Chapter 5
Macro-context and the Cross-Country Variation in the Micro-level Relationship Between Fertility and Women's Employment

5.1 Introduction

It is widely acknowledged that European countries differ strongly in the conditions offered to working parents to combine paid employment and childcare. Our analysis conducted in Chapter 4 demonstrates that in the second half of the 2000s these conditions were undoubtedly best in Scandinavian countries, followed by the Netherlands, Finland, Belgium, the United Kingdom, and France. In such countries as Ireland, Austria, Luxembourg, Estonia, Germany, and Latvia the incompatibilities between women's employment and childrearing imposed by the macro-context were already stronger. The institutional, structural and cultural environment was found to be least favourable to work and family reconciliation in Southern European countries and remaining former socialist countries, such as Hungary, Czech Republic, Lithuania, Slovakia and Poland. Among them, Poland and Greece displayed extraordinarily high incompatibilities between work and care. Europe is also strongly divided as regards the level of living standards which are better in the West than in the East in the objective as well as subjective terms.

The macro-context shapes the individual fertility and employment choices by influencing the opportunity costs of childbearing, but also by defining the opportunities of childbearing and childrearing in single-earner couples. In general, the economic theory of fertility and women's labour supply predicts the opportunity costs of childbearing to be higher where the support to working parents is lower. In such countries working women are hypothesised to be more likely to postpone transition to motherhood and experience more difficulties with employment (re-)entry due to an inability of organising childcare. Furthermore, those who succeed in re-entering employment after first birth are expected to be less likely to progress to their second child. Consequently, one should expect the micro-level relationship between childbearing and women's employment to be more negative in countries where the conditions for combining the two life spheres are worse. In the light of the

This chapter is a modified version of the article prepared together with Daniele Vignoli: Matysiak, A., & Vignoli, D. (2008). Fertility and women's employment: A meta-analysis. *European Journal of Population, 24*(4), 363–384.

A. Matysiak, *Interdependencies Between Fertility and Women's Labour Supply*, European Studies of Population 17, DOI 10.1007/978-94-007-1284-3_5,

information presented in Chapter 4 it should be thus most negative in those Southern and CEE countries where our general index of incompatibilities indicated strong tensions between work and family and least negative in Scandinavian countries.

The country-specific conditions for work and family reconciliation are not the only factor that may influence women's fertility and employment behaviours, however. Another factor are the country living standards and the extent to which material aspirations of the individuals are unsatisfied. Consistently with the theoretical arguments presented in Chapter 3 women's employment may constitute an important condition for the entry to motherhood and the increase in family size beyond parity one in countries where living standards are lower and material aspirations of the couples remain largely unsatisfied. In such countries mothers can be also strongly motivated to resume employment fairly quickly after birth. Such situation may take place in CEE countries. Hence, the micro-level relationship between fertility and women's employment in this part of Europe might be inflated in comparison to Western countries provided that the economic situation of the households and material aspirations of the couple are not taken into account in empirical models.

The expectations presented above could be verified in two ways. The first possibility would be to conduct a cross-country comparative analysis on micro-level longitudinal data, while the second would be to review the abundant micro-level empirical evidence on the topic. The problem with the first approach is the lack of an international comparative dataset that could provide required data, in particular as regards the post-socialist countries. For instance, the European Community Household Panel (ECHP), which is otherwise well suited for this type of analysis, is available for EU-15 only and covers a relatively short period of time (1994–2001). Another dataset that could be used is the Family and Fertility Survey (FFS). Admittedly, it includes the CEE countries, but for the majority it covers mainly fertility and employment histories realised during the socialist period.[1] A release of the Generations and Gender Survey data for public use will certainly change this situation, but this is a matter of a future. Apart from the international, there are also many national data sources, but they are neither easily accessible nor harmonised. Therefore, for the purpose of our study we decided on the second approach.

Although several reviews of the studies researching the interdependencies between fertility and women's work have been already conducted (Spitze, 1988; Willekens, 1991; Schröder, 2005), the character of these works is narrative. This means that they do not provide a quantitative assessment of the effect of interest standardised for the across-study differences. Therefore, in this study we go one step further and adopt a quantitative approach. This means that, instead of conducting a narrative literature review, we apply meta-analytic techniques. In this methodological framework, the single study estimates of the impacts of fertility on women's employment and vice versa constitute statistical units of observation, and the original study characteristics are used for standardising these estimates for the across-study differences. In this way, we are able to assess the variation in the effects

[1] FFS in the majority of the CEE countries was conducted in the first half of the 1990s.

of interest with respect to the contextual settings, net of the differences in the method applied, control variables employed, sample selected, etc. Finally, it is important to note that the effect estimates that are produced within the meta-analytic framework have higher external validity than those obtained in an individual study due to the generality of results across various research works (Shadish, Cook, & Campbell, 2002). Hence, the adopted analytical approach is not only superior to the narrative literature review, but it has a certain advantage over conducting a cross-country comparative analysis that would rely on single estimates.

The meta-analysis presented in this chapter was initially conducted together with Daniele Vignoli.[2] Its results are published in the *European Journal of Population* (see Matysiak & Vignoli, 2008) where we demonstrated the variation in micro-level relationship between fertility and women's employment across the Esping-Andersen's welfare regimes. In this book, we make us of the meta-database constructed together with Daniele Vignoli, but we investigate how the micro-level relationship differs across countries that vary in the intensity of work-family tensions as measured by the general index of incompatibilities. We focus only on European countries. Finally, we also slightly change the specification of our meta-regression models and employ an upgraded Stata module for meta-regression. Compared to the module used by Matysiak and Vignoli, it provides an opportunity to use a Knapp-Hartung modification of the variance of the estimated coefficients (Knapp & Hartung, 2003).

This chapter consists of seven sections, including this introduction. Section 5.2 introduces the method of meta-analysis. Section 5.3 describes the study selection criteria while Section 5.4 briefly reviews the collected research works with an emphasis on methodological aspects. In Section 5.5 we provide information on meta-analytic techniques applied in this paper. The results are presented in Section 5.6, followed by Section 5.7, which summarises and discusses the findings.

5.2 Meta-Analysis as a Quantitative Literature Review

Meta-analysis or, in other words, a quantitative literature review, 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 various studies standardised for the differences in the methodological approaches applied and types of data used. Originally it was developed in medical and epidemiological research, but recently it has been increasingly employed in the social sciences (Vemer et al. 1989; Amato & Keith, 1991; Waldorf & Byrun, 2005; Weichselbaumer & Winter-Ebmer, 2005; Wagner & Weiss, 2006).

[2]The work was conducted when Anna Matysiak and Daniele Vignoli were resident PhD students at the Max Planck Institute for Demographic Research. Together they carried out the literature search, constructed the meta-sample, built the meta-database, and ran the analyses. Matysiak was in charge of the effects of young children on mothers' employment, Vignoli the effects of women's employment on fertility.

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 that measure the true underlying effect or in other words the parameter of interest. 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.

As a method designed for surveying empirical findings, meta-analysis has several advantages over the standard narrative literature review (see e.g., Stanley, 2001). The first is its quantitative character. While a standard narrative literature review consists of commentary on the findings of previous research, meta-analysis allows for a quantitative assessment of the effect of interest. Second, it provides researchers with the opportunity to standardise the studied effects for the country examined, the method of analysis applied, the control variables employed, the sample selected, etc. Not only does it help to explain wide across-study variations 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 pre-defined criteria, which minimises the risk of literature 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. It can also be controlled for in the meta-regression framework. Papers cannot, however, be 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 reviewer's individual assessment of the papers.

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 pre-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, there might be a bias to the estimated effect size; in the worst case, it may be even impossible for the meta-analyst to locate a sufficient number of relevant studies on the topic (the so-called 'file-drawer' problem). 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 is thus necessary to make assumptions in order to overcome the lack of information.

5.3 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 search strategy, following Stuck et al. (1999), consisted of three stages: first we used Current Contents and EconLit, universal research

databases[3]; second, we checked the references in existing articles; third, we asked experts for their recommendations. Given that Current Contents covers articles published in 1990 and thereafter, all selected studies were limited to this publication period.

In our meta-study we focused on two types of effects: the impact of women's employment on childbearing and the impact of young children on women's entry into employment. We conducted an overview of available research works concerning EU member states, Norway, and Switzerland. The search was performed in the 7 months from April 2006 to October 2006. In order to collect a representative sample of high quality studies, we focused solely 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 limited our selection to papers that clearly explored women's transition to birth and to employment. Amongst them, only research works that adopted a life-course perspective for analysing the interdependencies between the two activities were accepted. Thus, we restricted the search to longitudinal studies. We ended the search at saturation point – in other words when, combining the different keywords and adding new ones, we obtained articles already selected.

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 that the calculated baseline intensities, even if reported, do not measure the effect which we focus on in our study, i.e., the 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 certain of having a representative sample of existing studies, possibly with a bias towards English-language literature. Omission of 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 25 papers on the transition to childbirth and 16 papers on employment entry (for the list of selected articles see Appendix, Table A.4). 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.

[3]Current Contents and EconLit, provided by the Ovid service, 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 1990.

Overall, the search procedure gave us a total of 67 effects of employment on fertility and 37 effects of young children on entry into employment (see Tables 5.1a and 5.1b). After collecting the articles, two separate datasets were constructed: one for the transition to childbearing, the other for the transition to work.

The collected studies encompass fairly large selection of European countries although for some countries no studies meeting our pre-defined criteria were located (e.g., Austria, Greece, Ireland, Portugal, and many post-socialist countries) and consequently they are not included in the meta-analysis. The country coverage is presented in Table 5.2. The numbers in brackets represent the number of effects located for each country. The selection of studies for investigating the effect of women's employment on childbearing is much broader, covering different regions

Table 5.1a Meta-sample: transition to employment

Type of transition		Number of estimates	Countries
From:	*Into:*		
Unemployment	Employment	3	France (1), Finland (1), Denmark (1)
Inactivity		7	Italy (1), France (1), Denmark (1), Germany (3), Finland (1)
Non-employment		10	the Netherlands (7), Germany (3)
Unemployment	Full-time	–	–
Inactivity	employment	3	UK(1), Germany(1), Denmark (1)
Non-employment		9	Netherlands (5), Germany (4)
Unemployment	Part-time	–	–
Inactivity	employment	1	Germany (1)
Non-employment		4	Germany (4)

Notes: non-employment is defined as unemployment as well as inactivity. Studies covering periods prior to 1990 refer to West Germany

Table 5.1b Meta-sample: transition to childbirth

Type of transition	Number of estimates	Countries
First parity	41	Flanders (2), France (5), Netherlands (2), Germany (5), UK (2), Italy (5), Spain (5), post-socialist Hungary (1), post-socialist Czech Republic (1), Norway (2), Sweden (7), Finland (4)
Second parity	12	France (2), Italy (2), Spain (1), Finland (2), Sweden (5)
Third parity	13	France (2), Italy (2), Spain (1), Finland (2), Norway (2), Sweden (4)
Joint transition to first and higher parities	1	UK (1)

Note: studies covering periods prior to 1990 refer to West Germany

Table 5.2 Meta-study country coverage

Effect of children aged 0–6 on women's employment		Effect of women's employment on childbearing	
Country	Cohorts	Country	Cohorts
Denmark (3)	1940s–1970s	Belgium-Flanders (2)	1950s–1970s
Finland (2)	1930s–1970s	post-socialist Czech Republic (1)	1970s–1980s
France (2)	1930s–1970s	Finland (8)	1950s–1980s
Germany (16)	1920s–1980s	France (9)	1950s–1970s
Italy (1)	1940s–1970s	Germany (5)	1950s–1980s
the Netherlands (12)	1920s–1970s	post-socialist Hungary (1)	1970s–1980s
the United Kingdom (1)	1920s–1970s	Italy (9)	1950s–1980s
		the Netherlands (2)	1960s
		Norway (4)	1930s–1960s
		Spain (7)	1940s–1980s
		Sweden (16)	1940s–1970s
		UK (3)	1950s–1980s

Note: studies covering periods prior to 1990 refer to West Germany Number of effect sizes in parentheses

of Europe (Nordic, Western, Southern, Central and Eastern). The selection of countries for investigating the effect of children on women's employment entry is far narrower and it is widely concentrated in two countries: the Netherlands and Germany. Furthermore, we located no single study investigating the effect of young children on mothers' employment entry in post-socialist countries and only one for a Southern European country, namely for Italy.

The collected studies differ also in birth cohorts they cover. In general the studies investigating the effect of women's employment on childbearing were conducted on younger cohorts, mainly born in the 1950s through the 1970s, but there also studies encompassing women born earlier, in the 1940s, and later, in the 1980s. The birth cohorts covered by the studies on the impact of young children on mothers' employment entry more often reach back to the 1930s and even 1920s and rarely extend to 1980s.

5.4 Critical Review of the Collected Studies

Before we proceed with our meta-study, some remarks should be made as to the methodological aspects of the collected research works. Our discussion is led by three out of the four conditions for understanding the interdependencies between fertility and women's labour supply formulated against the theoretical framework presented in Chapter 3 (Section 3.6), namely:

1. Disentangle the price effect from the income effect;
2. Control for work- and family-orientations;

3. If data shortcomings make it impossible to account for some of the factors listed in conditions (1) and (2), then selection effects might occur. Exploring these selection effects may provide valuable information for understanding the interdependencies between childbearing and women's labour force participation.

The overview of the collected studies shows that the clear majority do not meet the conditions listed above. First, the income effect is often not disentangled from the price effect. The collected studies fail to control directly for women's material aspirations and only some introduce variables describing the financial situation of the household, such as husband's earnings or non-labour income. Second, the orientations of women towards family and work are rarely taken into account. Altogether, out of 43 accepted papers only 12 incorporate variables describing the financial situation of a woman in an empirical model,[4] one paper takes women's preferences into account, and four control for unobserved characteristics of women, but assuming no correlation between unmeasured characteristics and model regressors.

A failure to control for important determinants of childbearing as well as women's employment entry and to allow for the correlation between unobserved characteristics and model regressors leads to selection effects. Consequently, the obtained estimate can either underestimate or overestimate the real conflict between fertility and women's employment, depending on the type of selection effect. Existence of negative selection leads to an overestimation of the conflict, since women select themselves into inactivity before the planned conception or give up childbearing in favour of their intended professional career. Positive selection, by contrast, results in underestimation of the price effect, as women decide to take up a job with the prospect of having a child or choosing to conceive, provided they will be able to resume employment after birth. Positive selection is very likely to occur if women's material aspirations are not taken into account.

The unavailability of data describing women's material aspirations or career orientations towards family and paid employment calls for other more innovative and non-standard solutions to be applied to account for selection effects. Among promising solutions are advanced statistical techniques that allow for capturing the unobserved factors and their correlation with model regressors. It appears, however, that attempts aimed at controlling these effects are rarely found in practice. Only one of the papers collected tackles this issue, by estimating fertility and employment jointly in a common maximum-likelihood framework. Additionally, we located four other papers where there was an attempt to account for selection. They were all based on instrumental variable methodology. As they were all conducted for the US they were not included in our analysis.

On the whole, this short review of the collected studies shows that the micro-level relationship, the variation of which we are studying, is composed of several

[4]Researchers mainly used partner's labour market status or partner's education as a proxy for partner's earnings. Only six papers directly used the variable 'partner's income', and only three controlled for household income.

effects: the price effect, reflecting the conflict between fertility and paid employment, and selection effects, caused by a failure of the researchers to control for women's material aspirations (income effect) as well as work and family orientations. This fact should be taken into account while interpreting the findings from our meta-study. Given that the Western economies are largely homogenous with respect to the magnitude of the income effect and that the post-materialistic values are relatively equally spread there (at least if compared to CEE countries), we attribute the differences in the micro-level relationship between fertility and women's work to the differences in the conflict between the two activities. More caution is required once we incorporate the CEE countries into our analysis as they display worse living standards, and materialistic values play a more important role there than in the West (compare Kowalska & Wróblewska, 2008).

5.5 Meta-Analytic Techniques

5.5.1 Effect Size Estimates

Our effect size estimates are the log odds ratios, the log relative risks, and the estimates of the OLS regressions measuring the impacts of women's employment on fertility and the impacts of young children on women's employment entry, respectively.

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.[5] The inversely coded effects (e.g., non-employment 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 referred 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 was the different reference categories used 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. Furthermore, the variable describing the age of the child was defined differently across the studies. The most frequent solution was to analyse the effect of

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

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). There were also papers where age of children was interacted with number of children (number of children in a given age interval). We accepted all three solutions. The effect sizes were later standardised for the definition of the age of a child and the type of reference category in the meta-regression framework.

5.5.2 Summary Indicators

The effect size estimates as discussed above were used to compute the summary indicators that describe the magnitude of the relationship of interest. For that purpose, a random-effect model was used as a point of departure. This model assumes that the variance of the effect size estimates is a sum of two components: the within-study variance (a sampling error) and the between-study variance (caused by across-study differences). Let $\hat{Y}_i$ be an estimate of effect size Y_i in study i and Y be the true underlying effect size (in other words, the parameter of interest). Then:

$$\hat{Y}_i = Y_i + \varepsilon_i, \quad \varepsilon_i \sim N(0, {\sigma_i}^2) \tag{5.1}$$

$$Y_i = Y + \eta_i, \qquad \eta_i \sim N(0, \tau^2) \tag{5.2}$$

where ${\sigma_i}^2$ is the within-study variance, τ^2 is the between-study variance, and ε_i and η_i are mutually independent, normally distributed error terms.

Under the random effects model, the estimator of the true effect is computed as a following summary indicator:

$$\hat{Y} = \frac{\sum_{i=1}^{n} w_i \hat{Y}_i}{\sum_{i=1}^{n} w_i}, \text{ where } w_i = \frac{1}{\hat{\sigma}_i^2 + \hat{\tau}^2} \tag{5.3}$$

where $\hat{\sigma}_i^2$ and $\hat{\tau}^2$ are the estimates of the within- and between-study variance components respectively. Hence, $\hat{Y}$ is an estimate of the parameter of interest, describing the magnitude of the studied effect. In analytical terms, it is defined as a weighted mean of effect size estimates $\hat{Y}_i$ with higher weight given to studies in which estimates have lower variance (that is, are more precise).

Computing the summary indicator $\hat{Y}$ requires ${\sigma_i}^2$ and τ^2 to be estimated. Let us first start with the within-study variance component. It is commonly assumed that individual studies provide good estimates of ${\sigma_i}^2$(Biggerstaff & Tweedie, 1997; Konstantopoulos, 2006). Consequently ${\sigma_i}^2$ is measured as a squared standard error of the parameter as reported in the study. A problem often encountered by meta-analysts is 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 problem arose also

in our analysis, mainly with reference to the papers on transition to childbirth. Following the literature on meta-analysis, we made the following assumptions: When the result was marked 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 asterisks only, we assumed the p-value to be equal to the mid-point of its interval.

Estimating the between-study variance τ^2 is slightly more complicated. One may start by assessing whether τ^2 is indeed significantly different from zero. A statistical test designed for that purpose was proposed by Cochran (1954). It is based on the test statistic Q that measures the extent to which the estimates of individual effect sizes vary around the estimate of the underlying effect size computed under the assumption that $\tau^2 = 0$:

$$Q = \sum_{i=1}^{n} w_i^* (\hat{Y}_i - \hat{Y})^2, \text{ where } \hat{Y} = \frac{\sum_{i=1}^{n} w_i^* \hat{Y}_i}{\sum_{i=1}^{n} w_i^*} \text{ and } \qquad w_i^* = \frac{1}{\sigma_i^2} \tag{5.4}$$

Under the hypothesis of homogeneity ($\tau^2 = 0$) Q follows a χ^2_{n-1} distribution. Large values of Q lead to a rejection of the hypothesis of homogeneity and the $\hat{\tau}^2$ has to be computed. DerSimonian and Laird (1986) propose a point estimate $\hat{\tau}^2_{DL}$ of τ^2:

$$\hat{\tau}^2_{DL} = \max \left\{ 0, \frac{Q - (n-1)}{\sum_{i=1}^{n} w_i^* - \sum_{i=1}^{n} w_i^{*2} / \sum_{i=1}^{n} w_i^*} \right\} \tag{5.5}$$

The relative importance of the between-study variance can be assessed by using the statistic I^2:

$$I^2 = \frac{\hat{\tau}^2}{\hat{\tau}^2 + \sum_{i=1}^{n} \sigma_i^2} \tag{5.6}$$

This statistic describes the proportion of total heterogeneity in the effect size estimates which can be attributed to the between-study variance (Higgins, Thompson, Deeks, & Altman, 2002).

In our meta-study we expect large between-study variation. The source of the variation lies in the differences in the contextual settings, 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 5.5.1). Hence, estimating the mean effect size for each contextual setting using formulas (5.3) and (5.5) may not be satisfactory, particularly if there is also variation in the effect size estimates between the identified country groups. A straightforward solution to this problem is to estimate a meta-regression.

5.5.3 *Meta-Regression*

Our meta-regressions take the following form:

$$Y_i = \sum \alpha_j w_{ij} + \sum \beta_k c_{ik} + \sum \vartheta_l v_{il} + \sum \theta_n s_{in} + \sum \delta_p m_{ip} + \eta_i + \varepsilon_i, \qquad i = 1, 2, ..., n, \tag{5.7}$$

where Y_i is the effect size corresponding to study i, w_{ij} are a set of dummies for the country j and c_{ik} for the cohort k, v_{il} represent l 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_{in} stand for n dummies controlling for the sample selection (taking value 1 if the sample was restricted only to a certain group of women), m_{ip} denote p variables standardising for the method and type of the data. The parameters $\alpha_j, \beta_k, \vartheta_l, \theta_n, \delta_p$ were estimated stepwise, using the standard maximum likelihood method. First, we introduced country into the model. It was followed by controls for the cohort, type of transition and measurement of the studied effect, the sample selected, the method applied and the type of the data used. At each stage, the reduction in the between-study variance was measured by comparing the estimate of τ^2 before and after adding the successive covariates. The adjusted R^2, measured as $100\% \cdot (1 - \tau^2(\text{full model})/\tau^2(\text{with no covariates}))$, provides us with the information on the extent to which our meta-model succeeded in reducing the between-study variance. Furthermore, the robustness of the meta-regression estimates is 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.

5.6 Empirical Findings

Table 5.3 presents the summary indicators of the impact of women's work on birth risk and the impact of children aged 0–6 on mothers' employment entry respectively. They are computed based on the studies accepted for meta-analysis according to formula 5.3.

The indicators suggest that both effects are significantly negative. The effect of women's employment on childbearing equals to -0.19 ($p = 0.000$), whereas the

Table 5.3 Mean effect sizes

	Number of studies	Summary indicator			Homogeneity Test		Between-study variance	
	N	$\hat{Y}$	t-stat	p-value	Q	p-value	$\hat{\tau}^2_{DL}$	I_2
Effect of women's employment on fertility	67	−0.19	−4.30	0.000	759.6	0.000	0.073	91.2
Effect of children aged 0–6 on women's employment entry	37	−0.33	−10.7	0.000	194.2	0.000	0.085	81.5

Note: the table includes the random effect estimates
Source: author's calculations

effect of children aged 0–6 on mothers' entry into employment amounts to −0.33 ($p = 0.000$). These effects vary considerably across the studies, however. More specifically, in both cases the between-study variance constitutes over 80% of the overall heterogeneity in the effect size estimates. One of the most important sources of heterogeneity may be the macro-context in which employment and childbearing decisions are taken. But the differences may also result from the across-study differences in the methods applied, the data examined, the sample restrictions imposed, the type of transitions studied, and the reference categories or definitions employed for the child's age variable. In order to deal with this problem, we applied meta-regression techniques.

In the first step we introduced only the country into our meta-regressions. As a reference category we used the country where the incompatibilities between women's employment and fertility imposed by the context are the strongest, provided that we succeeded in collecting a reasonably high number of studies for this country. As a result, in our meta-regression on the effect of women's employment on fertility our reference category is built by Italy for which we have nine effect sizes. As we collected only one study investigating the effect of young children on women's employment entry in Italy, in our second meta-regression we refer to Germany (16 effect sizes). The corresponding meta-regression estimates are presented in Tables 5.4 and 5.5 in columns M1. As the univariate analysis whose results were presented in Table 5.3 suggests that the micro-level relationship between fertility and women's employment is negative we interpret positive coefficients in the meta-regression to represent a weakening of the negative relationship. Similarly, negative coefficients are interpreted to display intensification of the negative effect.

Introducing only a country into our meta-regressions reduced the between-study variances by around 25% in both models. The model findings are not consistent with our expectations. The effects of women's employment on fertility do not vary significantly across countries. There is some significant cross-country variation in the effects of young children on mothers' employment entry suggesting that compared to Germany the effects are less negative in Denmark and France. The between-study

Table 5.4 Effect of women's employment on fertility: meta-regression estimates

Variable name	Variable categories	M1	M2
Country	Norway	0.01	0.51*
		(0.25)	(0.30)
	Sweden	0.20	0.32*
		(0.21)	(0.16)
	Finland	0.22	1.06***
		(0.20)	(0.28)
	Netherlands	−0.75**	0.33
		(0.33)	(0.37)
	France	0.23	0.16
		(0.24)	(0.18)
	Belgium	−0.36	0.91**
		(0.33)	(0.41)
	United Kingdom	−0.42	0.49
		(0.27)	(0.62)
	Germany	−0.06	0.55**
		(0.27)	(0.27)
	Spain	−0.23	−0.37**
		(0.22)	(0.16)
	Italy	ref.	ref.
	post-socialist Hungary	0.93	2.48***
		(0.58)	(0.72)
	post-socialist Czech Republic	0.07	0.57*
		(0.48)	(0.34)
Birth cohort	>=1960		−0.44***
			(0.15)
	< 1960		ref.
Method	Continuous time		0.57*
			(0.34)
	Discrete		ref.
Parity progression	Parity one		0.05
			(0.35)
	Parity two		0.06
			(0.33)
	Parity three		−0.03
			(0.32)
	All parities		ref.
Constant		−0.20	0.09
		(0.16)	(0.32)
adj-R^2		0.248	0.694
number of studies		67	67

Note: *** < 0.01, ** < 0.05, * < 0.1. Standard errors are reported in parentheses. The results are standardized for the construction of the variable describing the effect of employment on childbearing and the sample selected
Source: author's calculations

Table 5.5 Effect of children aged 0–6 on women's employment entry: meta-regression estimates

Variable name	Variable categories	M1	M2
Country	Denmark	0.73**	2.93***
		(0.29)	(0.67)
	Finland	−0.23	1.96***
		(0.30)	(0.67)
	France	0.58*	1.04**
		(0.29)	(0.40)
	The Netherlands	−0.17	2.15***
		(0.24)	(0.66)
	The United Kingdom	0.27	0.28
		(0.42)	(0.41)
	Germany	ref.	ref.
	Italy	1.37	0.01
		(7.52)	(7.52)
Type of transition	from unemployment		−0.02
			(0.18)
	from inactivity		0.52**
			(0.21)
	from non-employment		ref.
	to full-time job		0.20
			(0.19)
	to part-time job		0.76***
			(0.18)
	to any job		ref.
Birth cohort	>=1960		−1.15**
			(0.48)
	<1960		ref.
Method	continuous		1.56**
			(0.59)
	discrete		ref.
Constant		−0.67***	−1.39**
		(0.13)	(0.51)
adj-R^2		0.232	0.972
number of studies		37	37

Note: *** < 0.01, ** < 0.05, * < 0.1. Standard errors are reported in parentheses. The results are standardized for the construction of the variable describing the effect of children on mothers' employment entry
Source: author's calculations

variance is still high, however, constituting around 87 and 65% of the overall variation in the effects of women's employment on fertility and the effects of young children on mothers' employment entry respectively. The cross-country variation in the effect sizes presented in columns M1 is thus unlikely to represent the variation in true effect sizes. The model estimates are probably affected by differences in various study characteristics mentioned above.

Therefore, in the second step we introduced all other variables that, in our opinion, might strongly contribute to the increase in between-study variance, e.g. the cohort, the type of transition, the type of reference category of the effect sizes, the sample selection, and the method applied. Due to the low number of observations, it was unfortunately not possible to introduce many characteristics of original studies (in particular in the meta-study of the effect of fertility on women's employment entry) and we had to limit ourselves to the most important ones. For this reason we were not able to study in detail the effect of the control variables employed in the original studies on our effect sizes. Despite this limitation our findings show that after the introduction of the covariates the between-study variance declined by 69% in the meta-regression explaining the variation in the effects of women's employment on fertility and by 97% in the meta-regression of the effects of young children on mothers' employment entry relative to the between-study variance in the same meta-regressions without any covariates (columns M2 in Tables 5.4 and 5.5). Using these model specifications we carried out sensitivity analyses in order to verify the robustness of our estimates. Namely, we reduced each sample randomly by 10% and estimated both models with the same covariates. The outcomes remained stable, suggesting that our findings are reliable (see Appendix, Tables A.5 and A.6). Altogether the substantial reduction in the between-study variance as well as the robustness of our estimates to the sensitivity test led us to the accept these model specifications as our final models.

Our findings on the cross-country variation in the micro-level relationship between fertility and women's employment are only partly consistent with our expectations. On the one hand, both our meta-regressions indicate that the effect sizes in Norway, Sweden, Finland and Denmark are significantly higher than in Italy and Spain which means that they are less negative. This implies that women are less likely to postpone entry to motherhood when employed in the Nordic countries than in the South. Furthermore, they are also more likely to enter employment after birth and more likely to give birth to another child after re-entry. It is, however, surprising that the conflict between women's employment and fertility experienced by women is weakest in Finland.

Our findings suggest also that employment has relatively little negative impact, if any, on childbearing behaviours of women in Belgium. This is in line with our expectations as we showed in Chapter 4 that the incompatibilities between women's employment and fertility imposed by the macro-context are not strong there. The situation of the Netherlands and France is already less clear. According to our estimates employed women in these two countries are as likely to postpone childbearing as women in Italy or Spain. At the same time mothers in France and the Netherlands experience less problems with employment entry than mothers in Germany or Italy. Exactly, the opposite is to be found in Germany where it is relatively difficult for women to re-enter employment, but employed women do not postpone entry to motherhood on such a large scale as in Italy. Mothers of young children seem to experience relatively serious difficulties with employment entry in the United Kingdom. In the same country women's employment seems to be a serious barrier to childbearing. Employed women are most likely to postpone births in

Spain, however. The estimates of our first meta-regression suggest that the impact of women's employment on fertility is even more negative there than in Italy.

On the basis of our findings we cannot tell much on the tensions between women's employment and childbearing experienced by women in post-socialist countries. We only collected two studies for this part of Europe for the period following the fall of state socialism. These two studies investigate the impact of women's employment on fertility in Czech Republic and Hungary. They suggest that this impact is far less negative than in Italy (in particular in Hungary) despite the fact that the incompatibilities between women's employment and childbearing are similarly intense in these three countries. This finding might be driven by the income effect that is supposed to be stronger in post-socialist countries than in Italy.

Some of our findings are surprising in the light of the information on the expected intensity of incompatibilities between women's employment and fertility presented in Chapter 4. The most astonishing are the results for the Netherlands where according to the general index of incompatibilities the conditions for work and family reconciliation are relatively good as well as for Spain and the United Kingdom which score better on the index than Italy. The evidence for France and Germany, although mixed depending on the meta-regression we look at, may suggest simply that the conflict is more intense there than in Nordic countries and less than in Southern Europe. Comparing the evidence brought by meta-regressions with the general index of incompatibilities between women's employment and fertility one should be careful, however. The empirical studies we collected cover childbearing and employment choices of women made in the 1970s through 1980s and 1990s to 2000s whereas the index is based on the data from the second half of the 2000s. Using the index in this analysis would be proper if we assumed that the cross-country variation in incompatibilities did not change over time. While it is probably true for many countries (for instance for Nordic versus the Southern European countries) it may not be the case for the Netherlands or the United Kingdom where the public support for working mothers is likely to have improved to a larger extent than in other Western economies.

Apart from the assessment of the variation in the studied effects across countries and contextual settings, our analysis provides an opportunity to evaluate temporal change in the micro-level relationship between fertility and women's employment as well as to assess the merits of certain research designs. As regards the first issue, our findings suggest that mothers born after 1960 tend to experience larger difficulties with employment entry than mothers born before that year. Likewise, younger cohorts of women are more likely to postpone childbearing when employed than older cohorts. We address these findings 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. All studies included in the analysis employed event-history techniques, applying continuous or discrete time models. As already mentioned, very few studies controlled for unobserved characteristics of women. Therefore, as regards the method, we only included variables testing the influence of the continuous versus discrete time models on the effect sizes in 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: 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.

Finally, our meta-models control also for the type of transition. It turns out that for young mothers it is more difficult to enter employment if they are unemployed than inactive. It is possible that inactive women in some studies are women on parental leaves which would explain this finding. For mothers, it is easier to take a part-time job than a full-time one. We do not find any variation in the effect of women's employment on fertility with respect to the number of children a woman already has.

5.7 Discussion

In Chapter 4 we discussed the cross-country differences in the intensity of the potential incompatibilities between fertility and women's work and the magnitude of the potential income effect imposed by the macro-context. The objective of the research described in the present chapter was to investigate the cross-country variation of the micro-level relationship between fertility and women's employment and to verify whether it is consistent with the cross-country differences in the work-family incompatibilities imposed by the macro-context as well as the cross-study differences in the living standards.

We addressed these issues by making use of the numerous micro-level empirical findings on the interdependencies between childbearing and women's employment, published in peer-reviewed journals, book chapters, and monographs. We focused on two effects: the effect of women's work on fertility and the effect of young children on women's employment entry. In order to synthesise, combine, and interpret the abundance of empirical estimates, we employed meta-analytic techniques. This enabled us to assess the variation in the effects of interest with respect to the country covered, net of the differences in the research design. An important advantage of our analytical approach over conducting a cross-country comparative analysis is that meta-analytic estimates have higher external validity than those obtained in a single study, due to the generality of results across various research works. The disadvantage of the approach, however, is that we had to rely on existing research works with all their methodological shortcomings. The most important one is that the collected studies mostly do not control for women's material aspirations or for their work and family orientations. This means in practice that the yielded estimates do not reflect the conflict between childbearing and paid employment but rather a mix of a price effect, income effect, and further selection effects. This is less of a problem if we compare Western economies. Since they are largely homogenous with respect to the magnitude of the income effect, and as the post-materialistic values are relatively equally spread there, the variation in the micro-level relationship between childbearing and women's employment may be basically attributed to the differences in

the contextual incompatibilities between the two activities. Nevertheless, once we incorporate the CEE countries into our analysis, we should be more cautious in our interpretation.

The first and main finding of our meta-study is that the impact of employment on fertility in the majority of the collected studies was on average negative, and vice versa. At the same time, however, we found a large variation in the magnitude of the analysed impacts across countries. As regards the *Western European countries*, it is clear from our study that the micro-level relationship between fertility and women's employment is least negative in the Nordic countries and most negative in the Southern European countries (Italy and Spain). This implies that women are less likely to postpone entry to motherhood when employed in the North than in the South. Furthermore, they are also more likely to enter employment after birth and more likely to give birth to another child after re-entry. The findings for other Western European countries are more ambiguous. They show that the conflict between fertility and employment experienced by women in France, the Netherlands, and Germany, i.e. Western European countries except for Nordic and Southern for which we collected most empirical studies, is stronger than in the North and weaker than in the South, but it is difficult to conclude on the ranking of these countries in that respect. We can only say that it is easier for mothers of young children to enter employment in France and the Netherlands than in Germany. In Germany, by contrast, employment of women hinders fertility to a lower extent than in France and the Netherlands. Furthermore, our analysis showed that the conflict between fertility and women's employment experienced by women in the United Kingdom is as strong as in Italy.

Our findings for Western Europe are quite in line with what would be expected on the basis of the general index of incompatibilities between fertility and women's employment developed in Chapter 4 despite the fact that the index was computed for the second half of the 2000s and the meta-analysis presented in this Chapter refers to studies that investigate women's employment and fertility behaviours since the 1970s. One of the reasons for this consistency might be that the cross-country variation in the incompatibilities between work and care has been relatively stable over time. Countries that are now most advanced in supporting women's employment and where the opinions on women's roles are least traditional, i.e. the Nordic countries, are probably those which pioneered in supporting labour market integration of mothers as well as gender equality. Likewise, the institutions and labour markets in Southern European countries which currently lag behind the Nordic countries on all contextual dimensions relevant to women's employment and fertility choices were long resistant to the ongoing social change. Nonetheless, there are also countries for which the results of our meta-analyses deviate from what would be expected on the basis of the general index of incompatibilities between women's employment and fertility. These are particularly the Netherlands and the United Kingdom for which our meta-study indicates presence of a stronger conflict than one could predict on the basis of the general index of incompatibilities. A possible explanation for this inconsistency might be that these two countries made a remarkably serious progress in terms of reducing the tensions between women's work and fertility.

In particular, the Netherlands succeeded in developing exceptionally flexible work arrangements while the United Kingdom introduced the system of statutory maternity and parental leaves in the 1990s forced by the EU legislation. Despite these exceptions our findings seem to suggest that employed women were more likely to postpone childbearing and mothers were less likely to enter employment in countries where the institutional, structural and cultural conditions are less favourable to work and family reconciliation than in countries where the overall incompatibilities between fertility and women's paid work imposed by the macro-context are weaker.

The findings for *the post-socialist countries* are different. In spite of the fact that the incompatibilities between fertility and women's labour supply in that part of Europe are exceptionally strong the two empirical studies we located identify no significantly negative relationship between the two variables at the micro-level. Given the importance of materialistic values in this part of Europe, strongly pragmatic attitudes towards women's work, large instability of employment in the transforming labour markets, and the rising consumer aspirations (probably unmet due to worse living standards compared to Western economies), we believe that the observed positive effect of women's work on childbearing results from a strong income effect. Driven by a need to contribute to the household income, women in this part of Europe are strongly oriented towards participating in the labour force and may even perceive employment as a pre-condition to childbearing. This explains the relatively high economic activity of women in CEE, observed also among mothers with children aged 5+ (see Chapter 2). At the same time, however, women do experience strong difficulties in combining paid work with caring for young children. This difficulty is reflected in low labour market participation rates of mothers of under-fives, as it was presented in Chapter 2. If women are expected to earn income and at the same time cannot combine market work with care duties, they will obviously tend to postpone or even give up further childbearing. We investigate the interrelationship between women's fertility and employment choices in a post-socialist setting more thoroughly in the following Chapter 6 where we present an empirical study conducted for Poland, i.e. the country where the institutional, structural, and cultural conditions for combining work and care are the worst among all CEE countries.

Our meta-study revealed one more finding which calls for an explanation. Namely, both meta-regressions showed that the younger cohorts of women, born largely after 1960, experienced stronger conflict between fertility and employment than the older cohorts, born prior to 1960. This finding was established, net of the cross-country differences in the contextual settings. In our opinion, a complex interplay of two factors is responsible for this state of affairs. First, it is likely that the price effect in Western economies has intensified. This is possible despite the changing attitudes towards working mothers and evolving family policies aimed at supporting working parents. In fact, these developments could have been counterbalanced by the transformations in the labour markets imposed by globalisation processes. Increasing competition and employers' rising demands for mobility and availability of workers led to the instability of employment contracts and raised the uncertainty about the future well-being of the families (Kotowska, 2004, 2005; Mills & Blossfeld, 2005). Women and the youth became most exposed to the globalisation

processes. Equipped with less work experience and unprotected by internal labour markets, they are likely to end up in precarious and low-quality employment such as fixed-term contracts, irregular working hours, or jobs characterised by low occupational standing and poor access to training. Second, it is very likely that the occupational aspirations of women have increased with a rise in women's educational attainment and that the professional career has gained in importance relative to the family career. As a result, women might be currently less eager to consent to a career break that would have been easily accepted by their mothers. Since the consequences of such work interruption are much more severe today than in the past, in terms of human capital lost or advancement opportunities foregone, the conflict between childbearing and paid employment experienced by women might have intensified.

Both the regional and temporal variation of the studied effects suggest that the institutional, structural, cultural, and economic factors have been important in determining the interrelationship between fertility and women's employment. This finding, established at the micro-level, supplements the research work of Brewster and Rindfuss (2000), Rindfuss et al. (2003), Kögel (2004) and Engelhardt et al. (2004) – i.e., that country-specific effects influence the correlation between fertility and women's labour supply at the macro-level. It remains to be established which contextual factors affect women's fertility and employment decisions in particular. Finally, our meta-study emphasises the necessity to better control for women's material aspirations as well as their work and family orientations while modelling fertility and labour market behaviours of women. The consequences of omitting such variables from the analysis are discussed more deeply in Chapter 6.