated or whether the observed correlation is a spurious one, caused by common antecedents of the two variables (Weller 1977). Some studies investigating the correlation between women's employment and childbearing at the macro-level provide evidence for the latter (e.g. Engelhardt *et.al.* 2004). Evidence at the micro-level, however, is fragmented and often provides contradictory results. The reason is that the micro-level studies focus on a specific context, constituting only a piece in the overall puzzle of understanding the relationship between fertility and women's work. The necessity to draw general conclusions on the size and direction of the effect under investigation calls for a systematic overview of the existing evidence.

The objective of this paper is to systematise the literature on the relation between women's employment and fertility at the micro-level with a special emphasis on the sources of the cross-study variation. In particular the effect of the socio-cultural and institutional context, time period and model specification are investigated. Instead of conducting a narrative literature review we apply meta-analytic techniques. A standard literature review usually consists of commentary findings of previous works. The character of this approach, however, is a qualitative one. It neither allows for a quantitative assessment of the effect of interest nor does it enable its standardisation for different methods applied across studies. The inability to compare estimates obtained by different researchers often leads to a literature selection bias. These problems can be overcome by applying a

meta-analysis, in other words, by conducting a quantitative literature review. This methodology, relatively new in the social sciences, has been developed in order to synthesise, combine, and interpret the abundance of empirical evidence on a certain topic. It offers a clear and systematic way to compare the results of different studies standardised for the country, the method applied, the control variables employed, the sample selected, etc.

Our study focuses on two effects: the impact of women's employment on childbearing and the effect of young children on mothers' entry into employment. We conducted an overview of available research works concerning Europe, the US, Canada, and Australia, published in English, German, Italian and Polish languages and meeting a priori specified criteria.

The paper consists of eight sections, including the introduction. Section 2 constitutes an introduction to the discussion on the association between women's work and fertility. Against this theoretical background Section 3 justifies our research objectives. Section 4 briefly presents the method of meta-analysis. Section 5 describes the criteria for the selection of the studies and Section 6 provides information on meta-analytic techniques applied in this paper. The results are presented in Section 7, followed by Section 8, which summarises and discusses the findings.

2. Theoretical framework: on the correlation between fertility and women's work

In the 1980s, many researchers still associated the severe drop in fertility experienced by all industrialised countries in the last 40 years with a rise in women's labour-force participation. For example, the authors of the concept of the "second demographic transition" ascribe the fall in the propensity to have children to the rising economic autonomy of women and their strive for self-fulfilment, among other things (Van de Kaa 1987, 1988; Lesthaeghe 1991, 1992). Similarly, referring to the high opportunity costs of motherhood, particularly for highly-skilled women, Becker sees the reasons for the falling propensity to have children in the rise of women's educational and labour-market attachment (Becker 1993).

However, since the mid 1980s the trends observed at the macro-level seem to contradict these theories. The countries with the highest women's labour-force participation have become characterised by highest rather than lowest fertility. Moreover, in the mid 1980s, the downward trend in fertility reversed in this group of countries. These observations have led to discussions on the changing correlation between women's labour-force participation (FLFP) and total fertility at the macro-level. Castles (2003), Rindfuss *et.al.* (2003), and Brewster and Rindfuss (2000) attribute the reversal to the correlation sign in the weakening incompatibility between childrearing and females' employment in some countries, resulting from changes in the socio-cultural and institutional context (e.g. changing attitudes towards working mothers, the introduction of family and labour-market policies aimed at the reconciliation between work and family). Furthermore, Ahn and Mira (2002) underline the role of cross-country differences in the income effects of women's wages, unemployment and labour-market rigidities in terms of fixed working hours. The importance of the socio-cultural and institutional setting is further confirmed in a study by Kögel (2004, 2006), who shows that that the correlation turns into negative after we control for the cross-country heterogeneity in the magnitude of this association and country-specific factors.

Indeed, the increase in women's labour force participation and the decline in fertility have been accompanied by a transformation of the institutional and socio-cultural contexts. Due to high cross-country heterogeneity of these processes several welfare regimes and gender arrangements have emerged. The Nordic countries, classified by Esping-Andersen (1990, 1999) as a social-democratic welfare regime, have developed a comprehensive set of social services to the working parents, supporting their full-time integration in the labour market. Together with relatively liberal attitudes toward working women (Muszyńska 2007, p. 90-94) these policies are believed to have contributed to a gradual adoption of a dual breadwinner/state carer model (Pfau-Effinger 2000). Although extensive state intervention in economic activity has also been a characteristic feature of the conservative welfare regime (e.g. Germany, Austria, Switzerland, the Netherlands) it has never been targeted at diminishing the social inequality. Hence, social services supporting mothers'

employment have hardly been provided. Additionally, in this part of Europe women have been perceived as only supplementary income providers, working for pay unless there are care duties. As a consequence, the primarily dominant traditional male breadwinner/female carer model has developed into a male breadwinner/ female part-time carer. Low institutional support to working parents has also been provided in the familialistic welfare regime (Mediterranean countries) where care has been expected to be offered within the large families. Traditional attitudes towards women's work, even if there are no children (Salvini 2004; Mencarini and Tanturri 2006), and limited part-time employment opportunities have additionally supported the prevalence of the male breadwinner/female carer model, still dominant in this part of Europe. By contrast, in the liberal welfare regime (UK, US, Canada and Australia) the state intervention have been always limited to assuring functionality of the market. Hence, individuals have been largely dependent on participating in the labour force to secure their families. High labour market flexibility and well developed private services coexisting with relatively liberal attitudes toward working mothers have finally resulted in adoption of a dual breadwinner/marketised female carer model. Finally, in Eastern Europe during state socialism a dual earner/female double burden model was developed. Women were expected to be workers as well as the main care providers (Geisler and Kreyenfeld 2005, Siemieńska 1997). They were supported in performing their double roles by generous social policies, job guarantees and low competition in the labour market. After the breakdown of the system the economic transformation and rising uncertainty in the markets have been accompanied by a reduction in the public provision of the services. As a result the difficulties in combining family and work have increased, resulting in a severe decline in fertility and employment of women.

The evolution of the socio-cultural and institutional contexts over time accompanied by a reversal to the cross-country correlation between total fertility and FLFP might suggest that the considered correlation is spurious. Applying vector correction models on time-series data from six developed OECD countries Engelhardt *et.al.* (2004), show that total fertility and FLFP are causally

related in both directions. They further presume that the simultaneous movements of both variables are caused by common exogenous third variables, such as social norms, social institutions, financial incentives, or the availability and acceptability of contraception. This result is consistent with the theoretical model of Apps and Rees (2004), who show that greater availability of childcare and a system of individual rather than joint taxation have a positive effect on total fertility as well as the FLFP, producing a positive correlation between the two variables. From the perspective of formulating policy recommendations, an investigation of the interdependencies between women's employment and fertility at the micro-level is however required.

3. Fertility and women's employment: a need for further investigation

The evidence on the relation between fertility and women's work at the micro-level is very wide. Although it generally suggests that both variables are negatively correlated, there are exceptions to this rule. An insignificant influence of women's employment on the transition to childbirth was found for many countries, beginning with Sweden (Berinde 1999; Santow and Bracher 2001), and ending at Italy (Bernardi and Nanio 2005). The evidence of a positive effect of women's employment on birth risks found for East Germany (Kreyenfeld 2004) and Hungary (Róbert and Bukodi 2005) is even more striking. Similarly, studies on entry into employment report an insignificant effect of young children on full-time employment (Drobnič 2000 for lonely mothers in the US; Giannelli 1996 for West Germany; Leth-Sørensen and Rohwer 2001 for Denmark), part-time employment (Drobnič et.al. 1999 and Drobnič and Wittig 1997 for the US; Drobnič 2000 for West Germany) or employment in general (Corijn 2001 for Flanders; Felmlee 1993 for the US; Bernardi 2001 for Italy). Moreover, empirical evidence for the US (Hofmeister 2006, Grunow *et.al.* 2006), Denmark (Grunow and Leth-Sørensen 2006) and, in the case of only one child, France (Grimm and Bonneuil 2001) even suggests that mothers of young children are more likely than other women to enter employment.

As this short narrative literature overview has shown, the empirical evidence on the issue is very large. Nevertheless, for several reasons it is difficult to draw conclusions from it. First, in spite of the fact that the majority of the studies indicate a negative association between fertility and women's employment, many present contradictory results. Second, the methods employed to compute the effects under investigation largely vary. Third, even if the methods are similar in nature, different control variables often are included into the model, possibly influencing the size of the studied effect. Moreover, the age of the children studied is categorised differently across studies and this makes it impossible to compare the strength of the effect. Finally, the sample under study is often selected according to the research objectives of the author. Therefore, in order to draw conclusions on the association between women's employment and fertility at the micro-level, a quantitative systematisation of the existing studies is required.

We undertake this task, taking advantage of meta-analytical techniques. We pay special attention to the variation in the studied effects across the socio-cultural and institutional settings as well as across time. First, we expect that the relation between fertility and women's work, if negative, is weaker in the welfare regimes characterised by the lower conflict between parenthood and employment. Second, the association might have changed over time as a result of the changing cultural, institutional and structural conditions for work and family reconciliation. Third, we verify how the specification of the model, in particular the inclusion of particular covariates, influences the studied effects.

4. Meta-analysis as a quantitative literature overview

Within the framework of experimental research, meta-analysis has been employed increasingly in the social sciences (Vemer *et al.* 1989; Waldorf and Byrun 2005; Weichselbaumer and Winter-Ebmer 2005; Amato and Keith 1991; Wagner and Weiβ 2006). It is designed to deal with a large amount of empirical studies, often providing contradictory results.

In order to conduct a meta-analysis, papers researching a topic of interest are collected in a systematic manner. First, estimated coefficients are selected across studies and recalculated in a standardised way into comparable indicators (i.e. effect sizes). The indicators reflect the magnitude of the association in each study. Next, they are combined into single summary indicators. If the computed effects contain a large amount of heterogeneity, regression techniques should be applied. Within this analytical framework, the dependent variable denotes the effect sizes and all methodological features of a particular study can be used as control variables.

Meta-analysis has several advantages to a standard literature review (see e.g. Stanley 2001). The first is its quantitative character. While standard narrative literature review consists of commentary findings of various works, meta-analysis allows for a quantitative assessment of the effect of interest. Second, it provides a researcher with the opportunity to standardise the studied effects for the country looked at, the method of analysis applied, the control variables employed, and the sample selected, etc. Not only does it help to explain the wide cross-study variation in research findings, but it also enables the evaluation of the merits of different research methods, designs, data, and country-specific contexts. Third, meta-analysis requires inclusion of all papers available worldwide meeting a priori defined criteria, which minimises the risk of selection bias. The quality and reliability of these papers is taken into account by weighting the original estimates by the inverse of their standard errors, additionally it can be controlled for in the meta-regression framework. Papers cannot be, however, highlighted or discarded from the review for any methodological or data-related reasons, a decision that may be taken in a narrative literature overview subject to the individual assessment of the papers by the reviewer.

Meta-analysis has limitations, however. First, it is much more confined in its range than a traditional literature review, which can cover a very broad range of studies (i.e. without a priori defined criteria) and even include studies that are only marginally related to the phenomenon under investigation. Second, since publishers tend to accept studies that report significant results, it may be even impossible for the meta-analyst to locate a number of relevant studies on the topic (the so-

called "file-drawer" problem). Note, however, that many ways have been developed in the methodological literature to test and deal with this problem (Rosenthal 1979; Card and Krueger 1995; Begg and Mazumdar 1994). Finally, a common problem is that researchers often do not report results required for conducting a meta-analysis (i.e. standard errors or t-statistics). It thus is necessary to make assumptions in order to overcome the lack of information.

5. Meta-sample

In order to carry out a meta-analysis, a necessary preliminary step consists of constructing one's own meta-data. The principle of completeness drives the choice of the original papers. Our article's search strategy, following Stuck *et al*. (1999), consisted of three stages: first we used Current Contents and EconLit, universal research databases[1]; second, we checked the references in existing articles; third, we asked experts for their recommendations. Due to the fact that the Current Contents covers articles published in the time-span 1990-2006, all selected studies were limited to this publication period.

The search was performed in the seven months from April 2006 to October 2006. In order to collect a representative sample of high quality studies, we merely focused on reviewed articles and chapters in books and monographs, leaving out working papers and internal research reports. Our systematic search was conducted using a specific combination of selected general keywords (work, fertility, childbearing, transition, progression, labour market, employment, etc). We ended the search at saturation point - in other words when, combining the different keywords and adding new ones, we obtained articles already selected. Applying the systematic search strategy, we found around 150 potential articles on the two effects studied, namely the effect of women's work on childbearing and the effect of young children on females' transition to employment.

We limited our study selection to works that clearly explored the women's transition to birth and to employment. Amongst them, only the studies that provide sufficient information to asses a

causal relationship between work and fertility were included. Thus, we restricted the search to longitudinal studies.

Furthermore, we decided to exclude papers where the transition to employment after childbirth was analysed; the reason being that in these papers the age of the child is the process time and the calculated baseline intensities, even if reported, do not measure the effect which we focus on in our study, i.e. effect of young children versus older ones or no children on women's employment entry.

English, German, Italian, and Polish-language articles were considered. We are quite positive of having a representative sample of existing studies, possibly with a bias towards an English-language literature. Omission of the studies published in other languages may cause an under-representation of some countries in our analysis. This is a common problem in the literature reviews. On the other hand, however, we did not locate many of them in the literature sources we used.

At the end of the selection process, we came up with 30 papers on the transition to childbirth and 29 papers on employment entry (the list of the studies included is available from the authors upon a request). Some authors presented an analysis of more than one independent sample or studied more than one transition in the same paper. These estimates were treated as independent and were all included into our analysis. We accepted the estimates from final models only. When the same author published two papers using the same dataset and the same model specification, an average estimate was calculated based on the reported outcomes. However, when the same dataset was used, but a different model was estimated, we included both estimates in order to avoid the possibility of a study selection bias.

Overall, the search procedure gave us a total of 90 effects of employment on fertility and 60 effects of young children on entry into employment (for details, see Tables 1a and 1b). The collected studies, apart from one, treat fertility as exogenous to employment or employment as exogenous to fertility. This is the most common way of investigating the relationship between the

two variables in the literature. The studies that consider the endogeneity of these two variables are rare and most often based on the experimental approach. Instrumenting fertility with twin-births or contraceptive use while studying its impact on women's work makes the studies too different to include them into our analysis.

After having collected the articles, we proceeded with the construction of two separate datasets: one for the transition to childbearing and another one for the transition to work. Data entry was conducted independently by each author for one of the two datasets. The reliability of each dataset was verified in the next step by the second author.

(Tables 1a, 1b about here)

In order to investigate the differences in the studied effects with respect to the institutional and socio-cultural context, we applied the Esping-Andersen classification of welfare regimes (Esping-Andersen 1999)[2]. As we included the Eastern European countries into our analysis, we added two new clusters: socialist, when the original analysis refers to the period before the breakdown of the socialist regime, and post-socialist in the opposite case. We included East Germany into the latter cluster. Although the country adopted the West German legal framework following the fall of the Berlin Wall, the female employment patterns and the attitudes toward working mothers largely differ in both parts of Germany (Matysiak and Steinmetz 2006). We succeeded in covering all welfare regimes in the analysis of the effect of women's employment on childbearing. Unfortunately, due to an insufficient number of available studies on the effect of young children on mothers' employment entry in the socialist, post-socialist, and familialistic welfare regimes (less than 5 per regime) we decided to concentrate only on the three remaining welfare regimes: conservative, liberal, and social-democratic ones. Thus, the number of effects of young children on women's employment entry included in our analysis decreased to 55. Table 2

presents the resulting classification of the countries used in both analyses. As one can see, in none of the welfare regimes the distribution of effects by country is proportional.

(Table 2 about here)

6. Meta-analytic techniques

6.1. Calculation of effect sizes

Our effect sizes are the log odds ratios, the log relative risks and the estimates of the OLS regressions weighted by the inverse of their variances. The weighting allows us to take statistical significance of the effect into account as well as to indirectly consider the sample size of the original study. The effects come from the models, where the dependent variable is defined as the hazard of employment (full-time, part-time or employment in general), the hazard of birth (first, second, third, all birth orders together) or, in the case of the fixed-effects OLS regressions, deviation from the person-specific mean. The variance of the effect size is defined as a sum of the squared standard error and the between-study variation.

In order to study the influence of women's employment on childbearing, we selected the estimates of being employed or, if this was not possible, being employed full-time versus being inactive, unemployed or non-employed[3]. The inversely coded effects (e.g. inactivity versus employment) were recalculated.

Our analysis of the effects of fertility on women's employment focused on children aged 0-6. This was the most frequent age interval, in which the age of children was classified. Many authors, however, used other age intervals. In order to maintain coherence across studies, we fitted spline functions to all coefficients that refer to the influence of the age of children on women's entry into employment for each study. The size of the coefficient was the Y-axis value. We placed the mid-points of the reported age intervals on the horizontal axis. Given the parameters of the

spline function, we were able to calculate the coefficient for the mid-point of the required age interval.

Another problem we encountered while calculating the effects of children on women's employment is the different reference categories employed by researchers. The majority of authors defined the reference category as "having no children", but some used "having no children younger than" a certain age. We accepted both types of papers, but in the case of the latter we did so only if the age limit was at least seven. Finally, the variable describing the age of the child was defined differently across the studies. The most frequent solution was to analyse the effect of the age of the youngest child. However, in some cases older children were categorised together with the youngest child (having children in the given age interval). Moreover, while in the two cases presented above the covariate describing the age of the child was defined as categorical, there were also papers where it was coded as continuous (number of children in a given age interval). We accepted these three solutions. The effect sizes were later standardised for the definition of the age of child and the type of reference category in the meta-regression framework.

The last problem we encountered while calculating the effect sizes was the lack of standard errors or other statistics allowing a direct calculation of standard errors (e.g. t-statistics or at least p-values). This applied to the papers on transition to childbirth. Following the literature on meta-analysis, we made following assumptions. When the result was marked to be significant and no other details were available, we set the p-value equal to 0.05. When the result was not significant and the upper limit for significance assumed by the author was 0.1, we set the p-value at 0.45, and when the upper limit was 0.05, we used a p-value equal to 0.475. When the significance was marked with stars only, we assumed the p-value to be equal to the mid-point of its interval.

6.2. Testing for homogeneity

The estimated effect sizes were tested for homogeneity, using the homogeneity test proposed by Hedges and Olkin (1985). The test statistic Q measures the extent to which individual effect sizes

vary around the mean effect size. Significant values of Q require an application of further procedures.

We expected large variation in the estimated effect sizes. The source of the variation lies in the differences in the institutional context, in which the employment and fertility decisions are taken, as well as in the peculiarities of the original studies in terms of the methods applied, the data looked at, sample restrictions, cohorts covered, the types of the transition studied, the definitions of the reference category of the investigated coefficient, or any other variations in the effect measurements (see Section 5.1) Significant heterogeneity in the mean effect sizes was tackled with by estimating meta-regressions.

6.3. Meta-regression

Our meta-regressions take the following form:

$$Y_j = \sum \alpha\, w_j + \sum \beta\, c_j + \sum \vartheta\, v_j + \sum \theta\, s_j + \sum \delta\, m_j + \sum \gamma\, x_j + \xi_j, \qquad j = 1,2,...,n,$$

where Y_j is the effect size of study j, w_j are a set of dummies for the welfare regime, and c_j for the cohorts covered, v_j represent the control variables for the type of the transition and measurement of the studied effect (e.g. birth order, type of employment, type of non-employment, definition of the reference category, definition of the child's age variable, etc.), s_j stand for dummies controlling for the sample selection (taking value 1 if the sample was restricted only to the ever-working, or married, or lonely mothers, or mothers of at least one child, or if it covered other ethnic groups apart from the nationals) , m_j denote variables standardising for the method and type of the data, and x_j are implemented to standardise for the covariates incorporated as controls in the original studies. The parameters $\alpha, \beta, \vartheta, \theta, \delta, \gamma$ were estimated stepwise, using the standard maximum likelihood method. First, we introduced welfare regime variables into the model. They were followed by controls for the type of transition, the definition of the variable on the child's age, the type of the reference category, the sample selected, the method applied, and the type of the data and the control variables employed in the original studies.

The robustness of the meta-regression estimates was verified by conducting a sensitivity analysis. Namely, we estimated the same models on the samples reduced randomly by 10%. Minor differences in the estimates prove that the outcomes are reliable.

7. Empirical findings

7.1. Univariate analysis

Table 3 presents the mean effect sizes respectively of children aged 0-6 on mothers' employment entry and women's work on the birth risk calculated, based on the information in all collected studies.

Generally, one can see that the effect of children aged 0-6 on mothers' entry into employment is negative (-0.29) and strongly significant (p=0.000), whereas the effect of women's employment on childbearing is zero (p=0.9). However, as the homogeneity statistics developed by Hedges and Olkin indicate, these results contain a large amount of variation. This is consistent with our expectations. Specifically, one of the most important sources of heterogeneity can be the institutional context, in which employment and childbearing decisions are taken. For this reason, we disaggregated the mean effect size by the welfare regimes.

The results show that the effect of young children on mothers' employment entry is on average significantly negative in conservative as well as liberal welfare regimes. Furthermore, the negative effect of young children on females' employment entry turns out to be much stronger in the conservative welfare regime than in the liberal showing higher work and family incompatibilities under this institutional setting. The social-democratic welfare regime forms an exception, with the mean effect of young children on mothers' employment entry insignificantly different from zero.

The mean effect sizes of women's employment on childbearing present almost the same picture. They are significantly negative in the liberal, conservative, and familialistic welfare

regimes. In the social-democratic and socialist welfare regimes, the influence of females' employment on childbearing is on average insignificantly different from zero, whereas in the post-socialist welfare regime a significantly positive effect is found.

Apart from the variation across the welfare regimes we also examined whether the effects experienced by the younger cohorts differ from those of older cohorts. In our meta-sample the cohorts analysed range from the 1920s to the 1980s. Due to the fact that some papers cover a wide range of cohorts, we decided to distinguish two groups of studies: one concentrates mainly on women born before 1960 and the other focuses on females born mainly after this year. The results of the univariate analysis show that the effect of young children on women's employment entry is negative and similar in size for both the younger and the older cohorts, whereas the effect of females' work on fertility is significantly negative for the older but insignificant for the younger cohort.

(Table 3 about here)

Nevertheless, despite the disaggregation by welfare regimes or cohort, the Q-statistics show that the effect sizes presented in Table 3 still contain a large amount of variation and cannot be treated as reliable estimates. As mentioned above, the variation may be a result of the methods applied, the data looked at, the sample restrictions made, the type of the transitions studied, and the reference categories or definitions of the child's age variable employed. In order to deal with this problem, we estimated meta-regressions. The results are presented in the next sub-section.

7.2. Multivariate analysis

The most serious problem we encountered while estimating the parameters in meta-regression was the relatively low number of studies. We thus decided to include all variables that in our opinion may strongly contribute to the high variation in the effect size, e.g. the type of welfare regime, the

type of transition, the type of the reference category of the effect sizes, the definition of the child's age variable, the sample selection, the method applied, and the more important control variables employed in the original studies. It was unfortunately not possible to study in detail the effect of the applied research method or the type of the data used (retrospective, panel, administrative).

In order to evaluate the robustness of our estimates, we conducted a sensitivity analysis (Appendix). Namely, we reduced each sample randomly by 10% and estimated both models with the same covariates. The outcomes remained stable, demonstrating the reliability of our findings.

The meta-regression estimates are presented in Table 4. While interpreting the results, we assume the direction of the correlation sign between women's employment and childbearing to be negative. This assumption is consistent with the results of the univariate meta-analysis and the results of the majority of the papers on the topic. Hence, the positive coefficients in the meta-regression are interpreted to constitute an increase in the effect size or in other words a reduction in the negative effect size. Similarly, negative coefficients are interpreted to represent a decline in the effect size, which means that the negative effect is intensified.

(Table 4 about here)

The results of the multivariate analysis are generally in line with the results of the univariate one as regards the variation of the studied effects among the institutional settings. The negative effect of children aged 0-6 on mothers' employment entry is definitely strongest in the conservative welfare regime and lowest in the social-democratic regime. The liberal institutional setting lies in-between these two poles. The negative effect of women's work on childbearing is strongest in the familialistic, liberal, and conservative welfare regimes and lowest in the post-socialist ones. The socialist and social-democratic welfare regimes are characterised by the effect of females' employment on childbearing at an intermediate level.

As regards the variation in the effect sizes across cohorts the multivariate analysis confirms the result of the univariate analysis that the negative effect of women's work on fertility has decreased over time. Exactly the opposite is concluded on the effect of young children on women's employment entry. Although the results of the univariate analysis show that this effect does not differ between the two groups of cohorts, controlling for the study-specific characteristics reveals a significant increase in the negative impact of motherhood on women's work over time. We address this finding in more detail in the discussion.

As far as the research method is concerned, we did not have many options for selection of the covariates. Nearly all studies included in the analysis employed event-history techniques, applying continuous or discrete time models. In only one paper, which focused on the influence of young children on women's employment, did the authors estimate the fixed-effects OLS regressions on the annual data separately for the US and Switzerland. This was the only work among those studying the impact of young children on females' employment entry that controlled for unobserved heterogeneity. As regards the studies investigating the impact of women's work on fertility, the unobserved characteristics of the females were also rarely taken into account. The low number of studies controlling for unobserved heterogeneity made it impossible to test its impact on the studied effects. Therefore, as regards the method we only decided to include variables testing the influence of the continuous vs. discrete time models on the effect sizes into both meta-equations. Our results show that in both cases analysed, the models with continuous time tend to yield higher effect size estimates than models with discrete time. This finding is consistent with that of Zhang and Yu (1998, pp.1690), who show that if the event of interest is relatively frequent, the odds ratios tend to underestimate the relative risk if it is below one.

The remaining covariates in our meta-regressions regard the variables included by various researchers into the original models. Incorporating them into our analysis allows us to answer the question of how the inclusion of a particular variable affects the studied effect sizes. Our results show that controlling for partner characteristics (employment, occupation, wage, education), the

social background of the respondent (e.g. parents' education, parents' occupation, parents' home ownership) and women's job characteristics[4] (wage, occupation, working hours, type of contract or employment sector) tends to influence the magnitude of the effect sizes.

Generally, taking into account the above mentioned characteristics reduces the negative impact of young children on mothers' employment entry or the impact of females' work on fertility. This finding is consistent with our expectations. It shows that the employment and childbearing decisions of a woman are determined by a set of external opportunities and constraints. A labour market status of the male partner means high income security for the female partner, which in financial terms allows her to withdraw temporarily from the labour market for the period of delivery and care. Therefore, by omitting the partner's characteristics the researcher overestimates the negative influence of women's employment on childbearing. Surprisingly, controlling for partner characteristics occurred to have no impact on the effects of young children on females' employment entry.

Analogous conclusions can be drawn on the role of the social background. Not only may it influence the attitudes of a woman and her partner towards the gender roles but also the economic environment in which the employment and childbearing decisions are taken. Therefore, including the social background of the respondent into the model absorbs part of the negative effect of young children on females' employment. It does not have, however, a significant impact on the effect of women's work on fertility.

The last set of control variables are the respondent's job characteristics. They define the level of woman's security at the workplace and her chances of promotion. Our results show that controlling for job characteristics significantly reduces the negative effect of women's work on childbearing but surprisingly does not have an impact on the effect of young children on mothers' employment entry.

Finally, the meta-model investigating the effect of women's employment on childbearing controls for the order of birth. The results show that the negative effect of females' work on

childbearing is much lower in the case of first parity compared to a higher parity. This result confirms the assumption that the reconciliation of motherhood with work is a complex matter, inducing high opportunity costs, when there is more than one child at home[5].

8. Discussion

The examination of the interrelationship between women's employment and fertility at the micro-level has been a prominent issue in demographic and economic literature since a long time. There is no alternative to meta-analysis to bring light on this large number of empirical findings that allows a quantitative assessment of the effect of interest, standardised for the cross-study variation. In this paper, we have employed meta-analytic techniques to compare, synthesise, and interpret the large amount of worldwide studies on the topic. Two effects were analysed: the effect of women's work on fertility and the effect of young children on females' employment entry.

The first and main finding of our meta-study is a high variation in the analysed effects among the institutional settings. This result is fully consistent with the view of Rindfuss and Brewster (2000), Rindfuss *et.al.* (2003) and Engelhardt *et.al.* (2004) that country specific effects, such as policies or attitudes towards working mothers, have an impact on the incompatibility between childrearing and work, and influence both women's employment and fertility.

The results suggest that the conflict between employment and family is relatively low in the social-democratic and socialist welfare regime. In our opinion, this is related to the high institutional support to working mothers in both welfare regimes. Moreover, in the social-democratic welfare regime, the incompatibility of employment and childcare is reduced by relatively liberal attitudes towards working mothers, whereas in the socialist regime it was facilitated by strong job guarantees, low competition in the labour markets and socialist ideology forcing high fertility and high women's employment. Nevertheless, women's employment seems to depress fertility least in the post-socialist welfare regime. The univariate analysis even showed that woman's work is facilitated by childbearing. This finding seems to be striking since following the

fall of the socialist regime the Eastern European countries experienced a severe fall in women's labour-force participation and fertility, accompanied to a large extent by a withdrawal of the state from institutional support of working mothers (e.g. Kotowska 1999; Stropnik 2003). Furthermore, studies by Muszyńska (2007, p. 93-96) and Lück and Hofäcker (2003) reveal that attitudes towards working mothers in the post-socialist countries are relatively traditional when compared to the rest of Europe. We believe, however, that the observed positive influence of women's employment on childbearing may be the result of a strong income effect. Rapidly rising aspirations of individuals in Eastern Europe in the course of economic transformation, state withdrawal from financial support for families, and relatively low wages compared to the old EU member states may be a source of strong economic necessities that restrain one-breadwinner-couples from family formation. Moreover, individuals may be less willing to bear children when their economic situation is uncertain. Women on temporary contracts, on the risk of losing a job, unemployed or married to men with unstable employment may be more reluctant to have children due to economic problems and the fear of jeopardizing chances to maintain or find employment in case of pregnancy and childbearing. Moreover, following Kreyenfeld (2004), the positive impact of employment on birth in the post-socialist countries may also be due to a highly internalised impairment of work and childbearing in the past.

In the remaining welfare regimes, the conflict between work and family is much stronger and its magnitude increases as we move from liberal to conservative and familialistic welfare regimes. These results are consistent with our expectations. The high labour market flexibility in the UK and the US allows mothers to enter employment fairly rapidly after a career break, which may compensate in part for the lack of public support for working parents. In contrast to the liberal welfare regime, the conservative and familialistic institutional settings are characterised by relatively rigid labour markets and more traditional attitudes towards working mothers, additionally to low institutional support for working parents.

Apart from the high regional variation in the studied effects, we found a significant change in their magnitude over time. Our results undoubtedly show a significant reduction in the negative impact of women's work on fertility. On the other hand, however, it turns out that the negative influence of young children on women's employment entry has even strengthened. In our opinion a complex interplay of several factors is responsible for this state of affairs. Changing attitudes towards working mothers and evolving family policies directed at work and family reconciliation in many of the developed countries in the recent decades have improved the conditions for childbearing for working women, albeit at very diverse rates. Hence, these cultural and institutional factors might have contributed to a decline in the negative impact of women's work on fertility. On the other hand, however, increasing competition in the labour markets and consequently rising requirements of employers as regards mobility and availability in the globalising world have diminished chances of employment (re-)entry for mothers who withdrew from the labour force for the period of delivery and care or delivered while being out of employment. The anticipated inability to find a job or return to work after birth may force women to postpone childbearing until establishing a relatively good position in the labour market. In this situation women who plan to have a child will self-select themselves into employment prior to childbearing. Although such behaviour weakens the observed negative effect of employment on fertility, in the conditions of increasing uncertainty in the labour markets it may lead to a continued postponement in childbearing and a further decline in childbearing. Finally, apart from the developments described above, an increase in the negative impact of young children on women's employment entry might also result from a change in the characteristics of women participating in the labour force. Since in the past it was common for women to stay at home those who worked were very likely to be strongly work-oriented. For this group of women having children did not constitute a large obstacle to work. Nowadays, majority of women participate at least for some time in paid employment and the highly motivated to work constitute only a fraction of them.

Both the regional and time variation of the studied effects suggest that the correlation between women's employment and fertility is at least partly spurious, possibly caused by a simultaneous influence of common antecedents. This implies that regional and/or temporal variations in institutional factors (like childcare subsidies, taxation policies, and other forms of family support) structural factors (e.g. labour market rigidities or high uncertainty in the markets), and socio-cultural factors (such as attitudes toward working mothers and perception of the gender roles) have been important in determining the magnitude of the conflict between work and family. This finding is consistent with that of Engelhardt *et.al.* (2004) for the macro-level.

One of the most interesting results of our analysis regards the appropriateness of controlling for certain covariates while studying the interrelation between work and fertility. A failure to take the information on the job characteristics and social background of the woman as well as the labour-market status of the partner into account may cause biases to the estimates, resulting in the overestimation of the negative effect of women's work on fertility or the negative effect of young children on mothers' employment entry. In particular, only recently have some studies underlined the importance of taking into consideration the role of the partner as the second actor of the reproductive process (e.g. Blossfeld *et. al.* 2001; Kreyenfeld 2005). We demonstrated the consistency of this approach.

ENDNOTES

[1] Current Contents and EconLit, provided by the surface OVID, give access to complete bibliographic information and table of contents of over 7,600 of the world's leading scholarly journals and to more than 2,000 book series covering all disciplines. They cover items published since the year 1990.

[2] Following the Esping-Andersen's typology we also classify France and Belgium into the conservative welfare regime. Although some family policy typologies consider these two countries separately from Austria, Germany, the Netherlands and Switzerland we collected too few studies for France and Belgium to form a separate group.

[3] Non-employment is defined as unemployment as well as inactivity.

[4] In the models studying transition to employment the job characteristics, if considered, refer to the job of a woman prior to the non-employment spell.

[5] Here, one issue needs to be addressed. Work after birth can be an indicator both of a generally strong 'work orientation', predicting low fertility, and opportunity to combine work and motherhood, predicting high fertility. Hence employment after birth might be of a different nature than employment prior to first birth. Therefore, as a first step, studies on the transition to first birth were analysed separately. In short, the outcomes resulted consistent (both in terms of direction and significance level) with the model of table 4. For this reason, parity was included as a variable in the meta-regression.

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APPENDIX

Table 1a. Meta-sample: Transition to employment

Type of transition		Number of estimates	Countries
from:	*into:*		
unemployment	employment	3	France, Finland, Denmark
inactivity		9	Poland, Italy, Hungary, France, Denmark, West Germany, Finland
non-employment		21	The US, the UK, the Netherlands, Switzerland, Spain, West Germany, East Germany
unemployment	full-time employment	-	-
inactivity		3	Denmark, the UK, West Germany
non-employment		14	The Netherlands, West Germany, the US
unemployment	part-time employment	-	-
inactivity		1	West Germany
non-employment		9	West Germany, the US

NOTE: Non-employment is defined as unemployment as well as inactivity.

Table 1b Meta-sample: Transition to childbirth

Type of transition	Number of estimates	Countries
First parity	53	Flanders, France, the Netherlands, West Germany, the UK, Italy, Spain, East Germany, socialist Hungary, post-socialist Hungary, the socialist Czech Republic, the post-socialist Czech Republic, socialist Poland, Norway, Sweden, Finland.
Second parity	17	France, Italy, Spain, socialist Poland, socialist Hungary, Finland, Sweden
Third parity	18	France, Italy, Spain, socialist Hungary, Finland, Norway, Sweden
Joint transition to first and higher parities	2	The US, the UK

Table 2 The classification of the countries under study, based on the Esping-Andersen welfare regime typology

	Effect of children aged 0-6 on women's employment	**Effect of women's employment on childbearing**
Conservative	France (2), the Netherlands (12), Switzerland (1), West Germany (16)	Flanders (2), France (7), the Netherlands (2), West Germany (5)
Familialistic	-	Italy (9), Spain (6)
Liberal	The UK (3), the US (16)	The UK (3), the US (3)
Post-socialist	-	Czech Republic (1), East Germany (4), Hungary (1)
Socialist	-	Czech Republic (1), Hungary (11), Poland (5)
Social-democratic	Denmark (3), Finland (2)	Finland (8), Norway (6), Sweden (16)

NOTE: Number of effect sizes in parentheses.

Table 3 - Mean effect sizes by welfare regime and cohort

Effect of children aged 0-6 on maternal employment entry						
	Number of studies N	Effect size			Homogeneity test	
		mean	t-stat	p-value	Q	p-value
Total	55	-0.29	-7.28	0.000	677.1	0.000
Conservative	31	-0.61	-6.60	0.000	153.3	0.000
Familialistic	-	-	-	-	-	-
Liberal	19	-0.09	-2.80	0.005	182.9	0.000
Post-socialist	-	-	-	-	-	-
Social-democratic	5	-0.40	-1.48	0.140	60.8	0.000
Socialist	-	-	-	-	-	-
Birth cohort >=1960	9	-0.25	-3.93	0.000	40.1	0.000
Birth cohort <1960	46	-0.30	-6.47	0.000	610.2	0.000
Effect of female employment on childbearing						
	Number of studies N	Effect size			Homogeneity test	
		mean	t-stat	p-value	Q	p-value
Total	90	0.00	-0.13	0.901	115.9	0.000
Conservative	18	-0.27	-1.94	0.053	25.7	0.085
Familialistic	15	-0.44	-3.95	0.000	219.7	0.000
Liberal	5	-0.29	-5.63	0.000	25.6	0.000
Post-socialist	5	0.16	4.05	0.000	3.2	0.662
Social-democratic	31	-0.05	-1.22	0.223	270.2	0.000
Socialist	16	0.00	-0.13	0.901	83.4	0.000
Birth cohort >=1960	61	0.00	-0.12	0.901	521.9	0.000
Birth cohort <1960	29	-0.16	-2.02	0.000	459.4	0.000

NOTE: The table includes the random effect estimates.

Table 4 Meta-regression estimates

		Effect of children aged 0-6 on maternal employment entry	Effect of female employment on childbearing
Welfare regime	conservative	-1.06**	-0.29***
		(0.47)	(0.07)
	liberal	-0.79*	-0.35**
		(0.48)	(0.16)
	socialist	-	-0.26
			(0.06)
	post-socialist	-	0.30***
			(0.09)
	familialistic	-	-0.49***
			(0.06)
	social-democratic	ref.	*ref.*
Cohort	birth cohort >= 1960	-0.57***	0.17***
		(0.17)	(0.03)
	birth cohort < 1960	ref.	ref.
Method	continuous time	0.65***	0.14*
		(0.21)	(0.10)
	discrete time	ref.	ref.
Control variables	partner	0.23	0.37***
		(0.22)	(0.04)
	background	0.32*	0.02
		(0.17)	(0.58)
	job characteristic	-0.25	0.30***
		(0.26)	(0.04)
Parity Progression	parity one	-	0.24**
			(0.11)
	parity two	-	-0.03
			(0.11)
	parity three	-	-0.09
			(0.10)
No of studies			90

NOTE: *** < 0.01, ** < 0.05, * < 0.1. Standard errors are reported in the parentheses. The results are standardized for the construction of the variable describing the effect of children on mothers' employment entry or the variable describing the effect of employment on childbearing, the type of the transition, the sample selected, and the inclusion of non-white populations (this regards mainly studies on the US).

Table 5 - Sensitivity analysis: meta-regression estimates after random exclusion of 10% of the sample

		Effect of children aged 0-6 on maternal employment entry	Effect of female employment on childbearing
Welfare regime	conservative	-1.48***	-0.27***
		(0.48)	(0.07)
	liberal	-1.24**	-0.33***
		(0.51)	(0.14)
	socialist	-	-0.83
			(0.06)
	post-socialist	-	0.30**
			(0.09)
	familialistic	-	-0.46***
			(0.58)
	social-democratic	ref.	*ref.*
Coort	birth cohort >= 1960	-0.52***	0.16***
		(0.18)	(0.04)
	birth cohort < 1960	ref.	ref.
Method	continuous time	0.81***	-0.11
		(0.21)	(0.10)
	discrete time	ref.	ref.
Control variables	partner	0.21	0.24***
		(0.22)	(0.05)
	background	0.19	0.04
		(0.16)	(0.06)
	job characteristic	-0.09	0.24***
		(0.22)	(0.04)
Parity Progression	parity one	-	0.29**
			(0.10)
	parity two	-	0.18*
			(0.10)
	parity three	-	0.04
			(0.09)
No of studies			81

NOTE: *** < 0.01, ** < 0.05, * < 0.1. In the parentheses we present standard errors. The results are standardized for the construction of the variable describing the effect of children on maternal employment entry and for the construction of the variable describing the effect of employment on childbearing, the type of the transition, the sample selected, and the inclusion of non-white populations (regards mainly studies on the US).

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