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Job Instability and Fertility: How do 'precarious' workers deal with childbearing? Italy and EU countries case studies

Isabella Giorgetti

Supervisore
Prof. Stefano Staffolani
Correlatore
Prof. Matteo Picchio

Coordinatore
Prof. Riccardo Lucchetti

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Abstract

Chapter I
Fertility patterns have changed significantly since the 1960s in most advanced Western countries, with trends towards later childbearing, smaller families and an increase in childlessness. Described as 'one of the most remarkable changes in social behaviour in the twentieth century' (Leete 1998), declining fertility is one aspect of a range of demographic changes interpreted in the literature as the outcome of various socio-economical changes occurring as a result of modernisation. This process, the timing of which is variable across countries, is called the Second Demographic Transition (van de Kaa 1987; Lesthaeghe 1995). Since the mid-1980s,the macro level association between female labour force participation (FLFP) and Total Fertility Rate (TFR) has become positive (Ahn and Mira 2002; Engelhardt and Prskawetz 2004; Billari and Kolher 2004). This review starts with an overview of theories on the economics of fertility and the empirical implications in developed countries, seeking to explain fertility decline more generally and, finally, focusing on the relationship between job instability in the labour market and fertility choices.

Chapter II
This empirical study aims to investigate the relationship between the low female participation rate in the labour market and the "lowest-low" fertility rate in Italy during the recent econimc downturn (started from 2008), focusing on the effects of the implementation of the new types of flexible forms of contracts have had on the young couples' fertility choice, after the reform known as "Biagi Law" (L. 30/2003) in Italian labour market. Using Italian's individual data from longitudinal EU-SILC dataset (2004-2013), I consider all women between 15 and 45 years old, living with the partner, and who are active in the labour market. I build the job (in)stability measure for both the partners by their transitions in the activity statuses into the labour market during the two previous years. I estimate a First Difference Linear Probability Model (accounting for the unobserved heterogeneity and potential presence of endogeneity) in order to investigate the short-run effect

of job instability of both the partners on the couples' choice of having an addictional child, controlling for the other socio-economic characteristics. The main findings show that, for women, remaining in temporary contracts affects negatively, and furthermore this occupational status discourages childbearing more than being in unemployment because of higher opportunity-costs. For men, instead, finding a job boosts the choice of having at least an another child, while the fall and the remaining in unemployment depress the fertility.

Chapter III

The trends of decline in TFR varied widely across countries. In Northern European countries, the decline started early but has oscillated around 1.85 children per women since the mid-1970s. By contrast, among Eastern and Southern European countries the decline has been slower, starting in the mid-1970s, but reached an extremely low level of 1.3 in 1994 before slowly starting to edge up. The latters are known as 'lowest-low-fertility' countries because they have total fertility rates persistently around 1.3 children per woman (Kohler et al. 2002). Exploiting individual data from the longitudinal EU-SILC dataset from 2005 to 2013, the present study investigates the cross-country short-run effect of job instability on the couple's choice of having an addictional child. I build job instability measure for both the partners by the lag of economic activity status had in labour market (that encompasses holding temporary or permanent contract, or being unemployed). In order to account for the unobserved heterogeneity and potential presence of endogeneity, I estimate a Two Stage Least Square Model (2SLS) in first differences and under sequential moment restriction. Then, grouping European countries into the six different welfare regimes, I can estimate the heterogenious effects of instability in the labour market on childbearing among different institutional settings of European welfare. The principal result is that the cross-country average effect of job instability on couple's fertility decisions is not statistical relevant because of the huge country-specific fixed effects, even if having a temporary job for women encourages chilbearing, in average. When I analyse these impacts distinguishing also through welfare regimes' classification, the institutional structure and linked social active policies reveal a varying family behaviour for fertility choices. In low-fertility countries, however, it is confirmed that the impact of parents'successful labour market integration might be ambiguous, due to the absence of child care options.

Abstract

Capitolo I
Gli scenari di fertilità sono cambiati in modo significativo dal 1960 nella maggior parte dei paesi occidentali avanzati; essi seguono trend che evidenziano effetti di posticipazione nelle scelte di fertilità, si hanno famiglie di più piccole dimensioni e aumentano nel numero quelle senza figli. Ad oggi, il calo della fertilità è descritto come 'uno dei più gravi cambiamenti nel comportamento sociale del XXI secolo' (Leete 1998) e si presenta come uno degli aspetti di una serie di cambiamenti demografici e di profonde trasformazioni socio-economiche. Questo processo, che si presenta con una diversa tempistica tra i vari paesi, è conosciuto in letteratura come la Seconda Transizione Demografica (van de Kaa 1987; Lesthaeghe 1995). Dalla metà degli anni 1980, la correlazione a livello macro tra la partecipazione femminile alla forza lavoro (FLFP) e il Tasso di Fecondità Totale (TFR) ha cambiato segno, diventando positivo (Ahn e Mira 2002; Engelhardt e Prskawetz 2004; Billari e Kolher 2004). Questa review inizia con una panoramica delle teorie sull'economia della fertilità e delle implicazioni empiriche evidenziate per i paesi sviluppati. In questo lavoro si cerca di spiegare il declino della fertilità, in generale per poi concentrarsi sulla relazione che esiste tra l'instabilità nel mercato del lavoro e le scelte di fertilità.

Capitolo II
Questo lavoro si propone di indagare il rapporto tra il basso tasso di partecipazione femminile al mercato del lavoro e l'ancora più ridotto tasso di fecondità in Italia durante gli anni della recente crisi economica (iniziata a partire dal 2008), con un focus sugli effetti generati dai nuovi tipi di contratti a forme flessibili introdotti con l'attuazione della legge 'Biagi' (L. 30/2003) sulle giovani coppie circa le loro scelte di fecondità. Dai dati individuali longitudinali italiani raccolti dal dataset EU-SILC (2004-2013) estraggo un campione di tutte le donne tra i 15 e i 45 anni conviventi con il partner e che sono attive nel mercato del lavoro. Costruisco la misura di instabilità del lavoro, per entrambi i partner, attraverso le loro transizioni occupazionali avvenute nel mercato del lavoro e registrate nei due anni precedenti e stimo un modello

di probabilità lineare in differenze prime (controllando per l'eterogeneità non osservata e la potenziale presenza di endogeneità) al fine di studiare l'effetto di breve periodo che l'instabilità del lavoro genera nella scelta da parte delle coppie di avere un (altro) figlio. I principali risultati mostrano che, per le donne, mantenere un contratto a tempo determinato influisce negativamente e l'effetto è statisticamente significativo sulla scelta di procreazione. Questo produce un effetto maggiore anche rispetto a quello generato dal restare in disoccupazione. Per gli uomini, invece, è il trovare un lavoro la determinante che aumenta la probabilità della scelta di fecondità, mentre la caduta e il restare in disoccupazione sono effetti che la deprimono.

Capitolo III

Il declino del tasso di fecondità totale (TFR) ha subito negli anni ampie variazioni nella misura e differisce tra i paesi europei. Nei paesi del Nord Europa, il trend negativo è iniziato presto, ma si è fermato e oscilla intorno al 1,85 figli a partire dalla metà degli anni 1970. Al contrario, tra i paesi dell'Europa orientale e meridionale il calo è stato più lento, è partito dalla metà degli anni 1970, ha raggiunto un livello estremamente basso pari al 1,3 nel 1994, per poi iniziare lentamente a riprendersi. Questi paesi sono conosciuti come i paesi con più bassa fertilità proprio perché hanno tassi di fecondità che oscillano intorno a 1,3 figli per donna (Kohler et al. 2002). Utilizzando i dati individuali dell'indagine europea del reddito e sulle condizioni di vita (EU-SILC) 2005-2013, il presente studio indaga l'effetto cross-country e di breve periodo che l'instabilità del lavoro ha sulla scelta della coppia di avere un figlio in più. Costruisco la misura dell'instabilità per entrambi i partner dal ritardo del proprio status di attività (che comprende il contratto temporaneo, permanente, o l'essere disoccupato), concentrandomi in particolare sulle scelte di fecondità delle coppie attive nel mercato del lavoro. Al fine di tenere conto della eterogeneità non osservata e della potenziale presenza di endogeneità, stimo un modello Two Stage Least Square (2SLS) in differenze prime assumendo la condizione di esogeneità sequenziale. Poi raggruppo i paesi europei sfruttando una classificazione di sei regimi di welfare differenti e stimo gli effetti eterogenei dell'instabilità nel mercato del lavoro sulle scelte di fecondità che si manifestano tra i diversi contesti istituzionali. Il risultato principale di questo lavoro è che l'effetto medio cross-country che l'instabilità nel mercato del lavoro genera sulle decisioni di avere bambini prese da parte delle coppie non è statisticamente significativo, a causa degli enormi effetti fissi specifici per paese. Solo la presenza di lavoro temporaneo per la donna promuove in media le scelte di fecondità. Inoltre, quando distinguo tra i diversi regimi di welfare, i risultati rilevano invece una variazione di comportamento profonda tra le coppie in tema di maternità, la quale è molto legata alla struttura istituzionale e alle politiche sociali attive promosse dai propri

regimi di welfare.

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Introduction

Since the 1990s, economic uncertainty has been becoming an essential factor in explanations of the decline in fertility and the postponement planning of family formation across Europe, particularly when the aim is concerned to explain the developments recorded in Southern and post-socialist Central and Eastern Europe (e.g. Kohler and Kohler 2002). The start of the economic recession in 2008 has triggered renewed interest in the role of economic uncertainty for family dynamics. In view of the consequent financial and economic volatility across Europe, the relationship between economic household conditions and family dynamics enlarges its notoriety and becomes a major topic of public interest.

Economic uncertainty may be perceived as an individual risk factor, linked to phases in the life course that are characterized by unemployment, part-time work, working on a term-limited contract, or difficulties entering and reentering the labour market (e.g., Mills and Blossfeld 2005).

It may also be understood as an aggregate phenomenon that reflect general uncertainties felt by all people during, for instance, an economic recession (Sobotka et al. 2011). Most recently, empirical research has stressed the idea of economic uncertainty as a potential root of the fertility declines observed across Europe since the 1980s.

The evidence of correlations in some countries between low fertility rate and adverse economic conditions has boosted this interest. First, Southern Europe countries recorded extreme fall in annual birth rates during the 1990s owing to segmentation of Southern Europe's labour markets, determining high levels of youth unemployment and precarious patterns of entry into the labour market (McDonald 2000). Second, in Central and Eastern Europe, birth rates declined quickly after the abolishment of the communist regimes. The growth of uncertainties in labour markets during the transition from planned to market economies has negatively affected fertility in these countries. (Ranjan 1999). Furthermore, deregulation, internationalization, and globalization in the labour market have determed an increase in economic uncertainty, especially for young adults that face them into the partnership

and parenthood spheres of their lives (Mills and Blossfeld 2005). Increasing youth unemployment, the prevalence of temporary contracts, and instability in employment are now evaluated as the main driving forces behind the postponement of childbearing in contemporary Europe.

While the first decade of the new millennium documented a moderate increase in fertility rates across Europe countries, their policy makers still consider their current fertility levels as too low and this situation is becoming worrying after the beginning of the financial crisis and economic volatility in Europe in 2008 has emphasized this issue (Sobotka et al. 2011).

My thesis try to insert in this brach of literature and addresses this recent research topic, focusing on the effect of job instability on fertility. This is an issue on which evidence is still scarce and the major reason is linked to the fact that identifying the casual effect of job instability on fertility must be account for endogeneity problems (see paragraph 1.4 for more information).

It is composed by three chapters. In the first one I introduce an overview of theories on the economics of fertility and the empirical implications when they take place in fertility behaviour in developed countries, seeking to explain fertility decline more generally and, finally, focusing on the relationship between job instability in the labour market and fertility choices.

In the second one, I investigate the relationship between the low female participation rate in the labour market and the 'lowest-low' fertility rate in Italy during the recent econimc downturn (started from 2008), focusing on the effects of job instability measures for both the partners biult by their occupation transitions have on chilbearing. Using Italian individual data from the longitudinal European Survey of Income and Living Conditions (EU-SILC) from 2004 to 2013, I estimate a First Difference Linear Probability Model (accounting for the unobserved heterogeneity and potential presence of endogeneity) in order to investigate the short-run effect of job instability of both the partners on the couples' choice of having at least an another child, controlling for the other socio-economic characteristics.

In the third one, I enlarge my focus of the study at 21 European countries to capture the cross-country average effects and also the heterogeneous effects of instability in the labour market on childbearing across the different European welfare regimes in order to better understand the real detarminants of fertility choices introducing institutions' role. Finally, the work ends with explanations of final remarks.

Chapter 1

Literature review

1.1 Introduction

Since the 1960s in most developed Western countries, fertility trends have changed significantly, with paces towards later childbearing, smaller families and an increase in childlessness. Described as 'one of the most remarkable changes in social behaviour in the twentieth century' (Leete 1998), fall in fertility is one aspect of a range of demographic and socio-economic transformations occurring as a result of modernisation. This trend, the timing of which varies across countries, is called the Second Demographic Transition (van de Kaa 1987; Lesthaeghe 1995): in fact, the decline of fertility below replacement level[1] was previously viewed as the most important feature of the transition in the demographic literature (van de Kaa 1987).

Fertility decline is mainly due to fertility postponement behaviour of households.[2] This one raises several issues concerning demographic ageing and its socio-economic implications (for example for social security provision), the possible future decrease in labour supply and its impact on future economic growth, and the prospect of total population decline.[3]

Since the mid-1980s,the macro level association between female labour force participation (FLFP) and Total Fertility Rate (TFR) has become positive (Ahn and Mira 2002; Engelhardt and Prskawetz 2004; Billari and Kolher

[1]The replacement level of fertility is the level at which the population of a society, net of migration, would remain stable. In contemporary societies this occurs with a total fertility rate of around 2.1. The total fertility rate is a measure that expresses the mean number of children that would be born to a woman if current patterns of fertility persisted throughout her childbearing life.

[2]Some authors suggest rather that delayed childbearing constitutes a 'postponement transition' towards a late-fertility regime (see Kohler, Billari and Ortega 2002).

[3]Increasing concern about the possible consequences of fertility decline is evident in numerous articles and reports commissioned by the European Union.

2004). But a meta-analysis of micro level studies (Matysiak and Vignoli 2008) indicates that the association between FLFP and fertility remains negative, but its magnitude is stronger where the male-breadwinner model prevails (e.g. Southern Europe), and weaker in the Nordic Countries where more generous and/or efficient protection systems have been implemented to reconcile motherhood with work (Esping-Andersen 1999; Adserà 2004; Del Boca and Sauer 2009). During the 1990s, the increasing competition in the labour markets and employers' rising demands for workers flexibility have further affected childbearing in general (Mills and Blossfeld 2005). The employment instability with precarious jobs increases economic uncertainty and becomes more intense the difficulties among the young in their transition to adulthood, when they start their labour market careers, try to improve their economic position and begin to plan family project (e.g. McDonald 2006 and Vignoli, Drefahl and De Santis 2012).

This review starts with an overview of theories on the economics of fertility and the empirical implications when they take place in fertility behaviour in developed countries, seeking to explain fertility decline more generally and, finally, focusing on the relationship between job instability in the labour market and fertility choices.

In the next section I seek to review the choice-theoretic static framework of neoclassical economics originated in the pioneering paper by Becker (1960) known as 'New Home Economics' in which the theory of the consumer is applyed to explain the choice of complited family size with regard to variations in family income and the "prices", or opportunity cost of children.

In the third section, I review the literature on dynamic models of fertility behaviour over the parents' life cycle. I outline the ways in which these models linked to the static models and examine what implications they provide for dimensions of fertility behavior which cannot be addressed with the earlier models, namely, the timing of first births, spacing of children, and contraceptive behavior.

After this review of the theoretical models of fertility, I discuss, in section 1.4, the broad issues in estimating the implications of the theory for observed fertility behavior: the fundamental identification problems which arise in assessing the impact of prices and income on both lifetime and lifecycle fertility behavior.

So, I introduce the Easterlin' hypotesis to have a comprehension of macroeconomic approach model on fertility behaviour and to have an alternative framework to better understand the recent branch of literature that focusing on the studies that analyse the statistical association between the "job instability" and the fertility choices, that I present at the last section.

The chapter concludes with a short summary.

1.2 Static models of fertility: "New Home Economics"

The microeconomic approach to explaining fertility behavior is an application of neoclassical models of consumer demand: parents as rational consumers choose the quantity (or better, the number) of children which maximizes their utility subject to the price of children and the budget constraint they face. Such models are "static" because they assume that the unit of time for these choices is the parents' lifetime perspective as one period.[4]

More formally, they assume that parents maximize an utility function,

$$U = U(n, s) \tag{1.1}$$

which depends on the outcome of interest, the number of children, which is denoted by n, and a good, s, which characterizes all other consumption and the utility function has all the conventional properties, i.e., increasing and concave in both arguments. In this simple setting, parents are assumed to choose n and s so as to maximize Equation (1.1) subject to the following (conventional) budget constraint:

$$I = \pi_s s + p_n n \tag{1.2}$$

where I is the household's income, p_n is the "price" of children per unit, and π_s is the price of the composite commodity per unit. Taking the price of the composite good as numeraire, this simple model yields a standard *demand for children function* as following:

$$n = N(p_n, I) \tag{1.3}$$

which depends upon the price of children and parental income. The effect of changes in the price of children on completed fertility size are characterized by the income and substitution effects of consumer theory and variations in

[4]They ignore such issues as the possibility that the constraints that parents face, in terms of prices and budget constraints, may vary over the parents' life cycle, the potential uncertainty that parents may have at any point in time about these constraints in future periods, or the apparent fact that fertility outcomes unfold over time as well. These possibilities and their implications will be considered in the dynamic models of fertility behavior below.

parental income rise the income effects with respect to the "purchase" of children.

The first empirical challenge is to find proxies for the price of children: in fact, given a parametric specification of Equation (1.3)[5] and assuming that children are not Giffen goods, one can estimate the price responsiveness of the demand for children due to exogenous variations in the cost of rearing children or changes in governmental policies which affect the cost of children (e.g., changes in tax deductions for dependents or public assistance benefits). The second one is concerned on determining the direction and magnitudes of the effect of income on the demand for children, although there has been a presumption in the literature that they are positive, i.e., children are not inferior goods. Finally, the challenge of adapting neoclassical economic models to fertility behavior has driven a number of important extensions of this simple model, addressing the distinctive aspects of this set of behavior, and, also, representing important adaptations of the application of economics to human behavior (Hotz et al. 1997).

In the following sections, I examine two important contributions to the early literature on the economics of fertility so called "New Home Economics" or "Chicago School" that started in the 60s. In the first one, the *quality-quantity model* of fertility in which parents demand numbers of children with *certain qualities*. The second one is concerned with the importance of *allocation parental time*, especially for the mothers those mainly nurture children. Elements of these two model features are shown by Becker (1960) and Mincer (1963). Then they are synthesized by Willis (1973), with some further implications of the quality-quantity model developed in Becker and Lewis (1973).[6], and they are recalled by Becker (1991) into the book "A Treatise of the Family".[7]

1.2.1 The quality-quantity model

With regard to the observations that fertility tends to be negatively related to income both in time series and cross section, Becker (1960) rejected assertation that children are inferior goods or that high income families, who spend more on their children, have lower fertility because they face higher prices of children. Instead, he argued that the puzzle could be inserted within

[5]See Browning (1992) for a literature overview of some methods of defining children variables to yield a demand function.

[6]Willis (1987) suggests that these papers mark the emergence of the economics of the family as a distinct subfield in economics.

[7]I refer to the second 'enlarged' edition published in the 1991.

a *model of stable preferences* in which children are a normal good[8] in addition to the quantitative dimension represented by the number of children and a qualitative dimension associated with the choice of expenditures per child. He assumed a simple model of fertility behavior in which parents had preferences both for the number of children and the quality per child. This static lifetime model is an adaptation of the simple model is shown above. In particular, a new married couple acts as a unitary household with a single decision maker with preferences given by the utility function

$$U = U(n, q, Z) \tag{1.4}$$

where n continues to denote the number of children, Z the parents' standard of living, and q is the quality per child. In place of Equation (1.2), the household's lifetime budget is now as

$$I = \pi_c nq + \pi_Z Z \tag{1.5}$$

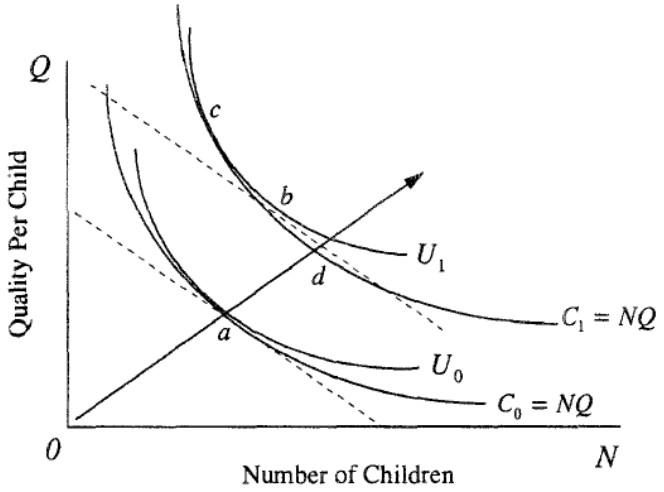
where I continues to be the total family lifetime income, π_c is a price index of goods and services for children and π_Z is a price index of goods and services for adults. The particular feature of this problem is that the *budget constraint is nonlinear* because quantity and quality enter multiplicatively. It is this quality-quantity interaction that leads to certain distinction features of the demand for children. In the model of Equations (1.4) and (1.5) Becker (1960) adds an implication such as the income elasticities of demand for n, q and Z must satisfy the following relationship

$$\alpha(\varepsilon_n + \varepsilon_q) + (1 - \alpha)\varepsilon_Z = 1 \tag{1.6}$$

where α is the share of family income for children and the ε indicate income elasticities. If children are normal goods and total expenditures on children are an increasing function of income, then the sum of the income elasticities of the number and quality of children must be positive (i.e., $\varepsilon_n + \varepsilon_q > 0$). But it is still possible that the income elasticity of demand for the number of children is negative (i.e., $\varepsilon_n < 0$) if the income elasticity of quality

[8] In "A Treatise on the Family" (Becker 1991) it becomes also durable good and without perfect substitutes

Figure 1.1 – Interaction of the demand for quality and quantity of children



Source: V.J. Hotz, J.A. Klerman and R.J. Willis (1997), p.296, Fig.7

is high enough.[9] He ended up arguing that income is likely to have a small positive effect on fertility, but believed that a negative correlation between birth control knowledge and income might change the overall sign of the income-fertility relationship to negative. Willis (1973) and Becker and Lewis (1973) provide a formal analysis of the quality-quantity model in which the implications of the nonlinearity in the budget constraint in Equatione (1.5) are explored.

Maximizing household utility in Equation (1.4) subject to the family budget constraint in Equation (1.5) yields the following first-order conditions:

$$MU_n = \lambda q \pi_c = \lambda p_n; MU_q = \lambda n \pi_c = \lambda p_q \tag{1.7}$$

where the MU's are marginal utilities and the p's are marginal costs or shadow prices of the number of children and quality per child, respectively, and λ is the marginal utility of income. These conditions imply that the shadow price of the number of children is an increasing function of child quality, while the shadow price of child quality is an increasing function

[9] Although Becker was unable to cite estimates of the demand for other goods in which the income elasticity of demand for quantity was negative, he cited studies showing that quality elasticities tended to be larger than quantity elasticities.

of the number of children. Furthermore, since n and q are chosen by the household, the shadow prices are endogenous.

The household's optimal choice of number and quality of children is shown in Fig.1.1. Equilibrium is at point a where the indifference curve U_0 is tangent to the budget constraint, $c_o = nq = (I - \pi_Z Z(\pi_c, \pi_Z, I))/\pi_c$, where c_0 is the *household's real expenditure on children* and $Z(\pi_c, \pi_Z, I)$ is the *demand function for parents' standard of living*. The indifference curve must be more concave than the budget constraint, $c_0 = nq$, which is a rectangular hyperbola.[10]

The nonlinearity of this budget constraint causes a quality-quantity interaction as income increases that yields a substitution effect against the number of children and in favor of quality per child (if the income elasticity of demand for quality exceeds the income elasticity of demand for number of children). In fact, in Equation (1.6) the marginal rate of substitution between the quantity and quality of children is $MU_n/MU_q = p_n/p_q = q/n$ so that the relative cost of the number of children increases if the ratio of quality on quantity rises ($\varepsilon_n > \varepsilon_q$). If the income elasticities for quality and quantity were equal, the income-expansion path would be given by ray Oad and the ratio of quality to quantity and the marginal rate of substitution between quality and quantity both remain constant. If $\varepsilon_n > \varepsilon_q$, the total effect of an increase in income that raises total expenditures on children from c_0 to c_1 is to move optimal consumption from point a to point c. This total effect may be disaggregated into a *"pure income effect"*, holding p_n/p_q constant from point a to point b, and an *"induced substitution effect"* from point b to point c. As drawn in Fig.1.1, the total effect of an increase in income do not change the number of children because the pure income effect, which tends to increase desired fertility, is crowded out by a substitution effect that yields an increased expense per child associated with higher desired quality.

Becker and Lewis (1973) incorporate in the budget constraint of Equatin (1.6) the costs of the number of children (independent on quality) and costs of quality (independent on the number of children), as follow

$$I = \pi_n n + \pi_q q + \pi_c nq + \pi_Z Z \tag{1.8}$$

where π_n and π_q, represent these independent cost components so that the marginal costs of numbers and quality become, respectively, $p_n = \pi_n + \pi_c q$ and $p_n = \pi_n + \pi_c n$. They consider a case (as an application) in which $\pi_q = 0$ and

[10]So, quality and quantity cannot be too closely substitutable in consumer preferences if second-order conditions for utility maximization are to be satisfied.

π_n represents the opportunity cost of fertility control, such as introduction of a new contraceptive method such as the oral contraceptive pill will reduce the cost of averting births and, therefore, increase the marginal cost of a birth without affecting the marginal cost of child quality. The increase in p_n, leads to a substitution effect against fertility which increases q/n, thereby inducing a further substitution effect against fertility and in favor of quality.

Their analysis suggests that the elasticity of demand for number of children is likely to be more negative with respect to variables such as contraception or maternity costs, which affect π_n, than it is with respect to variables such as the female wage which affect π_c. A parallel analysis suggests that a decrease in π_q due t, an increase in parents' education, may have a negative effect on fertility because the direct substitution effect which increases q causes an increase in p_n. Other examples of factors affecting π_q might include the quality of a neighborhood, school quality, and cultural factors.

There are several alternative concepts of child quality in the literature.[11] Becker (1991) considers children are as a durable consumption good and child quality is indexed by expenditures per child in much the same way that quality might be estimate by price in markets for cars in a world of perfect-informed consumers. The dominant view of child quality in the literature on fertility behavior and family economics is based on the theory of human capital form, in which parents parents, who care about the lifetime economic well-being of their children, influence their children's well-being either through the direct transfer of money or by investing in the child's human capital.

1.2.2 Parental time allocation

The second major reason for explaining the presence of a negative relationship between income and fertility, in addition to quality-quantity interaction, is

[11]The concept of "child quality" synthesizes different factors of children's well-being, such as time, effort, and money for their care and growing up, their likelihood of not dropping out of school, and the level of parents' subjective well-being which in turn has relevant effects on children's psychological development. Willis (1973), for example, defines child quality as a function of the resources parents devote to each child. See Browning (1992) for a survey of this literature: a number of indirect approaches have been suggested to estimate the "cost of children" based upon equivalency scales which depend upon how observed household consumption patterns, e.g. proportion of income spent on food, vary as income and household consumption vary. But, as Hotz et al. (1997, p. 298) state: "this literature is not helpful in understanding fertility behavior because (a) estimates of child costs are derived under the assumption that variations in household composition, including the number of children, are exogenous and (b) total expenditures on children are not decomposed into an endogenous part reflecting child quality and an exogenous part measuring the price index of children faced by the household."

the hypothesis in which the association of higher income and a higher cost of female time is due to increased female wage rates raising the value of female time in nonmarket activities. The assumption is that childrearing is a relatively time intensive activity, especially for mothers, so the opportunity cost of children increases for the above reasons, the substitution effect against children rises.[12]

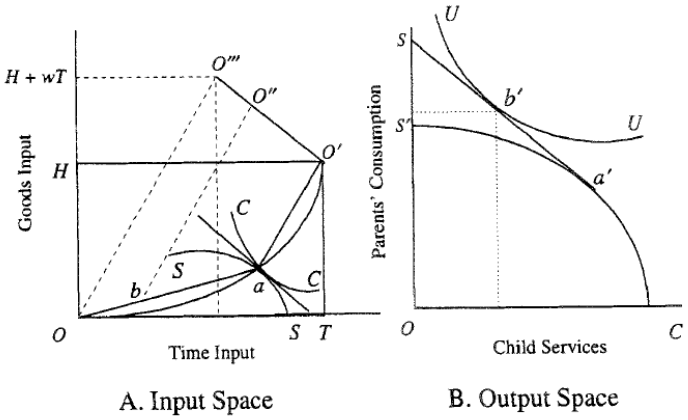
Willis (1973) introduces a simple static, lifetime framework for analyzing the interplay between time allocation, labour supply and fertility behavior in which all the choices are assumed to be made at the beginning of marriage and are not subject to revision: In fact, he assumes that the married couple is the decision-makers who derive utility from adult standard of living and from the number and quality of children as given by the utility function in Equation (1.4).

Following Becker (1965), the household uses the nonmarket time of household members and purchased goods as inputs into household production processes whose outputs enter into the utility function. First assumption is that only the wife participates in the production of household commodities while the husband is fully specialized in market work and his income, H, is exogenous. Total family income is $I = H + wL$ where w is the wife's real wage and L is her labour supply. Second one is that satisfaction from children is measured by "child services", $c = nq$, and the determination of the division of c between the number and quality of children is not considered for the moment. Third one is that household production has constant returns of production functions, $s = g(t_s, x_s)$ and $c = f(t_c, x_c)$, where t_s and t_c are the wife's time inputs x_s and x_s are purchased goods devoted, respectively, to the production of adult standard of living and child services. Finally, the key assumption of the model is that the production technology for children is time intensive relative to the technology for parents' standard of living. The total time of the wife, T, is allocated between home and work that is $T = t_c + t_s + L$. Purchases of market goods are constrained by total household income so that $I = H + wL = x_c + x_s$.

The equilibrium of this model is shown in Panel A with an Edgeworth Box diagram (Fig.1.2): the horizontal dimension of the box measures the total amount of wife's time that is devoted to household production (i.e. $t_c + t_s = T - L$) and the vertical dimension measures the total expenditure on goods (i.e. $x_c + x_s = T + wL$). When the wife does not work, the diagonal corners of the Edgeworth box are OO', if the wife works, the northeast corner

[12]The cost of time hypothesis was first advanced by Mincer (1963) and then it is developed by Becker's (1965) household production model. This relationship between fertility and female labour supply has become a standard feature of models of household behavior.

Figure 1.2 – Time allocation and fertility decisions



Source: V.J. Hotz, J.A. Klerman and R.J. Willis (1997), p.300, Fig.8

of the box moves to points such as *O"* or *O"'* where the slope of the line *O'O"'* is determined by the wife's market wage *w*.

Assuming that the wife does not market work, all possible efficient allocations of time and goods occur along the contract curve, *OO'*. Within the box, isoquants corresponding to increasing outputs of child services (CC) come from the origin at O while isoquants for parents standard of living (SS) originate at *O'*. Because of the assumption that children are relatively time intensive, it implies that the contract curve lies below the diagonal of the box. The common slope at the tangency in absolute value between CC and SS at point a is equal to the shadow price of the wife's time ω, given by the ratio of the marginal products of time and goods in each activity, and it is equal to the value to wife's market wage given by the slope of *OO"'*. The corresponding outputs of c and s are indicated at point *a'* on the production possibility frontier in Panel B (Fig.1.2). If the output of child services is increased by moving along the contract curve to the northeast of point a in Panel A, the shadow price of time increases because ratio of goods on time in the production of both c and s increase; so, given that children are relatively time intensive, an increase in the price of the time input leads to an increase in the relative cost of the time intensive output. Thus, the relative shadow price of children, $\pi_c/\pi s$, which is equal to the (absolute value of the) slope of the production possibility frontier in Panel B, tends to increase as the output of children rises above the level indicated at point *a'*.

Conversely, as the output of s is increased and input allocations occur to the southwest of point a, the shadow price of the wife's time falls below the market wage, implying that it is inefficient for her spend all of her time

in household production. As the wife enters the labour market, thereby increasing household money income and decreasing the supply of nonmarket time, the shadow price of her time can be increased to equality with her market wage and household output can be increased beyond the boundaries of the production frontier associated with full-time housework. For example, the time intensities of c and s production at point b along the contract curve OO', which is associated with a positive amount of market labour by the wife, are the same as the intensities at point a along the contract curve OO', but the output of c is smaller and of s is larger at point b. Under the assumption of constant returns technology, the ratios of the marginal products of inputs remain constant if factor intensities remain constant. In addition, constancy of the shadow prices of inputs implies that the relative marginal cost of outputs remains constant. Hence, point b' on the production frontier in Panel B, which corresponds to point b in Panel A, must lie along the tangent at point a' on bowed-out production possibility curve that constrains the household when the wife does not participate in the labour market.

The household's fertility decision is determined by maximization of its utility subject to the production possibility frontier. In Panel B of Fig.1.2, this optimum is shown at the tangency between the household's indifference curve and the linear segment of the production frontier at point b'. The associated allocations indicated by point b in Panel A show that the wife is supplying a positive of amount of market labour and the shadow price of her time is equal to her market wage ($w = \omega$) corresponding to an Edgeworth box whose northeast corner is at point O''. If the household had a stronger preference for children relative to adult commodities such that its optimal choice occurs on the production frontier to the right of point a', the wife would do not work at the market and the shadow price of time would exceed the market wage.

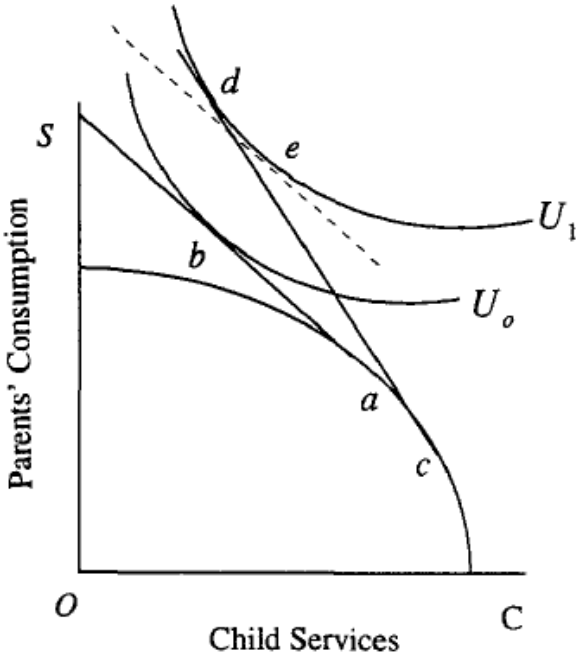
In general, given a large population of households with identical resources but heterogeneous preferences for children, they choose every point along the production frontier $Ca'S$ in Panel B:

- high fertility women who never work during their marriage consisting of households who choose points to the right of point a' on the production frontier in Panel B and who choose an Edgeworth box whose northeast corner is at point O' in Panel A;

- childless women who devote to market work choose the corner solution at point S in Panel B with a corresponding choice of market labour implied by the Edgeworth box whose corner is at O''' in Panel B;

- wives combine motherhood and market work such as, for example, households whose preferences are depicted in Panel B. In this group, there would tend to be a negative correlation between completed fertility and frac-

Figure 1.3 – Effect of an increase in the female wage



Source: V.J. Hotz, J.A. Klerman and R.J. Willis (1997), p.303, Fig.9

tion of married life devoted to market work.

The major empirical hypotheses of this static model are developed from comparative static analysis of the effects of exogenous variations in husband's income and female wage rates on fertility choices and related labour supply decisions by the wife. These results are presented diagrammatically in Fig.1.3 for an increase in the wife's market wage, w, and for an increase in the husband's income, H, in Fig.1.4.[13]

An increase in w causes for wives a shift from point a to point c on the production frontier in Fig.1.3 so that the linear portion of the new frontier ($L > 0$) is outside of and steeper than the linear portion of the previous frontier. It implies that the increase in w increases the household's real income and increases the opportunity cost of children and the household moves its optimal choice from point b to point d. The total effect of the increase in w on c is ambiguous because the substitution effect against c be more than offset by a positive income effect in favor of c. Even if the income effect dominates so that $c = nq$ increases, it is possible that fertility decreases while child quality increases. Indeed, Willis (1973) argues that this may be the probable outcome because it seems unlikely that child quality would

[13]See Willis (1973) for mathematical derivations.

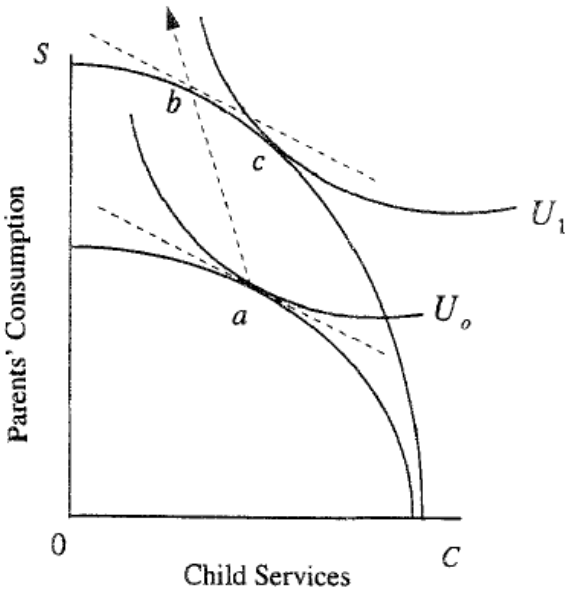
decrease while parents' standard of living increases sharply. Thus, increases in the female wage might tend to attract increasing numbers of women into the labour force and reduce fertility at high parities while, at the same time, it reduces the incidence of childlessness among women who have the lowest levels of fertility.

Although the income effect associated with increasing female wages may push women away from childlessness toward married lives in which they combine motherhood and work, this effect may be offset by increasing returns to human capital investments in labour market careers caused by the fact that the returns to a given investment in human capital are proportional to its rate of utilization. To the extent that rising female wages lead women to devote a larger fraction of their lives to market work, there is a larger return to investments for women in market-related skills and reinforcing effects on their incentive to supply market labour and on the shadow price of time.[14] As shown by Willis (1973), investment in wife's human capital leads to a non-convex production possibility frontier which decreases the likelihood that a mix of motherhood and market work will dominate corner solutions involving either high fertility and specialization in home work or childlessness and an emphasis on the wife's labour market career.

As far as the husband's income is concerned, under the assumption of children as relatively time-intensive goods, its increase will have an asymmetric effect on the household's production frontier, increasing the potential output of adult commodities by more than it increases the potential for child-related commodities, when the wife's supply of time is held constant (Fig.1.4). If the household's preferences for children are relatively weak and the wife supplies a positive amount of market labour when husband's income is low, an increase in income will cause her to reduce her supply of labour. As long as she continues work at a constant wage, her price of time remains constant and, consequently, the opportunity cost of children also remains constant. Thus, in this case, the increase in H leads to a *pure income effect* which presumably increases the demand for c, and, because of quality-quantity interactions, has an ambiguous effect on the demand for number of children. For households with the same initial resources and a demand for c which is sufficiently strong that the wife does not work, the income effect resulting from an increase in H tends to be offset by a substitution effect against children, moving the equilibrium from point a to point c in Fig.1.4. It is more likely that increases in husband's income will reduce fertility among

[14]The enormous literature on investments in human capital by women originates with Mincer and Polachek (1974) and the emphasis of the effects of increasing returns on the sexual division of labour is found in Becker (1991).

Figure 1.4 – effect of an increase in the husband's income



Source: V.J. Hotz, J.A. Klerman and R.J. Willis (1997), p.304, Fig.10

households with relatively strong preferences for children.

1.3 Dynamic life-cycle models of fertility

This section presents the crucial features of the dynamic, or life-cycle, models of fertility that have been developed in the literature: changes in prices and income over the life cycle may result in changes in the timing of fertility demand or *fertility tempo* (even if they do not affect the choice of fertility *quantum*). Furthermore, the life-cycle framework is also the proper setting to insert the stochastic process of human reproduction, including the choice of contraceptive practices, and to examine the relationships between women's labour supply, investment in human capital and childbearing decisions.[15]

1.3.1 Features of life-cycle models of fertility and the optimal solution

Following Hotz et al.(1997), I consider a household which consists of a woman and her spouse as a unique decision maker to make fertility and time and resource allocation decisions over a finite lifetime, characterize their lifetime in discrete time units t that index the *age* of the household unit and their lifetime runs from zero to T.[16] Under a ratioanl choice perspective, it assumes that the couple make their choices to maximize a well-defined set of preferences, subject to time and financial budget constraints, to technological constraints (which rule the (re)production and rearing of children), and to constraints on the production of the woman's stock of human capital (which determines the value of her time in the labour market at each age). The couple will make these decisions either in a certain or an uncertain setting, where the uncertainty they may face can arise either from the stochastic nature of the reproductive process or of the future income, prices or wage rates they may face.

Preference structures and the production of child services

As the structure of preferences within the static models, the most general specification of lifetime parental utility function considered in the literature takes the form:

[15] Hotz et al.(1997, p.309) argue: "Existing economic theories of fertility in a life-cycle setting blend features of static models of fertility with those from at least four different strands of dynamic models of behavior: (i) models of optimal life-cycle consumption, (ii) models of life-cycle labour supply decisions, (iii) models of human capital investment and accumulation, and (iv) stochastic models of human reproduction".

[16] An exception to the rule is Hotz and Miller (1986) model in which couples are assumed to be infinitely-lived for analytic reasons.

$$U = \sum_{t=0}^{T} \beta^t u(c_t, l_t, s_t) \tag{1.9}$$

where l_t is the amount of time the mother consumes in leisure activities at age t, s is parental consumption, β is the couple's rate of time preference ($0 \leq \beta \leq 1$), and c_t the flow of child services parents receive at age t from their stock of children, is ruled by the following production process:

$$c_t = (b_0, b_1, ..., b_{t-1}, t_{ct}, x_{ct}) \tag{1.10}$$

where $b_\tau = 1$ if the parents had a childbirth when they were age τ ($\tau = 0, ..., t-1$) and $b_\tau = 0$ otherwise, and t_{ct} and x_{ct} denote, respectively, the mother's time and a vector of inputs used by child services (that includes also non-parental child-care services); then, the couple's stock of children at age t is given by

$$n_t = \sum_{\tau=0}^{t-1} b^\tau \tag{1.11}$$

In the literature, the life-cycle models of fertility differs each other (and from this framework) in terms of several specializations: the simplest specification is Happel et al. (1984) that assumes that U in Equation (1.9) does not depend on l_t at any age and does not depend on c_t except at age T, when child services are assumed to be proportional to n_T, the couple's completed family size ($c_T = n_T$). The majority of the studies of the life-cycle models developed to date, child services $c(.)$ vary with the parents' age but are restricted to be proportional to the accumulated number of children n_t. The exceptions are the papers by Moffitt (1984) and Hotz and Miller (1986) in which in the specifications of Equation (1.10) parental time inputs t_{ct}, and market inputs x_{ct} vary as a function of the ages of children, with young children "requiring" more maternal time and older children more market inputs.

Maternal time constraints

The life-cycle models include period-by-period constraints on the mother's time of the form

$$l_t + h_t + t_{ct} = 1 \tag{1.12}$$

where it uses to normalize the per-period amount of time available to the mother to one and where h_t is the (normalized) amount of time she spends in the labour market.[17]

Production of children

In the literature, as in the static models of fertility assumed that the control of fertility was perfect and costless, this assumption is recalled by several of the life-cycle models, such as Wolpin (1984), Moffitt (1984), Happel et al. (1984), and Cigno and Ermisch (1989). But, as argued by the demographic and biological literature, controlling a woman's fertility is not likely to be either perfect or without costs in terms monetary or psychic. Thus, Heckman and Willis (1975) started to model human reproduction as a stochastic process in which childbirth represents a realization of this one. The models developed by Rosenzweig and Schultz (1985) and Hotz and Miller (1988) also incorporate the stochastic nature of reproduction into choice based, life-cycle models of fertility and build a couple's fertility function like stochastic but controllable, in part, by the contraceptive strategies they choose:

$$b_t = R(e_t, \varphi_t) \tag{1.13}$$

where b_t is a random variable, e_t denotes a K-dimensional vector in which the e_k element is whether or not the kth contraceptive method is used with $k = 1..., K$ and φ_t denotes the stochastic component of the likelihood to have a childbirth that a birth is produced with an unprotected sexual act. The parents' birth probability function is given by

$$P_{bt}(e_t, \mu, \sigma_\phi^2) \equiv Pr(b_t = 1 \mid t, e_t, \mu, \sigma_\phi^2) = E_\phi(R(e_t, \varphi_t) \tag{1.14}$$

where $E_\phi(.)$ denotes the expectations operator over the random variable φ_t, μ is its mean that measures the couple's fecundty and σ_ϕ^2 denotes its variance. In this way, models in which the birth process is stochastic, as in Equation (1.13), transform the parents' intertemporal optimization problem into one of decision making under uncertainty.

[17] To my knowledge, not exist life-cycle models consider the time allocation decisions of fathers, they are assumed only to provide for the rearing of children through the income they generate.

The household's budget constraint

The scholarship of life-cycle models of fertility presents two assumptions about budget constraints that vary in base on the parents' ability to save and/or their access to capital markets: the capital markets are assumed either perfect (PCM) in which parents are able to borrow and lend across time periods at a real interest rate r, or perfectly-imperfect (PICM), in which capital market is not available to borrowings or savings. In the first case, PCM assumption, savings at time t is counted by $S_t \equiv A_t - A_{t-1}$ where A_t is the parents' assets can be borrowed or lent over time, and the parents' budget constraint at time t is given by

$$S_t = Y_{ht} + w_t h_t - s_t - p'_{ct} x_{ct} - p'_{et} e_t - \pi_n n_t \tag{1.15}$$

where Y_{ht} denotes husband's income at time t, w_t is the wife's market wage rate, p_{ct} and p_{et} are vectors of prices for market inputs to the production of child services and the out-of-pocket costs of contraceptives, respectively, and π_n denotes the per unit non-quality cost of children. A key feature of the PCM assumption is that savings in any period can be positive or negative, so parents are allowed to borrow against the future or dissave.[18]

In the second case of PICM assumption,[19] parents cannot save, $S_t = 0$ for all t, and parental consumption is constrained by the following period by period constraint:

$$Y_{ht} + w_t h_t = s_t + p'_{ct} x_{ct} + p'_{et} e_t + \pi_n n_t \tag{1.16}$$

Finally, considering parental decision making within the life-cycle context puts the possibility that they face uncertainty about future income and prices: most of the literature on life-cycle fertility does not incorporate this form of uncertainty, while the model of Hotz and Miller (1988) in which future realizations of husband's income Y_{ht} and the wife's wage rate w are treated as stochastic.

[18] See Happel et al. (1984), Moffitt (1984), and Walker (1995) that have this assumption about capital markets.

[19] The models of Heckman and Willis (1975), Wolpin (1984), and Hotz and Miller (1988) adopt this assumption about the nature of capital markets available to parents.

Maternal investments in human capital

In most of the models in which the allocation of maternal time is treated as endogenous, the mother's wages over her life cycle are treated as exogenously determined. However, the models of Happel et al. (1984), Moffitt (1984), Cigno and Ermisch (1989) and Walker (1995) incorporate the possibility of maternal human capital investment, as such the mother's participation in the labour force not only generate income for the family but also may enhance her future labour market skills, and thus her future wage rate possibilities. This is an important feature because it introduces a potentially important source of intertemporal variation in the opportunity cost of maternal time in the production and care of children and, thus, in the timing of births over the life cycle.

The life-cycle fertility models which introduce human capital investment generally adopt a "learning-by-doing" human capital production process in which maternal wage rates are determined, in part, by the mother's past labour supply and her current work effort. More formally, this production function is given by

$$w_t = H(w_{t-1}, h_t) - \delta_1 w_{t-1} - \delta_2 w_{t-1} \mathbf{1}[h_t = 0] \tag{1.17}$$

where $H(\cdot, \cdot)$ is the human capital production function, $\mathbf{1}[\cdot]$ is the indicator function, and δ_1 and δ_2 are rates of depreciation ($0 \leq \delta_i \leq 1, i = 1, 2$) of woman's skills and, thus, her subsequent wage rates, due to not use in the labour market.

1.3.2 The optimal timing of motherhood

In this section *life-cycle dynamic models* identify on the one hand *consumption smoothing*, and on the other hand *career planning* of the woman as the main explanations to the fertility choices. Following Gustafsson (2001),I describe three theoretical models, such as Happel et al.(1984), Cigno and Ermish (1989), and Walker (1985), in detail to summarize the main findings of this literature.

Happel et al. (1984) assume *consumption smoothing* as the major determinant of fertility timing. Individual utility is separable into *consumption* and the *'effective' number of children*, like a combination of quantity and quality. Under PICM assumption, the husband's (exogenous) earnings profile matters for fertility timing since women give birth in a time spell in which the primary earner income is relatively high. The wife's earnings depend on

pre-marital work experience and when she gives birth she retires from the labour market for a fixed exogenous period, during which job skills subject depreciation and obsolescence. The optimal time to have the first child is husband's income reaches the highest peak; the household smoothes its consumption profile and raises its economic welfare delaying the childbirth (and the wife's periods of inactivity in the labour market). Thus, the polices which aim to reduce the out of work time for women could tackle this postponement effect.

On the contrary, Cigno and Ermish (1989), also presented in Cigno (1991) put the career planning motive as the main determinant of LFP and fertility choices. Parents' utility is disagregated into consumption and 'effective' children. Parents have a positive discount rate and PCM assumption. In based on this model a higher of pre-marital human capital stock implyes a lower completed fertility in the number and early child births. This is due to the income effect, in fact parents discount the utility come from offspring. He suggests that women with a steeper earnings profile postpone child births: in fact, for a steep earnings profile the current cost is relatively lower when a woman is young, while the future cost decreases with age since there are less years of work activity left.

Finally, under PCM assumption, Walker (1995) focuses on the career planning motive, and he specifies a dynamic model in which parents derive utility from children and consumption. The parents are strongly encouraged to have children early in the life-cycle due to the fact that children yield a recursive flow of utility also for all periods following the birth event, which is discounted at a positive rate of time preference (unlike in Happel et al. 1984): the motivation is that during a period of increasing wages, ceteris paribus, women have an incentive to give birth early in the life-cycle, when the opportunity cost of their time is relatively low. The current wage forgone derived by birth and rearing children is much lower when an individual is relatively younger. In this model an increase in wealth tends by the cumulative nature of the utility flows to reduce the tempo of fertility too, while, by contrast, changes which flatten the earnings profile tend to delay fertility.

1.3.3 The optimal spacing of motherhood

The econometric Timing and Spacing literature is born by the hypothesis of a negative effect of female wages and a positive effect of male wages on fertility (Butz and Ward 1979; Heckman and Walker 1990; Tasiran 1995; Merigan and St Pierre 1998). The dependent variable collapses all the different features of the development of the fertility rates into one measure, the *hazard rate*.

Heckman and Walker (1990, p. 235) state: *"Our model explains parity*

choices, sterility, childlessness, interbirth intervals and initiation of pregnancy with in a unfied framework" in order to distinguish between tempo of fertility (the age at first birth) and quantum of fertility (the number of children born). Their another contribution is given by the estimation of birth transitions by a method that the literature call 'a piecemeal approach of estimating one birth transition at a time' that account for unobserved heterogeneity between individual women's fertility. They consider this unobserved heterogeneity as a measure of individual differences in fecundity, but they also claim that: "Unlike for societies like the Hutterites where serially correlated fecundity differences play a central role, in accounting for fertility in modern Sweden serially correlated unobservables play a negligible role" (Heckman and Walker 1990, p. 235) because in modern European societies with low fertility rate we would expect that economic variables would play a more decisive role. They (1990) use current wages of males and females to explain fertility transitions and motivate this choice by the fact that *"the correlation between past, current and future wages is very large, which makes current wages a good prediction for future wages".* and they find that there are signficant positive effects of male wages and significant negative effects of female wages in Sweden; these results are confirmed also in the study of Canadian fertility by Merrigan and St Pierre (1998) .

Tasiran (1995) analysing timing and spacing of births in Sweden using basically the same dataset as (Heckman and Walker 1990) (SFS) matching the Swedish household panel dataset (HUS) gets results that contrast: in fact, he finds much weaker effects of current male and female wages on birth transitions. The differences in results could be due to the fact that he uses individual observations on wages in a larger time series of aggregate male and female wages and adds other explanatory variables, such as parental benefits and child-care into the hazard models.

Adserà (2011) estimates proportional hazard models of the transitions to the first three births using individual level data from the European Community Household Panel (ECHP). She controls for several time-varying measures of country-specific aggregate market conditions, such as unemployment rates, shares of public sector and part time employment, as covariates of interest in order to investigate the association between labour market dynamics and fertility choices. This study shows that high and persistent unemployment rate of the country is associated with delays in childbearing and, as a result, a likely lower number of children. For a given unemployment level, a wide supply of public sector employment yields a faster transitions to all births, while second births occur sooner in countries where the access to part-time makes it easy. Finally, women with temporary contracts, mostly prevalent in Southern Europe, are the least likely to give birth to a second child.

Finally, Bratti and Tatsiramos (2012) focus on the consequences of delaying motherhood on fertility in several European countries using the European Community Household Panel (ECHP). Estimating a multistate discrete-time duration model, which accounts for correlated unobserved heterogeneity across parities, they are able to analyze the effect of age at first birth on the transition to the second parity, addressing jointly the endogeneity of age at first birth. The empirical study shows the coexistence of two opposite forces, the biological and sociocultural factors producing a postponement effect and career-related factors leading to a catch-up effect. Their magnitudes vary and depend on countries' institutional features: in particular, the postponement effect is larger in Southern European countries, where a traditional male-breadwinner model prevails and where it is not favored the conciliation between family and work, while a catch-up effect is large in countries where institutions support properly the mothers to participate in the labour market.

1.4 Empirical implications of models of fertility: identification issues

While there is strong and recent evidence on the negative effect of child bearing on female labour supply and *vice versa*, the interpretation of this correlation is complicated by several modelling issues.

Firstly, there may be an endogeneity issue arising from the presence of unobservable factors that may affect both the participation and fertility decisions (Browning1992). For instance, women with stronger preferences for a career-based life style may have fewer children and may also have higher unobservable skills in the labour market. In this case, the observed negative relationship between fertility and employment could be spurious. The endogeneity of fertility choices has been tackled by exploiting exogenous changes in the family composition. One of the proposed instruments is the sex of the first two children, as parents with two children of the same sex are more likely to be willing to have a third child (Angrist and Evans 1998; Carrasco 2001). Alternatively, exogenous infertility shocks, based on information on the use of contraceptives, have recently been used as instruments to identify the causal effect of having children on female labour supply (Agüero and Marks 2008). While the latter strategy has the advantage of being applicable to a broader sample of women in fertility age, the former uses information on family composition that can be easily found in households surveys.

Secondly, part of the literature on life-cycle labour supply has treated employment and fertility as a result of a joint dynamic process, to explicitly account for the effect of past labour supply and existing children on present participation and fertility choices. This strand of literature has considered fertility as predetermined in a sequential dynamic framework (Arellano and Carrasco 2003; Michaud and Tatsiramos 2011) or as contemporaneous with respect to labour market participation decisions (Del Boca 2002; Francesconi 2002; Del Boca and Sauer 2009; Keane and Sauer 2009; Eckstein and Lifshitz 2011). In addition, further to the distinction between genuine state dependence and permanent unobserved individual effects, the literature on dynamic labour supply has recently emphasised the importance of accounting for autocorrelation in time-varying unobserved heterogeneity. In fact, Hyslop (1999), following Browning (1992) and Chamberlain (1984), tests for the exogeneity of fertility via a discrete choice correlated random effects model. His results indicate that fertility is endogenous when dynamic factors such as state dependence or serial correlation are excluded. Thus, in dynamic specifications including either first-order state dependence or AR(1) serial correlation, he finds no unambiguous evidence against the exogeneity of fer-

tility hypothesis. Directly testing for the exogeneity of fertility has yielded very mixed results.

1.5 A macro approach to fertility: the Easterlin's hypothesis

As argued, standard microeconomic models of fertility predict that fertility should be counter-cyclical (Butz and Ward 1979). But by the end of the 1980s, the cross-country correlations between fertility and female labour market activity turned positive while, by contrast, many European countries with rising levels of unemployment documented fast declines in fertility rates (Ahn and Mira 2002; Engelhardt and Prskawetz 2004). Pro-cyclical fertility came out as a new empirical regularity, and numerous studies showed unemployment on fertility showed a strong negative relationship between unemployment and fertility in the aggregate as well as in the individual level.[20]

Thus, it comes to light the Easterlin's 'relative income' hypothesis, a macro theoretical approach that explains fertility and female employment. The relationship between higher birth rates and adverse socio-economic effects is due in Easterlin's approach to a 'crowding mechanisms' operating within the family, school, and labour market (Easterlin 1980). He focuses on the role of male incomes, relative to economic aspirations, as driving force of fertility and female labour force participation. Economic aspirations of young adults are defined by material conditions of their parental households during their teenage years. In the first theoretical model Easterlin assumes that women are not on the labour market (Easterlin 1978), thus, an increase in male relative income - defined as the fluctuations between economic aspiration in teenage years and current and expected economic conditions - shifts preferences in favor of childbearing and away from female labour force activity, while, by contrast, a decrease in relative income results in increased female employment, delayed childbearing and reduced fertility.

In the full Easterlin model (Easterlin 1980) relative income is affected by the size of the birth cohort of the young adults relative to that of their parents. In this framework an enlargement of young adults' cohort yields an increasing in competition among their peers in education and employment opportunities, which leads to adverse consequences on their earnings. At the same time the earnings of their parents might have been higher because of their smaller birth cohort; thus, on the one hand, they would have contributed to face different decisions concerning fertility and labour market activity in their early adult years and, on the other hand, they would have made the formation of the higher material aspirations for the later genera-

[20]See Adserà (2005) for a study of the effects of aggregate unemployment rates on fertility rates across a number of European countries. Gutiérrez-Domènech (2008) studies its impact on fertility timing and marriage behaviour in Spain. See also Sobotka et al. (2011) for a recent review on the effect of recessions on fertility.

tion. In other words, the driving force behind both increased female labour force participation and reduced fertility consists on the aspiration of a larger birth cohort to improve relative economic status, with parental income as the measure of material aspirations.[21]

Both the previuos explained thoeries, New Home Ecomonicsl and the Easterlin's hypothesis, are founded on wage structures but poorly clarify common time trends and cross-national variation in fertility and female employment. Thus, in the literature an *alternative hypothesis* emerges a new brach in which the costs of children focuses less narrowly on the female wage as measure of the 'price' of children and, instead, it points more attention to the ability of women to conciliate childbirth and work, including both costs of the household standard of living and of the woman's career, that increase from interruptions or reductions of labour supply determined by childbirth and child-rearing events. The institutions define how easily a woman can balance work and family in terms of how much cost and how large the wage or career opportunity-cost are due on the experienced labour market reduction for women. The changes in the industrial and occupational structure have expanded job opportunities for women, especially for part-time employment.[22]. Furthermore, increasing in rates of part-time job reduces the opportunity-cost of children and also increases fertility. A measure of the supply of child-care services is the gross enrolment ratio of children in pre-primary education. In based on reduction of opportunity-cost of chilbearing this ratio should impact with a positive effect on the TFR as well as with a positive effect on FLFP. Finally, family allowances affect the income constraint, reducing it, and, therefore, they are expected to have a positive effect jointly on increasing demand of childcare services and supply of part-time jobs, and also on fertility, e.g. in Nordic European countries.[23]

[21]Empirical tests of the Easterlin model have been surveyed Macunovich (1998).The literature suggests support for the relative income concept in fertility, but it seems to be less clear regarding the sources of differences in material aspirations.

[22]See Gauthier (2007) for an literature review on the impact of family policies on fertility in industrialized countries

[23]See, also, the papers by Del Boca et al. (2005), Del Boca and Vuri (2007), and Rondinelli and Zizza (2011) to examine the Italian phenomenon.

1.6 Economic uncertainty and fertility during the 20th century

During the 1990s, a further decline in fertility (TFR) has been determined by the increasing competition in the labour markets and rising of workers flexibility (Mills and Blossfeld 2005): in fact, the employment instability and job precariousness increase economic uncertainty and among the young the difficulties occurring to their transition to adulthood have been hardened, when they start their labour market careers, they prefer firstly to strengthen their economic position and then begin to consider family formation (e.g., McDonald 2006; Vignoli, Drefahl and De Santis 2012). As argued by McDonald (2002), this strand of literature mostly refers to two main alternative theories: the *risk aversion theory* and the *uncertainty reduction hypothesis* (Friedman et al.1994). The two theories assume the same groundwork in terms of current and future economic uncertainty as negative states that individuals will seek to reduce or avoid and they posit two opposing strategies that individuals might use to make less uncertain their future prospects.

Risk aversion theory comes from rational choice theory and new home economics (Becker 1960, 1965, 1991). According to these theory, under an uncertainty dimension people decide whether to have an addictional child according to an opportunity-cost analysis. Individuals may, in fact, have only a reducted estimation in value of the opportunities and costs associated with their choices. As individuals consider the future and its uncertainty conditions, individual decision makers may be risk adverse ones: thus, the risk adversion theory implies an investment in economic security (education, attachment to the labour force, savings) rather than in the insecurity that accompanies the irreversible choice to have children. McDonald (2002) also highlights the fundamental role of welfare systems in deal with market instabilities: in fact, risk-averse behaviors are even more likely to be adopted when the protection role of welfare polices is not efficient to guarantee an adapt coverage of new social risks (Esping-Andersen 2009).

The *theory of uncertainty reduction* (Friedman et al. 1994), instead, is based on the assumption that, although under conditions of uncertainty, people continue to plan children. Referring to the wider human uncertainty entailed by economic one, they advance an opposing model: individuals feel life-course choices that offer a reducing of their uncertainty as particularly attractive. In this context, parenthood may be like a counterforce that rebalance the uncertainty due to precarious working conditions and the investiment in children may move to a relative certainty that comes from having lifelong rights and obligations. In other words, having children may be seen

as an alternative life goal for people who are most affected by uncertainty consequences of the globalization process.

Furthermore, an empirical study by Hondroyiannis (2010) examines the determinants of fertility, using panel data for 27 European countries. Yielding a co-integration panel, he estimates fertility as function of demographic and economic variables and shows that low fertility in most industrialized European countries is due to low infant mortality rates, high female employment, low nuptiality rate, and high opportunity cost of childbearing: in fact, in other words, he finds that a downward shock to infant mortality, due, for example, to medical advances, negatively affects fertility, by constrast, an upward shock in real GDP per capita, due for example to an improvement in the terms of trade, rises fertility by a positive income effect on the demand for children. Finally, using two measures of economic uncertainty, such as a production volatility measure and the unemployment rate, he proves that both measures of economic uncertainty have a significant negative effect on fertility, suggesting that labour market insecurities might be a significant factor affecting fertility decisions.

In the theoretical branch of the literature that links declining fertility and economic uncertainty two models are particularly interesting. Ranjan (1999) argues that increase in uncertainty about future income induces risk adverse agents to delay fertility decisions. Assuming that a woman plans to have a child in the future only as long as she has a positive shock producing her future income to be higher than the current period one. Thus, increasing in the degree of uncertainty negatively yields the probability for childbearing.

Sommer (2016) establishes that higher earnings uncertainty linked with the risk of loosing the job reduces fertility plans or better, when labour market risk is high households put work before family formation prefering accumulation of savings and postponing fertility decisions. But, while this could be initially seen as a temporary choice, infertility risks increase with age and delayed fertility may turn into a reduced fertility quantum.

A group of papers focus on subjective measures of economic uncertainty on fertility. Kreyenfeld (2010) using the German Socio-Economic Pane, builds objective measures of uncertainty, such as unemployment, as well as subjective measures, in particular whether the respondent is worried about her economic situation, whether she is worried about the security of her job. She finds no empirical evidence that uncertainties in female employment careers lead to a postponement of parenthood. But, she shows that the economic uncertainty and first birth nexus differs among level of education: highly educated women postpone parenthood if they suffer employment uncertainties, while those with low levels of education often respond to these situations by becoming mothers. Schimitt (2012), drawing on survey data

from the U.K. and Germany, studies a cross-national comparison of the association between various economic conditions and first childbirth in two distinct welfare state regimes. He finds that for men a decline in income, as a signal of reduced breadwinner capabilities, blocks men from starting a family only in Germany. The role of women's employment in fertility is ambiguous, as a woman's unemployment seems to foster her fertility transitions, particularly in the U.K.

Finally, a second group of papers focus on measures of economic insecurity on fertility. Prifti and Vuri (2012) investigate the effect of Employment Protection Legislation (EPL) on fertility decisions of Italian working women. Using administrative data, after the reform that introduced in 1990 costs for dismissals unmotivated by a 'fair cause' in firms below 15 employees and left firing costs unchanged for bigger firms, estimate a difference in difference (OLS-DID) model to control for possible period-invariant sorting bias and an instrumental variable (IV-DID) model to account for time-varying endogeneity of the treatment status. Their results document that a strengthening of the EPL regime reduces economic insecurity and has a positive and sizable impact on fertility decisions of Italian female workers. Modena et al. (2014) employ measures of economic insecurity, such as being precariously employed, level of household income, and level of household wealth. Using a pooled cross-section of Italian households from samples between 2002 and 2008 of the Survey on Household Income and Wealth (SHIW), they show that the instability of women's work status discourages fertility intentions among medium and high income households, while it produces no effect among low-income couples. Finally, household wealth is significantly and positively correlated with the decision to plan the birth of a first child.

1.6.1 Job instability and fertility

This section deals with a new branch of literature which relates labour market conditions to fertility focusing on the issue of job instability. Only a few of empirical studiies has addressed this topic on which evidence is still very scarce. This also depens on the fact that identifying casual effect of job instability is a nontrivial issue.[24] However, at the beginning current literature has emphasizes the idea of unemployment as measure of job instability and also determinant of the recent trends in fertility rates observed in many European countries. High aggregate unemployment rate may affect the increasing in individual unemployment incidence, in the next future risk of losing a job, and/or at the same time the fall of the likelihood of

[24]See paragraph 1.4 to review.

future wage growth (Adserà and Menendez 2011). Then, studies have enlarged the job instability topic including the other forms of labour market precariousness such as temporary contracts, part-time work, or flexible jobs, and they have documented statistical evidence (correlations) between job instability and fertility. Ahn and Mira (2001) find that males' past unemployment events and temporary contracts are main determinants of marriage delay and fertility decline in Spain. De La Rica and Iza (2005) show that Spanish women with fixed-term contracts and lacking expectations of stable employment postpone the entry into motherhood compared to female workers with open-ended contracts. Adserà (2005) using cross-country variation in labour market institutions across OECD countries documents a reduced fertility where unemployment have experienced acute, and, by contrast, an increasing of female investment in education and skill acquisition in order to face and minimize the risk of unemployment.

Santarelli (2011), using the European Community Household Panel (ECHP) by a longitudinal event-history analysis, investigates the transition to first child (conception) for childless married couples during the years 1994-2001. She finds that single-earner couples have their first child earlier than dual earner couples, but the type of contract does not clear evidence. She also analyses the impact of couple's income on first birth risks, but without controlling for the couple's employment instability.

Modena and Sabatini (2012) investigate whether in Italy having a precarious job (i.e. unstable, low paid, and with scarce guarantees) is a deterrent or a encouraging factor to childbearing in based on the opportunity-cost of child for women. Using micro-level data of Survey of Household Income and Wealth (SHIW) matched with aggregate territorial control variables, they confirm evidence that unemployment negatively affects fertility plans. Furthermore, couples with female precarious (i.e. atypical, temporary, and low-guaranteed) workers are in fact much less likely to plan to have children in the future.

Vignoli et al.(2012) exploiting micro-level data by IT-SILC, estimate the probability of having a first child in a given year controlling for women's and partners' characteristics in the preceding year. Their findings show that for Italian couples a permanent occupation for both partners is associated with higher fertility, while the presence of job instability for one of the partner or for both ones depress fertility.

Auer et al.(2013) develop a simple dynamic model including economic uncertainty assumption associated with holding fixed-term employment contract; in this framework couples have theorical possibilities to have child in the first period, postpone it to later one, or decide to remain childless. Then, they using data from the German Socio-Economimc Panel (SOEP) estimate

these theoretical predictions by ordinary least squares and fixed-effects estimations. They find that, for early female employment careers, compared to have a permanent job, holding a fixed-term employment contract is negatively correlated with the probability of parenthood, while, by contrast, for women in their mid-career lives, holding a fixed-term contract show a positive impact on the probability of childbearing.

Del Bono et al.(2012) show that an unexpected career interruption, compared with others unaffected by job loss, reduces significally the number of children for women in Austria, especially in the case of women in white collar occupations. Furthermore, Del Bono et al. (2015) investigate the relationship between unemployment and fertility in Austria over the years between 1990 and 1998. They choose job displacement due to a firm closure as a source of exogenous variation in unemployment in order to disentangle the effect of unemployment per se from the effect of an involuntary job dismissal. Thus, they analyse whether fertility is mainly affected by the financial deprivation owing to loss of earnings for unemployed status or is also due to the involuntary change in career prospects and the linked effort for seek a new job caused by a firm closure. To account for the endogeneity of unemployment, they choose as instrument of the latter using a variable built by interactions between firm closure and seasonal, geographical and temporal fixed effects in order to distinguish two effects of job displacement, the first one which operates through career and employment considerations and the second one which operates through the loss of earnings caused by an unemployment spell. Their results show that unemployment per se yields a negative effect on fertility, while the duration of unemployment due to the firm closure does not have an additional relevance. Finally, they also find stronger and more negative effects of displacement for women with higher pre-displacement wages and earning growth, concluding that employment career is a more important determinant of fertility choices than short-run income effect owing to an unempolyment event.

Finally, Greulich et al.(2016) investigate the relationship between job security and the second childbirth. Using longitudinal data from the European Survey of Income and Living conditions (EU-SILC) matched with data from the OECD Family Database, document that, on average within European countries, women in stable employment have a significantly higher probability of second childbirth than women in inactivity or in unemployment. Furthermore, while in general female employed status promote a transition to second childbirth in high-fertility countries, the impact is heterogenous across low-fertility countries.

1.7 Conclusions

In this chapter, I revisit economic theories of fertility born from the 60s to nowadays and the main findings can be summarized as follows.

In almost all theories it is presented the assumption that raising children is a time intensive activity and that this time must be supported by the parents.

These theories are based on exogenous wage heterogeneity and mainly are depended on the assumption of presence of a high elasticity of substitution between consumption and children.

The addiction of a quality choice regarding children does not generate a negative fertility-income relationship by itself, but the quantity-quality trade-off employes only in linkage to assumptions similar to those of the previous point.

Theories that assume heterogeneity in tastes for children may be able to produce a negative fertility-income relationship without necessitate having a high elasticity of substitution between consumption and children.

The extention of the models that are successful in matching with the cross-sectional properties of fertility choice in order to develop fully dynamic models with heterogeneity in tastes has left many open questions.

Currently there has been a recent increase in researching macroeconomists studies that investigate the relationship between demographic transition and economic development.

Finally, there is also a recent literature that uses dynamic models to analyse the interplay between fertility, labour force participation, and marriage (or co-living) during the current years in which the presence of economic uncertainty and the job instability have become other 'significant' determinats of fertility choices. But the evidence employed by studies of this topic is still scarce and this fact let us open unexplored research horizons to investigate.

Chapter 2

Job Instability and Fertility Choices during the Economic Recession: the Case of Italy

2.1 Introduction

As documented in the literature,[1] e.g. by Guinnane (2011), after the *Baby Boom* of the 1960s, the phenomenon known as the "Second Demographic Transition" has come up in almost all developed countries: Total Fertility Rate (TFR)[2] has declined and reached values largely below replacement level until the late 1990s and, since then, fertility has stagnated at very

This research is based on data from Eurostat, longitudinal Italian EU-SILC survey for the years 2004-2013.The responsibility for all conclusions drawn from the data lies entirely with the author.

[1]See Strulik and Vollmer (2015) for studing the evolution of the distribution of fertility rates across the world from 1950 to 2005, the demonstration of the existence of twin speeds, and the division of the world's countries in two distinct components: a high-fertility regime and a low-fertility regime.

[2]The definition given by OECD regarding total fertility rate is: in a specific year, as the total number of children that would be born to each woman if she were to live to the end of her child-bearing years and give birth to children in alignment with the prevailing age-specific fertility rates. It is calculated by totalling the age-specific fertility rates as defined over five-year intervals. Assuming no net migration and unchanged mortality, a total fertility rate of 2.1 children per woman ensures a broadly stable population. Together with mortality and migration, fertility is an element of population growth, reflecting both the causes and effects of economic and social developments. The reasons for the dramatic decline in birth rates during the past few decades include postponed family formation and child-bearing and a decrease in desired family sizes. This indicator is measured in children per woman". *OECD (2016), Fertility rates (indicator). doi: 10.1787/8272fb01-en*

low levels (Van de Kaa 1987; Lesthaege and Willems 1999). Several Eastern and Southern European countries, especially Italy, so-called 'lowest-low fertility' countries have total fertility rates persistently around 1.3 children per woman (Kohler et al. 2002). As fertility levels significantly below the replacement level have important negative consequences for the macroeconomic equilibrium of a country, identifying the reasons behind low fertility becomes basic.

Neoclassical microeconomic models of fertility relate the fertility decline with the parallel increase in women labour force participation (Willis 1973; Butz and Ward 1979; Becker 1981; Cigno 1991): the rise of female activity levels should stimulate the demand for children (positive income effect) but also should enlarge the opportunity cost of childbearing (negative substitution effect), especially given the increase in the level of educational attainment of the younger cohorts of women (Bratti 2003; Adserà 2004; D'Addio and D'Ercole 2005).[3]

Since the mid-1980s the cross-country association between female labour force participation (FLFP) and fertility (TFR) has become positive (Ahn and Mira 2002; Engelhardt and Prskawetz 2004; Billari and Kolher 2004), by contrary at micro level this is not yet: a meta-analysis by Matysiak and Vignoli (2008) indicates that the relationship between FLFP and fertility remains negative in micro level studies, but the magnitude of the association is stronger where the male-breadwinner model prevails (e.g.Southern Europe), and weaker in the Nordic countries where more generous protection systems have been implemented to reconcile motherhood with work (Esping-Andersen 1999; Adserà 2004; Del Boca and Sauer 2009).

During the 1990s, the increasing competition in the labour markets and employers' rising demands for workers flexibility have further discouraged

[3]An higher level of education achieved and the related prospects for better work positions and higher earnings raised the opportunity cost of not working, thereby causing a *postponement effect* of childbearing decisions, which in turn led to a fall in fertility rates (Gustafsson and Wetzels 2000; Amuedo-Dorantes and Kimmel 2005; Modena and Sabatini 2012). A mother's age at the childbirth can be seen as the result of a trade-off between investment in human capital and career planning, on the one hand, and motherhood on the other (see for an comprehensive literature review Gustafsson 2001). The effect of income on the timing and the number of births may follow different paths. Bratti (2003) finds that, in Italy, fertility is stimulated by increasing education up to the upper secondary level, but, also, higly educated women postpone fertility, because they show an higher labour market attachment. Gustafsson(2005) suggests that for young Swedes, any additional year of education affects fertility due to a delay in the formation of a stable couple, and this has a larger effect than that due to a delaying parenthood once the couple is formed. Furthermore, Amuedo-Dorantes and Kimmel (2005) argue that college-educated mothers can benefit from postponing motherhood because they are in a better position to negotiate a family-friendly work environment with flexible work schedules.

childbearing in general (Mills and Blossfeld 2005). The employment instability and job precariousness increase employment uncertainty and the difficulties among the young workers in their transition to adulthood become more intense: in fact, when they start their labour market careers try to strengthen their economic position and then begin to look upon family formation idea (e.g. McDonald 2006; Vignoli, Drefahl and De Santis 2012).[4]

This study focuses on Italy during the years of recent economic recession (started from 2008), an interesting case study owing to its 'lowest-low' TFR (Della Zuanna 2001), low FLFP, and a modest institutional support for working women with rare part-time works, rigid working schedule, and scarce public chidcare services (Del Boca 2002; Saraceno 2004; Bratti et al. 2005; Del Boca et al. 2009; Istat 2016). Furthermore, the precarious workers are characterized by low income levels, improper social protection, and discountinuous careers (Barbieri and Scherer 2009). Using Italian's individual data from *longitudinal EU-SILC dataset (2004-2013)*, I investigate the short-run effect of *job (in)stability* on the couple's choice of having at least an additional child.

The literature which relates labour market conditions to fertility has always stressed the idea that unemployment is only one aspect of the problem, so-called labour market "instability", and that might be a new determinant of the recent trends in fertility rates observed in many European countries.[5] However, attempts to isolate these different mechanisms or to identify the effects (or mere correlations) of labour market institutions that increase instability—such as temporary contracts, part-time work, flexible jobs, or job displacement—have been rather sporadics (De la Rica and Iza 2005; Gonzalez and Jurado-Guerrero 2006; Adsera 2011, Modena and Sabatini 2012; Vignoli et al. 2012; Del Bono et al. 2012, 2015).[6]

The contribution of this paper to the existing literature is twofold. First,

[4]See McDonald (2002) for an overview of the two main alternative theories of the *risk aversion theory* and of the *uncertainty reduction hypothesis* (Friedman et al.1994) under economic uncertainty.

[5]See Adserà (2005) for a study of the aggregate unemployment rates effects on fertility rates across European countries. Adserà and Menendez (2011) find that high aggregate unemployment may affect positively individual unemployment incidence, the risk of losing a job in the next future, and at the same time may reduce the likelihood of future wage growth. Del Bono et al. (2015) show that job displacement (and not simple unemployment) has a negative effect on fertility choices. See also Sobotka et al.(2011) for a recent review on the effects of recession on fertility.

[6]See Kohler and Kohler (2002), Ranjan (1999), Kreyenfeld (2010), Schimitt (2012) for studies trying to associate the fertility decline with general economic uncertainty; see Fiori et al. (2013) and Modena et al. (2014) to overview studies about economic insecurity effect on the fertility intentions in Italy.

I build *job instability* measure for both the partners by the lags of occupational transitions had in labour market to reconstruct their own recent occupational history (that encompasses job mobility, holding temporary or permanent contract, and being dismessed or unemployed), focusing specifically on childbirth of the active in the labour market couples. Second, I account for the unobserved effects, such as unobserved heterogeneity, feedback effects, and the possible presence of endogeneity due to reverse causality (Browning 1992). Only a few empirical studies have dealt with this issue (Auer et al. 2013; Modena and Sabatini 2012; Del Bono et al. 2015), but none was valid and proper for my data.[7] It may be that employed women with a short-term contracts may have disparate observed and unobserved characteristics, such as preference for children, individual abilities, and diversity in fecundity. Furthermore, there may be feedback effects, i. e. shocks in the fertility affecting the future transitions in the labour market. In addition, women with strong preferences for children (and with highest marginal utility of children) could decrease their own levels of education and their labour market attachment, and may choose stable job, but with lower earning profiles (Francesconi 2002). In order to account for the potential presence of endogeneity due to unobserved heterogeneity, causal reverse, and feedback effects, I estimate a First Difference Linear Probability Model under sequential moment restriction and I choose the lag of my variable of interest (the occupational transition as instrument of my potential endogenous variable (the occupational transition in first difference) to test to possible presence of endogeneity problem (Wooldridge 2010; Picchio and van Ours 2016).

My results show that, for women, moving to an open-ended contract from a short-term position encourages the childbearing, while the remaining in temporary contracts negatively and statistically affects it; furthermore this occupational status discourages it more than remaining in unemployment because of higher opportunity costs. For men, instead, finding a job boosts the choice of having an additional child, while the fall into unemployment depresses the fertility. In other words, in Italy is confirmed a gender different impacts of economic activity status of both partnerns on determining fertility decisions. Furthermore, the year 2010 presents a negative sign and statistical relevance, testing the economic recession might depress the probability of childbirth.[8]

[7]Modena and Sabatini (2012) use as instrument of job precariousness the share of precarious workers over the labour force in the Italian region of residence; the same one for Auer et al. (2013) but they add an specification of industry levels. Finally, also Del Bono et al.(2015), moving on to a IV approach, use as instrument for unemployment the interaction between firm closure and dummies for years, quarters, regions and industries.

[8]Sobotka et al. (2011; p. 6) argue: "*The recent recession is likely to have some*

For a policy perspective, this study is important because it finds new evidence that, in Italy, the labour market institutions with higher uncertainty about employment, low-paid jobs, and scarce career prospects (especially for women and young) can significantly depress the number of children.

The remaining structure of this paper is organized as follows: in section 2.2, I review the relationship between labour market outcomes and fertility, focusing on the job instability in Italy; in section 2.3, I describe the sample selection process and the data; in section 2.4, I explain the methodology; the main results and robustness checks are presented in section 2.5; the paper closes in section 2.6 with a conclusions and brief discussion on policy implications of the analysis.

depressing effects on childbearing and push period fertility rates that are often considered too low to a slightly lower level in many countries, especcially in 2010-2012."

2.2 Labour market outcome and fertility in Italian scenario

2.2.1 Couples, employment, and fertility

The new home economics (Becker 1981) claim that recent transformations in the tempo and quantum of family formation among the developed countries have come from the increased human capital and socioeconomic emancipation of women, which make the value of children more expensive, and provoke parents to trade quantity (fewer children) for quality (children with better health, more education, etc.).[9] Since both childbearing and rearing children are time-intensive, an increase in wage rates may be a cause of the negative substitution effect, that reduces the demand for children (Becker 1960; Willis 1973; Becker 1981). In this 'classic male breadwinner model' framework, higher earnings discourage women to have chilbirth by raising the opportunity cost of children. For men, the income effect tends to dominate because of their less time spent on rearing children, even if the magnitude of these effects vary across birth parity and country-specific institutional context (Willis 1973; Butz and Ward 1979; Ahn and Mira 2002).[10]

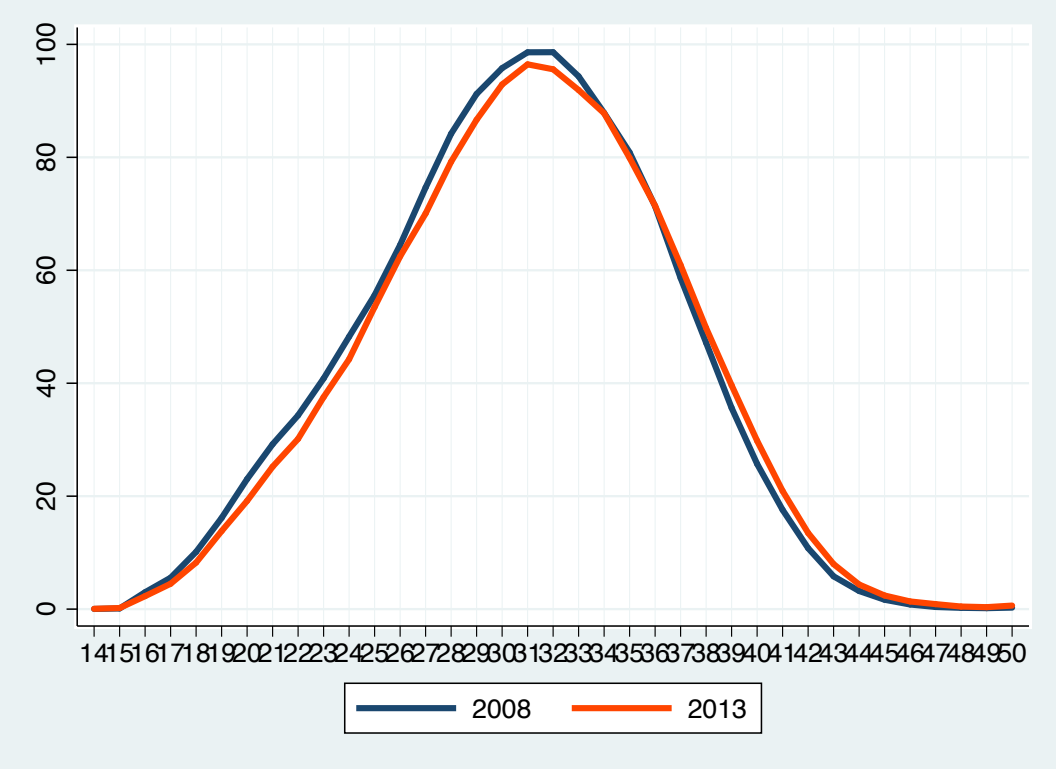
Over the past three decades, labour market institutions have been revised in countries to make it easier for women to conciliate career and family, causing a change in the relationship between labour market outcomes and fertility at the macro level. The correlation between FLFP and TFR, which was negative since the 1970s, turned positive at the end of the 1980s across OECD countries (Ahn and Mira, 2002; Billari and Kohler, 2004; Engelhardt and Prskawetz, 2004). The shift has been explained as resulting from the increasing availability of childcare services and part-time jobs, especially in Nordic countries (Del Boca and Locatelli 2006; Del Boca et al. 2009). Northern Italian regions are experiencing the same trend, even if they still lag behind the European average (Rondinelli and Zizza, 2011).

In Italy, the probability of a first child has remained almost stable (Dalla

[9]The concept of "child quality" synthesizes different factors of children's well-being, such as the time, effort, and money that parents devote to their care and development, their likelihood of not dropping out of school, and the level of parents' subjective well-being. Willis (1973), for example, defines child quality as a function of the resources parents devote to each child.

[10]The impact of women's labour market participation on fertility decisions may also depend on the availability of external childcare services (Ermisch, 1989). On the one hand, women with high earned income may have more children, because they are better able to pay these expenses, and, on the other hand, those with low income are less likely to be able to afford childcare services, but may still have higher fertility due to the lower opportunity cost of childbearing.

Figure 2.1 – Italian age-specific fertility rate - 2008 vs 2014 (Values per 1,000 women)



Source: Istat, Iscritti in anagrafe per nascita

Zuanna, 2004), so the emergence of 'lowest–low fertility' is related to a decrease in the progression to the second, third, and subsequent children. During the last economic recession, in Italy, the TFR has changed from 1.45 in 2008 to 1.39 in 2013 (Istat, Fertility Indicators). The Fig.2.1 shows that the age-specific fertility rate trends in 2008 and in 2013 and it records a progressive decreasing of fertility among the younger ages across the years.

The motivations of this drop in fertility may be found in significant changes in the dynamics of family formation. Mothers' average age at the first childbirth, which had been quite stable at around 25 for a long time, gradually raised to the current threshold of 30 (Istat 2016). In this study published by Istat in 2015, Italian women continue to show a strong desire for two children, but the effect of delaying on the first child affects the second parity (Bratti and Tatsiramos 2010) and it has caused the dramatic fall of the third order childbirth rate, that is moved from 0.36 for the mothers born in 1950 to 0.14 for ones born in 1970. Furthermore, in 2012 the main dissuasive factors in the decision to have another children remain economic

and age motivations, after reaching the desired number.

2.2.2 Job instability, gender, and fertility

The process of Italian labour market deregulation-segmentation could be presented by two institutional 'events': the first one in 1997 by the reform known as 'Treu Law' (L.196/1997), and the second one in the early 2000s by the 'Biagi Law' (L.30/2003). They have led to the origin of new types of flexible forms of contracts (temporary, part-time, linked to specific projects, etc.),[11] all of them far less protective for the worker than former with open-ended jobs (Barbieri 2011).

In Italy, the share of temporary jobs of total employment increased from 11.84% in 2004 to 13.21% in 2013. This share is widespread among the young workers (15-24 years old) by 29.2% in 2004 and 44.5% in 2013 (Istat, Labour Force Survey data). The Fig. 2.2 shows that, under a gender perspective, the shares are always higher for women across all the years.

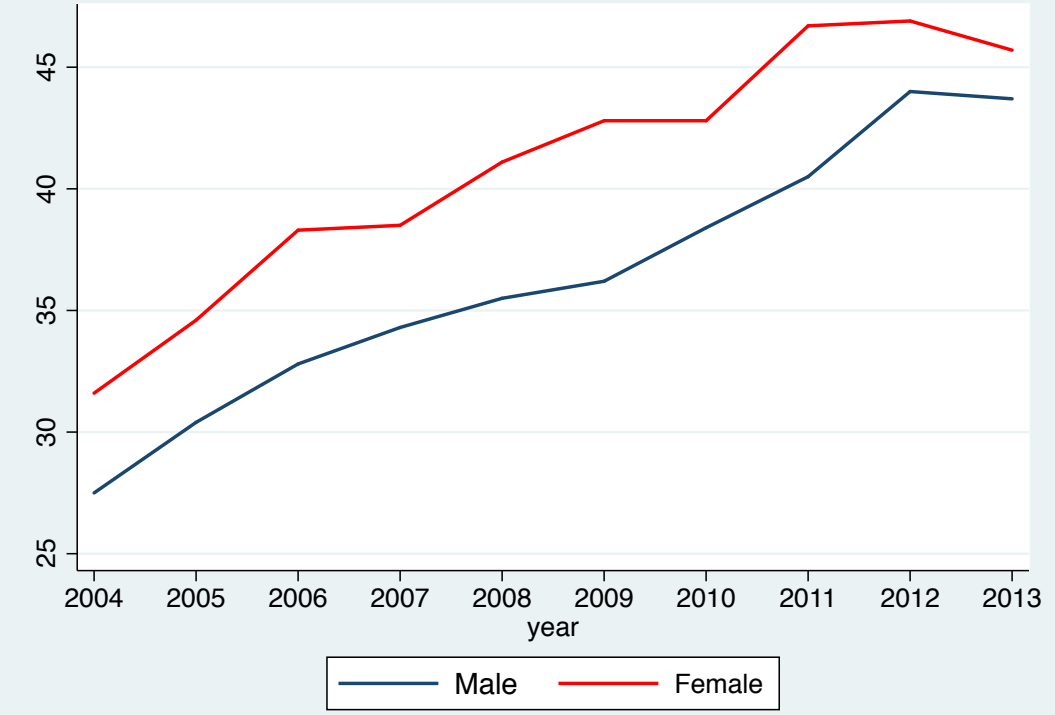
On the one hand, the literature regarding the transition from atypical contracts to permanent employment confirm the existence of 'stepping stone' effects: for instance, Picchio (2008) finds that holding a temporary position, rather than being unemployed, significantly increases from 13.5 to 16 percentage points the probability of moving two years later to a permanent contract. However, Picchio and Staffolani (2013) show that not all temporary contracts have the same effect: training contracts (apprenticeships) are better stepping stone than fixed-term contracts to a permanent job.

On the other hand, Boeri (2011) obtains evidence in Italy of a dual market presence: the insiders, who are hired permanently and enjoy a wide range of benefits, and the outsiders, who are hired on atypical contracts and face lower wages and reduced benefits. Picchio (2006) analyzes the wage effects of temporary jobs in Italy, and, taking into account individual and job specific unobservable components, estimates a wage penalty for temporary workers of approximately 12-13%. Also Tealdi (2010) confirms that the net earnings of permanent workers are approximately 20% higher compared the earnings of atypical workers.

Tealdi (2010) finds evidence that people who are more likely to be hired on atypical contracts are women, blue collars, and young, whose traditionally record high unemployment rates on the rise, as shown by the trend of Italian Youth Unemployment Rates: 22.2% in 2007, 26.6% in 2009, 31.1% in 2011, 42.5% in 2013, 40.7% in 2015 (Istat Labour Force Survey data). So, Italy also represents a propering case from a 'gender perspective': "flexible type"

[11] See Tealdi (2012) for an overview regarding the characteristics and the evolution of typical and atypical contracts in Italy.

Figure 2.2 – Percentage of temporary employees on total by gender (15-24 aged people, years 2004-2013)



Source: Istat, Labour Force Survey data

reforms have exacerbated the labour market gender inequality. The occupational gender gap, although dropping, is still relatively wide: in 2013, the female employment rate was 46.5%, compared to 64.7% for men. From 2004 to 2013 the average of the percentage of temporary employees by the total ones was 14.9% for women and 11.4% for men (Istat, Labour Force Survey data). Women are more likely to be trapped in job precariousness, and they are exposed to the risk of unemployment in the case of childbearing: in fact, in 2013, almost one working mother every four was no longer having a job two years after childbirth (22.7%; 18.4% in 2005; Bratti et al., 2005; Istat, 2015).

Overall, unemployment and temporary (in contrast to permanent) working contracts create employment uncertainties that tend to encumber family formation in contemporary Europe (Kohler and Kohler 2002; De la Rica and Iza 2005; Blossfeld et al. 2005; Becker et al. 2010; Scherer 2009; Modena and Sabatini 2012). Del Bono et al. (2012), using an instrumental variable approach, show that an unexpected career interruption reduces significally the number of children for women in Austria, especially in the case of women in white collar occupations. What remains interesting is if and how these job instabilities refer to male, female, or both employment career. Kreyenfeld (2010) argues that the effect of German women's employment on childbearing must be contextualized: "whether a woman whose position in the labour market is insecure will postpone childbirth varies according to whether she is expected to be a caregiver or household provider after childbirth." The job instability for women may be a stronger barrier to childbearing in patterns characterized by a pronounced insider-outsider divide, and in countries that lack safety nets and family policies aimed for reconciling motherhood and paid work. Furthermore, research on the potential impact of labour-market conditions on men's fertility normally starts from the (explicit or implicit) assumption that men are the main providers for a family. Oppenheimer (2003) argues that the deterioration of men's position in the labour market and the declining ability of men to serve as the family's single breadwinner are key factors for understanding the recent postponement of marriage and fertility. Under employment uncertainty, the male breadwinner model might not be an optimum solution, and both partners might prefer to be employed and invest in accumulating human and economic capital to reduce future adversity,[12] so reaching a stable job position could be a strategy to face employment uncertainty and grow the probability of childbearing.

[12]Cfr. the *risk adversion theory* in McDonald (2002).

2.3 Data

For the empirical analysis, I use the Italian survey of the EU-SILC dataset (European Statistics on Income and Living Condition), across the years 2004-2013: it collects detailed longitudinal information on the social and economic characteristics of individuals (respondents) and households. Each wave is representative of the whole Italian population and it drawns a sample of 5,500 households and of 11,750 respondents that are followed for four years using a rotational design in which a quarter of the sample changes every year.

First, I build the whole dataset combining all waves (each one of four years) of the longitudinal dataset from 2004 to 2013, and then I deleted the repetitions of the respondents appearing simultaneously in two or more waves. I am left with an unbalanced panel of 175,802 individuals for a total of 492,593 records. Second, I match all the women with their own partners (co-living), then, I continue the matching with their own child(ren), as they exist. In order to investigate the short-run effect of job instability on the couple's choice of having a (more) child(ren), I consider all women of childbearing age between 15 and 45 years old, living with the partner, and who are active in the labour market. After the application of these sample selection criteria, I am left with a panel of 18,102 individuals and 45,952 observations.[13].

I build job instability measure for both partners by the lags of occupational transitions had in labour market to reconstruct their own recent occupational history: for each year there are three different economic activity statuses (unemployed, temporary employee,[14] and permanent employee) and I construct all the nine possible occupational transitions with the lag of the economic activity status. I have to follow the units at least over three subsequent years due to because of the lack of the synchronicity that occurs between the getting pregnant (and the other lagged socio-economic covariates that influence the choice) and the childbirth event. The sample becomes of 2,779 individuals and 4,198 records when I include women who were first interviewed between 2004 and 2010 and re-interviewed at least for three sub-

[13]I choose to insert the both partners' socio-economic characteristics to avoid an overestimation of the negative effects of women's employment outcomes on fertility (Matysiak and Vignoli 2008)

[14]Eurostat, EU-SILC Description of Target Variables: "In the case of a work contract of limited duration the condition for its termination is generally mentioned in the contract. To be included in these groups are: person with a seasonal job, person engaged by an employment agency or business and hired out to a third party for the carrying out of a 'work mission' (unless there is a work contract of unlimited duration with the employment agency or business), person with specific training contracts but if there exists no objective criterion for the termination of a job or work contract these should be regarded as permanent or unlimited duration".

sequent years, while it consists of 1,451 individuals (and observations) when I consider all women who were first interviewed between 2004 and 2009 and followed for all four subsequent years. In the last sample 95 women have had a childbirth during the previous year and for physiological reasons they could not have another one in the period of analysis. So, I decide to drop out them to avoid underestimation of the probability of having aa addictional child. Finally, the sample consists of 1,356 women.

The main independent variables are dummies representing women's (men's) occupational transitions, recorded from time $t-1$ to $t-2$. We observe (Tab.2.1) that the 'permanent-permanent' women's (men's) transition amount to 78.4% (89.6%) of the sample. If we sum the other two transitions those end in the permanent job (respectively the 'temporary-permanent' and 'unemployed-permanent'), we find that at time $t-1$ the shares of stable employees of total ones are 83.4% for women and 92.1% for men and they are not very different to the Italian shares of temporary employees on total ones (the average percentages from 2004 to 2013 are 85.07% for women and 88.59% for men).[15]

Table 2.1: Transitions in economic activity status

Variable	Relative frequencies	Std. Dev.
Women's Transitions:		
$perm_{t-2} \longrightarrow perm_{t-1}$	0.784	0.411
$temp_{t-2} \longrightarrow perm_{t-1}$	0.039	0.194
$unempl_{t-2} \longrightarrow perm_{t-1}$	0.011	0.101
$unempl_{t-2} \longrightarrow temp_{t-1}$	0.014	0.117
$temp_{t-2} \longrightarrow temp_{t-1}$	0.075	0.264
$perm_{t-2} \longrightarrow temp_{t-1}$	0.024	0.154
$perm_{t-2} \longrightarrow unempl_{t-1}$	0.011	0.104
$temp_{t-2} \longrightarrow unempl_{t-1}$	0.010	0.094
$unempl_{t-2} \longrightarrow unempl_{t-1}$	0.032	0.177
Partners' Transitions:		
$perm_{t-2} \longrightarrow perm_{t-1}$	0.896	0.315
$temp_{t-2} \longrightarrow perm_{t-1}$	0.021	0.145
$unempl_{t-2} \longrightarrow perm_{t-1}$	0.004	0.066
$unempl_{t-2} \longrightarrow temp_{t-1}$	0.006	0.076
$temp_{t-2} \longrightarrow temp_{t-1}$	0.023	0.149
$perm_{t-2} \longrightarrow temp_{t-1}$	0.018	0.114

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[15] Istat, Labour Force Survey data.

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Variable	Relative frequencies	Std. Dev.
$perm_{t-2} \longrightarrow unempl_{t-1}$	0.009	0.081
$temp_{t-2} \longrightarrow unempl_{t-1}$	0.003	0.054
$unempl_{t-2} \longrightarrow unempl_{t-1}$	0.020	0.139
N^o of observations	1356	

Source: Own calculation from Italian dataset of EU-SILC 2004-2013.

Descriptive statistics are reported in Table 2.2. The dependent variable is the dummy Fertility that represents the event of "Having an addictional child" at time t: 6.5% of the couple records they had. The other control variables for couple's characteristics are age, marital status, number of children, presence of young children (0-5 aged) in the family, health status, level of education, job-skills, household (and female) disposable income, and geographical area of residence.

Table 2.2: Summary statistics

Variable	Mean	Std. Dev.
Fertility	0.065	0.246
Marital status:		
- Married couples	0.916	0.278
- More uxorio couples	0.084	0.278
N^o Child(ren)	1.412	0.895
Child(ren) under 5 years old	0.304	0.46
Age	38.979	4.576
Partner's Age	42.22	5.698
$HealthStatus_{t-1}$:		
- Good	0.835	0.371
- Fair	0.150	0.356
- Bad	0.016	0.124
$Partner'sHealthStatus_{t-1}$:		
- Good	0.839	0.367
- Fair	0.143	0.35
- Bad	0.018	0.132
Macro Regions:		

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Variable	Mean	Std. Dev.
- North West	0.259	0.438
- North East	0.335	0.472
- Centre	0.239	0.426
- South	0.121	0.327
- Islands	0.046	0.209
Household Disposable Income Classes:		
- Low Income	0.172	0.378
- Lower-Middle Income	0.606	0.489
- Upper-Middle Income	0.176	0.381
- High Income	0.045	0.207
Education:		
- Intermidiate Secondary	0.255	0.436
- Higher Secondary	0.554	0.497
- University or more	0.191	0.393
Partner's Education:		
- Intermidiate Secondary	0.384	0.487
- Higher Secondary	0.483	0.5
- University or more	0.133	0.339
$JobSkill_{t-1}$:		
- High Skilled White Collar	0.391	0.488
- Low Skilled White Collar	0.338	0.473
- High Skilled Blue Collar	0.068	0.251
- Low Skilled Blue Collar	0.152	0.359
- Unemployed	0.052	0.223
$Partner's JobSkill_{t-1}$:		
- High Skilled White Collar	0.341	0.474
- Low Skilled White Collar	0.225	0.418
- High Skilled Blue Collar	0.198	0.399
- Low Skilled Blue Collar	0.204	0.403
- Unemployed	0.032	0.175
N^o of observations	1356	

Source: Own calculation from Italian dataset of EU-SILC 2004-2013.

The average age is 38 for women and 42 for men, the average numbers of children is 1.41 (very similar to the Italian TFR), and 30.4% of the sample have the presence of children of which one at least is 0 – 5 years old.[16]

[16]See the Table 2.6 Number of child(ren) by woman age cohorts in Appendix

The marital status of all sample is in consensual union: the 91.6% with a legal basis, and the rest 8.4% has a consensual union without legal basis. We cannot account for couples' union duration because this information is not available in EU-SILC data. The age of the woman is coded into five cohorts: up to 25, 26-30, 31-35, 36-40, and 41-45.

In the dataset, the health status of each partner is broken down into five categories (very good, good, fair, bad, and very bad) and I sort them in three classes, such as good, fair, and bad.[17]

The women's and the partner's education are grouped into three categories, consistent with the International Standard Classification of Education (ISCED). The lowest category corresponds to lower secondary school, primary school, or lower education. In the intermediate level we find people who received upper secondary education or post-secondary, but non-tertiary, education. Individuals with tertiary education are assigned to the highest category.

The geographical area of residence is broken down into five macro regions (NUTS1): North West, North East, Central, South, and the Islands.

The women's and the partners' economic conditions are described through six variables, reflecting their gross and disposable income in the reference period (January 1st to December 31st of the previous year). The indicator used for household income is the sum of various types of income sources of the family components, such as employee cash income, non cash income (e.g., company car and associated costs, free or subsidised meals), and social transfers after tax. I build the household disposable income, after the subtraction of the female net income, so I create four classes of income: low income (less than 30,000 euro per year), lower-middle income (between 30,000 and 50,000), upper-middle income (between 50,000 and 75,000), and high income (more than 75,000). I repeat the building of classes of only the female income dividing the values of the groups by the half.

Furthermore, the EU-SILC regulation refers to the classification ISCO-88 until 2010 and the classification ISCO-08 from 2011 (both in 2 digits) to describe labour information on current activity status and current main job, including information on last main job for previously active people. I merged the two classifications in order to build an unique one at 1 digit. I sort the

to have informations about the distribution of number of children among the women age cohorts.

[17]For women I could choose the two-years lagged information to prevent that an hypothetical pregnancy could affect the health condition. But, in order to account for possible presence of endogeneity between job instability and fertility using $Trans(\cdot)_{it-2}$ as instrument for $\Delta Trans(cdot)_{it-1}$ to consistently estimate, I choose to control for all one-year lagged covariates.

types of occupation in five groups: high skilled white collar, low skilled white collar, high skilled blue collar, low skilled blue collar, and unemployed (for the persons who are seeking their first job). This job-skill variable is refered to the previous year.

2.4 Methodological framework

I model chidbearing as a binary choice. The dependent variable y may only take the values 1 and 0, which indicate whether the women had a child in the last year or not. At the first step, the conditional probability that y_{it} is equal to 1 is specified, for $t = 1, ..., T$ and $i = 1, ..., N$, as follows

$$\begin{aligned} P(y_{it} = 1|Trans_{it-1}, X_{it-1}, Z_i, c_i) = \\ = E(y_{it}|Trans_{it-1}, X_{it-1}, Z_i, c_i) = \\ = Trans(w)'_{it-1}\beta_1 + Trans(p)'_{it-1}\beta_2 + X'_{it-1}\delta + Z'_i\gamma + c_i, \quad (2.1) \end{aligned}$$

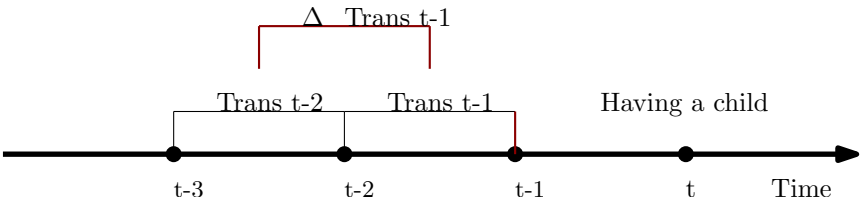
where $Trans(w)_{it-1}$ and $Trans(p)_{it-1}$ are my interest variables and each one, respectively of the woman and of her partner, is a vector 9×1 concerning the time-varying dummy variables related to the nine possible occupational transitions in labour market (Tab.2.1) in base on all the possible combinations between the three activity status such as unemployed, employed with a temporary contract, and employed with a permanent contract. X_{it-1} is a vector of time-varying control variables of the woman and her partner, such as job-skill levels, class of disposable income, health status, and age cohorts. Z_i corresponds to time-invarying control variables of the woman and her partner, such as education levels, macro regions, marital status, and number of children. Finally, c_i is unobserved heterogeneity. The model in Equation 2.1 is in the error equation form as

$$y_{it} = Trans(w)'_{it-1}\beta_1 + Trans(p)'_{it-1}\beta_2 + X'_{it-1}\delta + Z'_i\gamma + c_i + \varepsilon_{it}, \quad (2.2)$$

where ε_{it} is an idiosyncratic error term. The coefficients of interest are β_1 and β_2, which are the marginal effects of couples' occupational transition had in the previous year on the probability of having a child at time t. If c_i were not correlated to $Trans(\cdot)_i$,[18] where $Trans(\cdot)_i \equiv [Trans(\cdot)_{it}, Trans(\cdot)_{it-1}, Trans(\cdot)_{it-2}, ..., Trans(\cdot)_{i1}]$, and $Trans(\cdot)_i$ were strictly exogenous, i.e. $E(\varepsilon_{it}|Trans_i, X_i, Z_i) = 0$ for all $t = 1, ..., T-1$,

[18] By the $Trans(\cdot)_i$ I refer to the jointly occupational transitions of women and of partner.

Figure 2.3 – Time Line



then the Ordinary Least Square (OLS) estimator of Equation (2.2) would return unbiased and consistent estimates of β_1 and β_2 and would ignore the presence of c_i. However, the study of the association between female activity status in labour market, especially precarious status, and fertility may be driven by several unobserved factors. First, employed women with a short-term contracts are not a random sample of population, and it may be a problem of selection bias: in fact, they may have disparate observed and unobserved characteristics, such as preference for children, individual abilities, and diversity in fecundity. If $Cov(Trans(\cdot)_i, c_i) \neq 0$, I cannot consistently estimate Equation (2.2) by OLS simply ignoring c_i. Second, there may be feedback effects, i. e. shocks in the fertility affecting the future transitions in the labour market. For instance, couples with a positive transitory shock in the probability of childbirth might have a different behaviour (also by gender) in future career paths, in accumulating human capital, and, thereby, in job stability choices. In addition, the analysis of this phenomenon may lead to be a problem of 'reverse causality': women with strong preferences for children (and with highest marginal utility of children) could decrease their own levels of education and their labour market attachment, and may choose stable job, but with lower earning profiles (Francesconi 2002).

To solve the unobserved heterogeneity problem I take the first difference of both sides of Equation (2.2), so I get rid of the fixed effects c_i (and Z_i that corresponds to time-invarying control variables of the woman and her partner), as following:

$$\Delta y_{it} = \Delta Trans(w)'_{it-1}\beta_1 + \Delta Trans(p)'_{it-1}\beta_2 + \Delta X'_{it-1}\delta + \Delta\varepsilon_{it}. \qquad (2.3)$$

$\Delta Trans(\cdot)_{it-1} = Trans(\cdot)_{it-1} - Trans(\cdot)_{it-2}$ becomes the first difference of each of the nine occupational transitions had from time $t-2$ to time $t-1$ for both partners; their values are -1 or 1 whether it recorded a change of type of contract or unemployment status and 0 otherwise.

Under the strict exogeneity assumpion, the OLS estimator produces unbiased estimates of the coefficients in Equation (2.3). However, as mentioned earlier, the possible presence of feedback effects from y_{it} to $Trans(\cdot)_{ir}$ with $r \geqslant t$[19] (i.e. shocks in the fertility affecting the future transitions in the labour market) would fail the strict exogeneity assumption. I relax this assumption and replace it by the sequential moment restriction (Chamberlain 1992): $E(y_{it}|Trans(\cdot)_{it-1}, Trans(\cdot)_{it-2}, ..., Trans(\cdot)_{i1}, X_{it-1}, Z_i, c_i) = 0$ for all $t = 1, ..., T$. So, I allow correlation between ε_{it} and the current and future occupational transitions $(Trans(\cdot)_t, Trans(\cdot)_{t+1}, ..., Trans(\cdot)_{t+T})$: in other words, I assume that once I condition on $(Trans_{it-1}, X_{it-1}, Z_i, c_i)$, an event of childbirth at time t does not affect the probability of occupational transitions recorded from time $t-3$ to time $t-2$ (Wooldridge 2010; Picchio and van Ours 2016).

Henceforth, under the sequential moment restriction, the longitudinal dimension of the panel provides available instruments to take into account the potential endogeneity of $\Delta Trans(\cdot)_{it-1}$ in Equation (2.3) because of feedback effects: the lag of my indipentent variable of interest $Trans(\cdot)_{it-2}$ [20] is not correlated to $\Delta\varepsilon_{it}$ and it is a strong predictor of $\Delta Trans(\cdot)_{it-1}$ by construction. So, I use the Two Stage Least Square (2SLS) estimator with $Trans(\cdot)_{it-2}$ as instrument for $\Delta Trans(\cdot)_{it-1}$ to consistently estimate Equation (2.3) in presence of endogeneity.

[19] In this case, the equivalence is valid because of lack of temporal synchronicity between the the getting pregnant (and the other lagged occupational transitions that affect the fertility choice) and the childbirth.

[20] See in Appendix the Table (2.7) where Transitions in economic activity status from time $t-3$ to time $t-2$ are reperted in percentage values and used as instruments for the estimation.

2.5 Main results and robustness checks

2.5.1 Main results

Table 2.3 reports the estimation results in level and in first-differences of the Linear Probability Model in Equation (2.1) with the type of occupational transitions recorded in the labour market by both partners as the measure of job instability. The First Differences OLS is more advisable than the other two models for several reasons. The first one is because the First Differences OLS does not ignore the presence of unobserve heterogeniety as compared to the Levels OLS. The second one is because I can account for the possible presence of endogeneity of $\Delta Trans(\cdot)_{it-1}$ in First-Difference 2SLS model. An Hausman test is used and it fails to reject absence of endogeneity (F(16, 1355) = 0.86; p-value = 0.5489), while the instruments are correlated with the regressors but not perfectly strongs. Kleibergen-Paap Wald rk F statistic is by 9.121, thus, it is not larger than the rule of thumb level of 10. In First-Difference 2SLS model, the findings as causal effects must be interpreted with caution.

I estimate the effects of job instability (with respect to workers in job stability) on childbirth for both the partners in order to avoid to produce an overestimations due to lack of partnern's characteristics (Matysiak and Vignoli 2008) and because I might expect different 'gender' behaviours (in terms of signs, magnitude, and statistical relevance) of these occupational transitions (*ceteris paribus*).

Table 2.3: Estimation results of the model for fertility in levels and first differences

	Levels OLS			First-difference OLS			First-difference 2SLS, instruments T_{it-2}	
Fertility	Coeff.		Robust S.E.	Coeff.		Robust S.E.	Coeff.	Robust S.E.
Woman's transitions - Reference: $perm_{t-2} - perm_{t-1}$								
$temp_{t-2} - perm_{t-1}$	-0.025		0.0156	0.017	***	0.0055	0.098	0.0930
$unempl_{t-2} - perm_{t-1}$	0.004		0.0505	-0.007		0.0185	-0.074	0.1036
$unempl_{t-2} - temp_{t-1}$	-0.057	**	0.0243	0.012		0.0112	0.009	0.0869
$temp_{t-2} - temp_{t-1}$	-0.001		0.0141	-0.158	*	0.0817	-0.206	0.2836
$perm_{t-2} - temp_{t-1}$	0.014		0.0309	-0.002		0.0098	0.029	0.2089
$perm_{t-2} - unempl_{t-1}$	-0.017		0.0527	0.012		0.0147	-0.244	0.2977
$temp_{t-2} - unempl_{t-1}$	-0.037		0.0516	0.003		0.0306	0.362	0.4493
$unempl_{t-2} - unempl_{t-1}$	-0.048		0.0418	-0.031	***	0.0088	-0.052	0.1440
Partner's transitions - Reference: $perm_{t-2} - perm_{t-1}$								
$temp_{t-2} - perm_{t-1}$	-0.015		0.0104	-0.003		0.0172	0.096	0.1021
$unempl_{t-2} - perm_{t-1}$	-0.007		0.0111	0.024	***	0.0091	0.188	0.1758
$unempl_{t-2} - temp_{t-1}$	0.014		0.0153	0.013	***	0.0049	-0.080	0.1996
$temp_{t-2} - temp_{t-1}$	-0.010	***	0.0037	0.016		0.0205	-0.500	0.6054
$perm_{t-2} - temp_{t-1}$	-0.001		0.0052	-0.002		0.0130	0.127	0.2243
$perm_{t-2} - unempl_{t-1}$	-0.024		0.0222	0.006		0.0154	0.112	0.2760
$temp_{t-2} - unempl_{t-1}$	-0.007		0.0208	-0.021	***	0.0080	-0.591	0.9023
$unempl_{t-2} - unempl_{t-1}$	-0.015		0.0167	0.034		0.0710	0.188	0.3730
Woman's Job Skills - Reference: Unemployed								
High skilled white collar	-0.025		0.0391	-0.011		0.0300	-0.035	0.0419
Low skilled white collar	-0.017		0.0391	-0.068		0.0425	-0.105	0.0656
High skilled blue collar	-0.008		0.0413	-0.012		0.0747	-0.001	0.0795

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	Levels OLS			First-difference OLS			First-difference 2SLS, instrument T_{it-2}		
Fertility	Coeff.		Robust S.E.	Coeff.		Robust S.E.	Coeff.		Robust S.E.
Low skilled blue collar	-0.014		0.0396	-0.033	*	0.0179	-0.043		0.0289
Partner's Job Skills - Reference: Unemployed									
High skilled white collar	-0.155		0.1482	-0.014		0.0247	-0.009		0.0341
Low skilled white collar	-0.150		0.1484	0.008		0.0101	-0.039		0.0598
High skilled blue collar	-0.150		0.1489	-0.000		0.0205	0.058		0.0889
Low skilled blue collar	-0.153		0.1488	0.019		0.0410	0.001		0.0592
Woman's Age Cohorts - Reference: 15-25 age									
26-30 age	-0.029		0.0527	-0.023		0.0289	-0.020		0.2792
31-35 age	-0.094	*	0.0528	0.074		0.0617	0.166	*	0.0958
36-40 age	-0.135	*	0.0549	0.008		0.0328	0.038		0.0604
41-45 age	-0.151	**	0.0560	-0.026		0.0208	-0.001		0.0535
Woman's Health - Reference: Good									
Fair	0.004		0.0102	-0.033	*	0.0200	0.042		0.0946
Bad	0.006		0.0295	-0.020		0.0392	0.032		0.0622
Partner's Health - Reference: Good									
Fair	-0.012		0.0108	-0.013		0.0259	0.049		0.0787
Bad	-0.001		0.0302	0.012		0.0419	-0.024		0.0841
Household Disposable Income (with Transfers) - Reference: Low income/1000									
Lower-mid income/1000	-0.006		0.0118	0.031	**	0.0146	0.018		0.0317
Upper-mid income/1000	-0.008		0.0149	0.017		0.0221	0.016		0.0383
High income/1000	-0.042	**	0.0183	-0.018		0.0227	-0.001		0.0424
Number of children	0.011	**	0.0046	–		–	–		–
Presence of 0-5 aged child	0.114	***	0.0093	–		–	–		–

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	Levels OLS		First-difference OLS		First-difference 2SLS, instrument T_{it-2}	
Fertility	Coeff.	Robust S.E.	Coeff.	Robust S.E.	Coeff.	Robust S.E.
Marital status - Reference: Married						
More uxorio union	0.007	0.0140	–	–	–	–
Woman's Education - Reference: Primary and lower secondary						
Upper secondary	-0.004	0.0102	–	–	–	–
University and more	0.015	0.0154	–	–	–	–
Partner's Education - Reference: Primary and lower secondary						
Upper secondary	0.005	0.0089	–	–	–	–
University and more	0.013	0.0154	–	–	–	–
Macro regions (NUTS1) - Reference: North West						
North East	-0.003	0.0099	–	–	–	–
Central	0.002	0.0116	–	–	–	–
South	0.033	0.0229	–	–	–	–
Islands	0.028	0.0241	–	–	–	–
Year's dummies - Reference: 2007						
2006	-0.001	0.0138	–	–	–	–
2008	-0.023	0.0150	0.001	0.0229	0.039	0.0672
2009	-0.018	0.0139	0.019	0.0246	0.095	0.1049
2010	-0.041 ***	0.0126	-0.040 **	0.0195	-0.004	0.0524
2011	0.025	0.0168	0.027	0.0266	0.047	0.0628
2012	0.019	0.0182	0.042	0.0304	0.081	0.0827
2013	-0.025 *	0.0149	-0.031	0.0242	-0.056	0.0649
Δgdp	0.078	0.4995	0.127	0.4447	0.166	0.5004

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	Levels OLS		First-difference OLS		First-difference 2SLS, instrument T_{it-2}	
Fertility	Coeff.	Robust S.E.	Coeff.	Robust S.E.	Coeff.	Robust S.E.
Constant	0.342 **	0.1652	0.062 ***	0.0226	0.053	0.0505
# of observations NT (N)	4198(2778)		(1356)		(1356)	
R2	0.1280		0.0367		–	
Hausman Test of endogeneity	–		–		F(18,1355) = 0.87	
	–		–		p-value = 0.5393	
Weak identification test (cluster robust):						
Kleibergen-Paap Wald rk F statistic	–		–		9.121	

Notes: * Significant at 10%; ** Significant at 5%; *** Significant at 1%.The standard errors are robust to heteroskedasticity and within-individual correlations. "First-difference" refers to the model in which I use the first differences of T_{it-1} to avoid the unobserved heterogeneity. "2SLS, instruments T_{it-2}" refers to the model in which I use the 2SLS estimator with T_{it-2} as valid instruments for ΔT_{it-1} to test the presence of endogeneity.

Source: Own estimations from Italian dataset of EU-SILC 2004-2013.

In general terms, recording previous events of unemployment and precarious employment for women are found to strongly affect childbearing, but with different impacts in sign and magnitude. In particular, with respect to couples with permanently employed women during the two preceding years (which is the refering category), for women, moving to an open-ended contract from a short-term position encourages the childbearing by 1.7 percentage points. There is an increase of opportunity-cost of childbearing but it seems to be crowded out by the positive income effect and the raising of economic stability. Reamining in temporary jobs represses negatively and statistical significantly the probability of chilbearing by 15.8 percentage points, while the reaming in unemployment discourages it (- 3.1 percentage points) less than reamining in precariousness. This is might be explained by a lower opportunity-cost. In fact, more female workers with atypical than short-term contracts cannot enjoy any form of sick leave or parental benefits (like the permanent ones), and pregnancy could become a risk of job displacement. As argued by Modena and Sabatini (2012), the job loss possibly because of childbearing may doom the women to have further consequences on the financial conditions and well-being of the parent, and it may lead them into a 'precariousness trap'.

For men, instead, in respect to holding a stable job position, finding a job boosts the choice of having a (more) child(ren), respectively by 2.4 percentage points moving to permanet contracts and 1.3 points moving to a temporary positions.The reason is always the crowding out of the positive income effect on the higher opportunity cost of childbearing, but for men the increase of economic stability is statistical significant also for the transition from unemployed to temporary worker. So, under a 'gender perspective', it seems that precarousness and the effect known as 'precariousness trap' impact more on female careers than on male ones. Moreover, for men the coefficient of reamining in temporary employment is negative but not statistical significant, even if the uncertainty linked to job loss possibility and 'unemployment trap' discuorage the childbirth: in fact, the fall in unemployment from a precarious positions depresses the fertility of 2.1 percentage points *ceteris paribus*.

As expected, increasing levels of household disposable income (at net of woman's earning) boosts childbearing, so as the good woman health status. The woman age coefficients present the expected signs, but they do not show statistically significance. Furthermore, as far as the women's occupational skills is concerned, we can observe that low-skilled blue collar workers affects negatively and significantly the having another child by 3.3 percentage points. On the contrary to what Auer and Danzer (2015) find using German data, in Italy having a woman working in a low-skilled rather than not working at all discourages fertility because of labour market penalties (in terms of wage

and career breaking) for mothers (Pacelli et al. 2013), overall for those lower qualified.

As argue Sobotka et al. (2010), the year's dummies reflect a wide depression on the probability to the childbirth during the 2010 by 4.0 percentage points: it is connected to the recent recession that has observed in Italy an increase of unemployent rate by 1.7% from 2007 to 2009 and even more of youth unemployment one rises from 20.3% in 2007 to 25.4% in 2009 (Istat, Labour Force Survey data), while the variation of gdp per capita shows a positive but not statistically significant impact.

2.5.2 Heterogeneous effects analysis

Using Equation (2.3), the fixed effects c_i and all the time-invarying control variables of the woman and her partner Z_i are removed from the regressors, especially the number of children who live in the family. This control might be interesting for my estimations because I expect heterogeniuos effects on fertility across families with different household compositions, in particular, in terms of job instability of active women who (more than partners) face the reconciliation work-life balance overall during the years of preschooler children when the time devoted to childcare is greater. So, I decide to distinguish the sample across other two different dimentions: women with or without at least one child in Model (1) and women with or without 0-5 aged child(ren) in Model(2). For each of both classifications I build two dummy variables: the first one is one respectively whether in the family there is the presence of at least one child and whether there is at least a 0-5 aged child, the second one is one otherwise. I include in the previuos model introducing the interactions between the two dummies and the first difference indipendent variable $\Delta Trans(\cdot)_{it-1}$.

In the Table 2.4 the Model (1) interacts two dummies with the woman's occupational transitions, such as being childless and having children, while the Model (2) interacts two dummies, such as not having 0-5 aged child(ren) and having 0-5 aged child(ren).

Table 2.4: Estimation results of the model for fertility controlling for heterogeneous effects in first differences

Fertility	(1) Coeff (S.E.)	(2) Coeff (S.E.)
Woman's transitions - Reference: $perm_{t-2} - perm_{t-1}$ (without presence of child(ren))		
$temp_{t-2} - perm_{t-1}$	0.026***	0.021***
	(0.0086)	(0.0049)
$unempl_{t-2} - perm_{t-1}$	-0.070	0.006
	(0.0609)	(0.0168)
$unempl_{t-2} - temp_{t-1}$	-0.050	0.020***
	(0.0728)	(0.0074)
$temp_{t-2} - temp_{t-1}$	-0.092***	-0.042
	(0.0207)	(0.0301)
$perm_{t-2} - temp_{t-1}$	-0.023**	-0.018***
	(0.0114)	(0.0037)
$perm_{t-2} - unempl_{t-1}$	-0.009***	-0.009***
	(0.0030)	(0.0033)
$temp_{t-2} - unempl_{t-1}$	-0.050**	0.014
	(0.0224)	(0.0409)
$unempl_{t-2} - unempl_{t-1}$	-0.035**	-0.033**
	(0.0162)	(0.0137)
Woman's transitions - Reference: $perm_{t-2} - perm_{t-1}$ (with presence of child(ren))		
$temp_{t-2} - perm_{t-1}$	0.014**	0.004
	(0.0064)	(0.0143)
$unempl_{t-2} - perm_{t-1}$	0.006	-0.037
	(0.0134)	(0.0407)
$unempl_{t-2} - temp_{t-1}$	0.022***	0.004
	(0.0070)	(0.0202)
$temp_{t-2} - temp_{t-1}$	-0.161*	-0.312*
	(0.0873)	(0.1656)
$perm_{t-2} - temp_{t-1}$	0.000	0.023
	(0.0110)	(0.0234)
$perm_{t-2} - unempl_{t-1}$	0.015	0.045
	(0.0172)	(0.0332)
$temp_{t-2} - unempl_{t-1}$	0.010	-0.022 ***
	(0.0342)	(0.0057)

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Fertility	(1) Coeff (S.E.)	(2) Coeff (S.E.)
$unempl_{t-2} - unempl_{t-1}$	-0.029***	-0.028***
	(0.0102)	(0.0097)
Partner's transitions - Reference: $perm_{t-2} - perm_{t-1}$		
$temp_{t-2} - perm_{t-1}$	-0.003	-0.001
	(0.0173)	(0.0180)
$unempl_{t-2} - perm_{t-1}$	0.022***	0.022***
	(0.0073)	(0.0080)
$unempl_{t-2} - temp_{t-1}$	0.012**	0.012**
	(0.0053)	(0.0051)
$temp_{t-2} - temp_{t-1}$	0.033	0.014
	(0.0333)	(0.0195)
$perm_{t-2} - temp_{t-1}$	-0.001	-0.002
	(0.0132)	(0.0132)
$perm_{t-2} - unempl_{t-1}$	0.005	0.008
	(0.0156)	(0.0156)
$temp_{t-2} - unempl_{t-1}$	-0.020***	-0.013
	(0.0070)	(0.0103)
$unempl_{t-2} - unempl_{t-1}$	0.034	0.028
	(0.0710)	(0.0608)
Woman's Job Skills - Reference: Unemployed		
High skilled white collar	-0.003	-0.015
	(0.0324)	(0.0302)
Low skilled white collar	-0.075*	-0.072*
	(0.0420)	(0.0422)
High skilled blue collar	-0.024	-0.013
	(0.0636)	(0.0733)
Low skilled blue collar	-0.028	-0.032*
	(0.0186)	(0.0183)
Partner's Job Skills - Reference: Unemployed		
High skilled white collar	-0.014	-0.010
	(0.0248)	(0.0252)
Low skilled white collar	0.008	0.008
	(0.0104)	(0.0103)
High skilled blue collar	-0.002	0.010
	(0.0196)	(0.0231)
Low skilled blue collar	0.022	0.015

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Fertility	(1) Coeff (S.E.)	(2) Coeff (S.E.)
	(0.0414)	(0.0417)
Woman's Age Cohorts - Reference: 15-25 age		
26-30 age	-0.028	-0.032
	(0.0267)	(0.0281)
31-35 age	0.074	0.079
	(0.0626)	(0.0626)
36-40 age	0.010	0.004
	(0.0330)	(0.0335)
41-45 age	-0.028	-0.025
	(0.0209)	(0.0204)
Woman's Health - Reference: Good		
Fair	-0.033	-0.041**
	(0.0203)	(0.0201)
Bad	-0.018	-0.016
	(0.0397)	(0.0395)
Partner's Health - Reference: Good		
Fair	-0.012	-0.010
	(0.0259)	(0.0255)
Bad	0.015	0.016
	(0.0428)	(0.0434)
Household Disposable Income (with Transfers) - Reference: Low income/1000		
Lower-mid income/1000	0.032**	0.033**
	(0.0148)	(0.0145)
Upper-mid income/1000	0.017	0.015
	(0.0222)	(0.0225)
High income/1000	-0.018	-0.022
	(0.0227)	(0.0235)
Year's dummies - Reference: 2007		
2008	0.004	0.008
	(0.0279)	(0.0279)
2009	0.022	0.027
	(0.0408)	(0.0414)
2010	-0.037*	-0.037**
	(0.0206)	(0.0206)
2011	0.027	0.026
	(0.0282)	(0.0279)

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Fertility	(1) Coeff (S.E.)	(2) Coeff (S.E.)
2012	0.049	0.053
	(0.0364)	(0.0363)
2013	-0.032	-0.033
	(0.0252)	(0.0253)
Δgdp	0.082	0.133
	(0.4430)	(0.4499)
Constant	0.063***	0.061***
	(0.0227)	(0.0228)
# of observations N	1356	1356

Notes: * Significant at 10%; ** Significant at 5%; *** Significant at 1%.The standard errors are robust to heteroskedasticity and within-individual correlations. The Model (1) interacts two dummies, such as being childless and having children; the Model (2) interacts two dummies, such as not having 0-5 aged child(ren) and having 0-5 aged child(ren).

Source: Own estimations from Italian dataset of EU-SILC 2004-2013.

In general terms, most of previuos findings are in line with those of benchmark model but an heterogeneous effect emerges among the women depending on the presence or not of child(ren) and of young child(ren). In particular, as far as the occupational transitions of women without the children are concerned, Model (1) shows that worsening their job positions in terms of stability discourages negatively the choice of motherhood: in fact, falling in unemployment and moving on a temporary contract from an open-ended job affect negatively the childbirth and becomes statistically significant. In Model (2), instead, just losing a permanent job depresses significantly women's fertility choice without young children. The reasons could be linked with the aspect that for women without young children (but not children in absolute) the losing a stable job worsens the future financial conditions and it could yield a negative income effect on chilbearing; as for childless women this aspect is true but it is also linked with an increase of instability (and uncertainty forward the future), therefore previous states in temporary job have negative impacts with significant relevance. In other words, the job instability affects negatively the choice of motherhood and the choice to become mother is conditional to reach a stable work position. Furthermore, in both models remaining in unemployment affects negatively childbearing as well as this

effect comes out by the benchmark model and with a similar magnitude; this is always because of 'unemployment trap'.

As far as the presence of children in the family is concerned, moving from unemployment to temporary job becomes positive and statistically significant, while the other effects are similar to the refering model. So, for mothers just a short-run improvement of future financial conditions boosts having a more child (positive income effect). In Model (2), instead, for women with at least a 0-5 aged child, remaining in temporary job has a negative and larger in magnitude effect than the impact estimated by the benchmark model and falling into unemployment from a temporary job becomes negative and statistically significant. In other words, for mothers with young child(ren) the worries to remain into the 'precariousness trap' and also into the 'unemployment trap' are noteworthy and larger than the dropping of oppurtunity-cost of another child.

2.5.3 Robustness analysis

In this section, the robustness of effects of the job instability (linked to the type of occupational transitions recorded in the labour market) on childbearing are assessed by several addictions of control covarietes, by changing others, and by building the sample (Tab. 2.5).

The first robustness check (Model (3)) includes in the sample also inactive women in the labour force into the 'unemployed' category. I relax the sample selection criterion of only women with attachment to labour market and I enlarge it inserting voluntary inactive women (who could have an only preference for children) and involuntary ones (who exit the labour force as 'discouraged'). So, I expect a different behaviour of women from one of the benchmark model in regards to opportunity-cost measure.

Model (4) includes, among the covarietes, macro-level historical series of variation of gdp per capita and firm dead rate by Istat datasets, macro-level historical series of variation of average wage, female unemployment rate, and the historical serie of variation of share of temporary contracts of the total ones by cross-sectional EU-SILC datasets (from 2004 to 2012).[21] Adserà (2011) finds that high unempoloyment rates depress (and delay) childbearing, so I disaggregate the previous series into age cohorts, job-skills classes, and

[21]By the Istat - Labour Force Survey datasets, I extracted the historical series of firm dead rate and the variation of gdp per capita and they are merged by year t-1 and macro regions; by weighted cross-sectional EU-SILC dataset (from 2004 to 2012), I build the historical series of variation of average wage, female unemployment rate, and variation of share of temporary contracts of the total ones, combining with year t-1, macro regions, age cohorts, and job skill classes.

macro-regions to have a better verification of business cycle for the specific job characteristics of women than using the year's dummies.

Finally, Model (5) represents only the sample of the active women in the labour force under 40 years old because, on the one hand, ageing could represent an infertility aspect for women and, on the other hand, I would verify if the contribution to fertility choice of Italian 'older' women could underestimate the effects of job instability. In fact, Auer et al. (2013) point out to holdind a fixed-term contract has a positive association on the probability of entering in parenthood, when considering German women in their mid-career lives.

Table 2.5: Robusteness checks - First Differences Linear Probability Models

	(3)	(4)	(5)
Fertility	Coeff	Coeff	Coeff
	(S.E.)	(S.E.)	(S.E.)
Woman's transitions - Reference: $perm_{t-2} - perm_{t-1}$			
$temp_{t-2} - perm_{t-1}$	0.017***	0.017***	0.026***
	(0.0049)	(0.0060)	(0.0090)
$unempl_{t-2} - perm_{t-1}$	-0.005	-0.024	-0.002
	(0.0156)	(0.0227)	(0.0235)
$unempl_{t-2} - temp_{t-1}$	0.014*	0.009	0.016
	(0.0083)	(0.0104)	(0.0136)
$temp_{t-2} - temp_{t-1}$	-0.093	-0.162*	-0.165*
	(0.0731)	(0.0835)	(0.0860)
$perm_{t-2} - temp_{t-1}$	-0.005	-0.002	-0.001
	(0.0102)	(0.0099)	(0.0135)
$perm_{t-2} - unempl_{t-1}$	0.013	0.033	0.018
	(0.0153)	(0.0298)	(0.0218)
$temp_{t-2} - unempl_{t-1}$	-0.003	0.033	-0.043***
	(0.0212)	(0.0609)	(0.0129)
$unempl_{t-2} - unempl_{t-1}$	-0.030***	-0.050**	-0.041***
	(0.0075)	(0.0211)	(0.0148)
Partner's transitions - Reference: $perm_{t-2} - perm_{t-1}$			
$temp_{t-2} - perm_{t-1}$	0.007	-0.002	-0.008
	(0.0174)	(0.0180)	(0.0248)
$unempl_{t-2} - perm_{t-1}$	-0.003	0.022***	0.033**
	(0.0118)	(0.0075)	(0.0162)
$unempl_{t-2} - temp_{t-1}$	0.149*	0.023***	0.020*
	(0.0786)	(0.0071)	(0.0111)
$temp_{t-2} - temp_{t-1}$	0.002	0.024	0.039
	(0.0065)	(0.0283)	(0.0362)

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Fertility	(3) Coeff (S.E.)	(4) Coeff (S.E.)	(5) Coeff (S.E.)
$perm_{t-2} - temp_{t-1}$	0.006	-0.001	-0.022***
	(0.0207)	(0.0143)	(0.0056)
$perm_{t-2} - unempl_{t-1}$	0.025**	0.005	-0.014
	(0.0116)	(0.0169)	(0.0111)
$temp_{t-2} - unempl_{t-1}$	-0.009	-0.015	-0.014**
	(0.0095)	(0.0137)	(0.0375)
$unempl_{t-2} - unempl_{t-1}$	-0.010***	0.023	0.065
	(0.0037)	(0.0586)	(0.1667)
Woman's Job Skills - Reference: Unemployed			
High skilled white collar	-0.030*	-0.033	-0.055
	(0.0176)	(0.0092)	(0.0341)
Low skilled white collar	-0.003	0.048	-0.027
	(0.0681)	(0.0676)	(0.1319)
High skilled blue collar	-0.060	0.035	-0.073
	(0.0374)	(0.0663)	(0.0559)
Low skilled blue collar	-0.011*	0.018***	-0.067
	(0.0256)	(0.0256)	(0.0649)
Partner's Job Skills - Reference: Unemployed			
High skilled white collar	0.022	0.033	-0.019
	(0.0408)	(0.0449)	(0.0269)
Low skilled white collar	-0.009	-0.001	-0.003*
	(0.0197)	(0.0247)	(0.0302)
High skilled blue collar	0.006	0.004	0.039
	(0.0092)	(0.0095)	(0.0215)
Low skilled blue collar	-0.015	-0.016	0.020
	(0.0248)	(0.0245)	(0.0216)
Woman's Age Cohorts - Reference: 15-25 age			
26-30 age	-0.065**	-0.050*	-0.034
	(0.0293)	(0.0293)	(0.0445)
31-35 age	0.068	0.067	0.048
	(0.0602)	(0.0658)	(0.0648)
36-40 age	0.006	0.014	-0.021
	(0.0308)	(0.0361)	(0.0347)
41-45 age	-0.024	-0.006	-
	(0.0207)	(0.0204)	-
Woman's Health - Reference: Good			

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Fertility	(3) Coeff (S.E.)	(4) Coeff (S.E.)	(5) Coeff (S.E.)
Fair	-0.032*	-0.036*	-0.059**
	(0.0182)	(0.0204)	(0.0258)
Bad	-0.020	-0.019	-0.081***
	(0.0305)	(0.0399)	(0.0202)
Partner's Health - Reference: Good			
Fair	-0.012	-0.011	-0.050
	(0.0250)	(0.0247)	(0.0387)
Bad	0.015	0.008	-0.024
	(0.0430)	(0.0433)	(0.0486)
Household Disposable Income (with Transfers) - Reference: Low income/1000			
Lower-mid income/1000	0.030**	0.028**	0.022
	(0.0141)	(0.0137)	(0.0189)
Upper-mid income/1000	0.025	0.023	0.019
	(0.0228)	(0.0225)	(0.0365)
High income/1000	-0.014	-0.012	-0.034
	(0.0234)	(0.0245)	(0.0413)
Year's dummies - Reference: 2007			
2008	-0.008	0.026	0.010
	(0.0284)	(0.0278)	(0.0448)
2009	-0.006	0.070*	0.040
	(0.0449)	(0.0412)	(0.0763)
2010	-0.046**	-0.040**	-0.046*
	(0.0209)	(0.0193)	(0.0306)
2011	0.022	0.038	0.063
	(0.0284)	(0.0271)	(0.0457)
2012	0.022	0.076**	0.093
	(0.0375)	(0.0369)	(0.0645)
2013	-0.010	-0.027	-0.025
	(0.0257)	(0.0249)	(0.0446)
Δ gdp	-0.273	0.521	0.201
	(0.5078)	(0.4588)	(0.8692)
Constant	0.064***	0.162**	0.088***
	(0.0176)	(0.0792)	(0.0376)
fdr	no	yes	no
awage	no	yes	no

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Fertility	(3) Coeff (S.E.)	(4) Coeff (S.E.)	(5) Coeff (S.E.)
fur	no	yes	no
Δ temp-contr	no	yes	no
# of observations N	1418	(1356)	(751)

Notes: * Significant at 10%; ** Significant at 5%; *** Significant at 1%.The standard errors are robust to heteroskedasticity and within-individual correlations. The Model (3) includes also inactive women in the labor force into the 'unemployed' category; the Model (4) includes between the covarietes historical series of variation of gdp per capita and firm dead rate by Istat datasets, the historical serie of variation of average wage, female unemployment rate, and the historical serie of variation of share of temporary contracts of the total ones by cross-sectional EU-SILC datasets (from 2004 to 2012); the Model (5) represents only the sample of the active women in the labor force under 40 years old.

Source: Own estimations from Italian dataset of EU-SILC 2004-2013.

In general, these estimations results are in line with those in benchmark model showing also some expected distinctive features. As far as Model (3) is concerned, it seems that for occupational transitions of active and inactive women in the labour market the discernment aspect is linked with having a contract or not: remaining in temporary job loses the statistical relevance, moving on a fixed-term contract from a state of vacancy becomes positive and statistically significant, while the other outcomes are confirmed.

Model (4) concerns the additions of macroeconomics characteristics among the covarietes to explain better the business cycle and it finds that for men the effect of moving to unemployment from temporary position is negative but loses statistically significance, while for women the coefficients of staying in unemployment and in temporary contracts are larger than the refering model. It seems to be confirmed that if we verify the economic conjuncture, the effect of job instability known as 'precariousness trap' and as 'unemployment trap' affect more on female careers than on male ones.

Finally, in Model (5) I restrict the sample for women under 40 years old: all the effects are confirmed and stronger. Moreover, the effect of reamining in unemployed and of coming from temporary job are negative and become statistically significant. This one validates the previous interpretation about the association between uncertainty and cost of child. In other words, the value of chilbearing become higher with the increasing of women's age (that could be linked to 'postponement effect').

2.6 Conclusions and policy implications

The empirical analysis of this study focus on Italy during the years of recent economic recession started in 2008, an interesting society with joint features, such as the 'lowest-low' TFR, a low FLFP, and a modest institutional support for working women. It adds new insights to the debate on job instability and fertility by supporting an alternative explanation of the couples' fertility choices: the job instability (that encompasses all the transitions of holding temporary or permanent contract, and being dismessed or unemployed) of female economic activity status is revealed as a significant and strong dissuasive factor against the decision to childbirth, especially for young couples.

Mainstreaming theoretical predictions according to which female participation in the labour market may be underlying cause of the drop in fertility are not supported by empirical results of this work. On the contrary, women are far from being encouraged to bear children when they remain in precarious job; even if they have a lower opportunity-cost of leaving the labour market than those with a permanent job, they are definitely less likely to plan to have children. Reamining in unemployement has a negative effect on childbearing because of the 'career break job penalty'.

On the contrary, men's job precariousness is not a deterrent discouraging the intention to become a (new) father: in fact, only to become unemployed (with the consequence of worsening the family financial condition), affects negatively on fertility.

In Nordic European countries, where more generous policies on parental arrangements and childcare assistance have been implemented, the negative association between participation and fertility has in fact been reversed. These studies suggest the creation of more part-time jobs and the improvement of childcare assistance as possible ways to fill the gap (Del Boca and Sauer 2009; Del Boca et al. 2009). I suggest that public actions aimed for raising fertility should also take into account targeted labour market policies. In the Italian labour market, flexibility essentially means "precariousness". Precarious workers have low-paid jobs with scarce career prospects. Temporary female workers are well aware that in most cases a pregnancy would be a reason for dismissal, possibly causing a worsening in the financial situation of the couple. The resulting trade-off between completed fertility intentions and employability may be incompatible.

The demographic consequences of this drop in the birthrate are doomed to become stronger because of growing of the share of precarious workers in the labour and of the ageing of the population. Italy should improve suitable gender equality and family friendly policies for the future to promote the rising of the participation (and occupation) to the labour market, in

particular for women and youngers, in order to reach the European targets to move toward a flexicurity model that guarantees for (economic) uncertainty due to job instability and reverses the lowest-low fertility trend.

2.7 Appendix

Table 2.6: Number of child(ren) by woman age cohorts - Percentage values

	Number of Child(ren)								
Age Classes	0	1	2	3	4	5	6	7	Total
15-25	42.86	42.86	14.29	0.00	0.00	0.00	0.00	0.00	100
26-30	32.81	50.00	15.62	1.56	0.00	0.00	0.00	0.00	100
31-35	30.04	41.63	24.89	3.00	0.43	0.00	0.00	0.00	100
36-40	16.29	35.49	42.41	5.13	0.67	0.00	0.00	0.00	100
41-45	9.75	30.25	47.77	10.25	1.82	0.00	0.00	0.17	100
Total	16.65	34.93	40.38	6.85	1.11	0.00	0.00	0.07	100

Source: Own calculation from Italian dataset of EU-SILC 2004-2013.

Table 2.7: Transitions in economic activity status

Variable	Absolute frequencies	Relative frequencies	Std. Dev.	Min	Max
Women's Transitions:					
$perm_{t-3} \longrightarrow perm_{t-2}$	1105	0.760	0.426	0	1
$temp_{t-3} \longrightarrow perm_{t-2}$	73	0.054	0.226	0	1
$unempl_{t-3} \longrightarrow perm_{t-2}$	7	0.005	0.072	0	1
$unempl_{t-3} \longrightarrow temp_{t-2}$	18	0.013	0.114	0	1
$temp_{t-3} \longrightarrow temp_{t-2}$	127	0.094	0.291	0	1
$perm_{t-3} \longrightarrow temp_{t-2}$	22	0.016	0.126	0	1
$perm_{t-3} \longrightarrow unempl_{t-2}$	17	0.013	0.111	0	1
$temp_{t-3} \longrightarrow unempl_{t-2}$	9	0.007	0.081	0	1
$unempl_{t-3} \longrightarrow unempl_{t-2}$	51	0.038	0.190	0	1
Partners' Transitions:					
$perm_{t-3} \longrightarrow perm_{t-2}$	1177	0.876	0.357	0	1
$temp_{t-3} \longrightarrow perm_{t-2}$	36	0.026	0.160	0	1
$unempl_{t-3} \longrightarrow perm_{t-2}$	25	0.018	0.126	0	1
$unempl_{t-3} \longrightarrow temp_{t-2}$	7	0.006	0.052	0	1
$temp_{t-3} \longrightarrow temp_{t-2}$	37	0.027	0.163	0	1
$perm_{t-3} \longrightarrow temp_{t-2}$	20	0.015	0.120	0	1
$perm_{t-3} \longrightarrow unempl_{t-2}$	7	0.005	0.072	0	1
$temp_{t-3} \longrightarrow unempl_{t-2}$	4	0.003	0.047	0	1
$unempl_{t-3} \longrightarrow unempl_{t-2}$	31	0.023	0.149	0	1
N^o of observations	1356				

Source: Own calculation from Italian dataset of EU-SILC 2004-2013.

Job Instability and Fertility Choices during the Economic Recession: the Case of Italy

Chapter 3

Job Instability and Fertility Choices during the Economic Recession: European Countries

3.1 Introduction

Over the last five decades, in all but a few European countries total fertility rates (TFR)[1] have decreased and have reached sub-replacement levels. Demographic scholarship based on the key idea of a *Second Demographic Transition* (Van de Kaa 1987; Lesthaege and Willems 1999) explains that the fertility decline started early after the middle of the 1960s at the end of post-war baby boom in Western, Northern, and Southern Europe while that of Central and Eastern European countries arisen from the period after 1989.

The trends of TFR flexure varied widely across countries: in fact, in Northern European countries, the decline has oscillated around 1.85 children per women since the mid-1970s, while, by contrast, among Eastern and Southern European countries it has been slower but arrived at the lowest level of 1.3 in 1994 before gradually starting to edge up. The latters are known as 'lowest-low-fertility' countries because they have TFRs persistently around 1.3 children per woman (Kohler et al. 2002).

Demographic trends of declining fertility rates jointed by increasing life expectancy in most developed countries involve the consequent ageing populations have led to a reduction in the number of women of childbearing ages,

This research is based on data from Eurostat, longitudinal EU-SILC for the years 2005-2013. The responsibility for all conclusions drawn from the data lies entirely with the author.

[1] See definition of this index in footnote 2 of chapter 2.

the restricted growth of the potential labour force, and thus the growing number of retirees will lead to higher public (and private) spending on pensions and longterm care supports for the retired population (OECD 2011).

Recent research suggests that fertility diversities between European countries cannot fully be explained by the only process of postponement. Structural and cultural changes influenced by economic development are likely to affect fertility decisions not only in terms of timing, but also in terms of quantum (Kohler et al. 2002). Bratti and Tatsiramos (2012) find that two opposite forces cohabit with different magnitudes due to European countries' institutional features and determine the overall sign of *tempo effect*: the first one consists of biological and sociocultural factors and produces a postponement effect, while the second one based on career-related factors leads to a catch-up effect. In particular, they show that the postponement effect is larger in Southern European countries, where a traditional role of women prevails and where there are generally difficulties to reconcile family and work, while a catch-up effect is sizeable in countries where institutions, such as child-care and part-time jobs availability, longer maternal leaves and higher wages, facilitate mothers to participate in the labour market.

It is still debatable whether or not the macro-level evidence of a positive link between fertility and female employment reflects differences in individual behaviour:[2] in fact, earlier theorical studies looked at completed fertility in relation with employment and they do not have reason why the income effect should prevail over the substitution effect (Willis 1973; Becker 1981).[3] Matysiak and Vignoli (2008) performe, throught a meta-analysis, a systematic review of more recent studies that analyze the effects of female employment on fertility and they confirm high variations in the effect among institutional settings and find a significant reduction in the conflict between work and family life over time in countries with re-increasing fertility.

Mills and Blossfeld (2005) claim that, during the 1990s, childbearing has

[2]Since the mid-1980s the cross-country association between female labour force participation (FLFP) and fertility (TFR) has become positive (Ahn and Mira 2002; Engelhardt and Prskawetz 2004; Billari and Kolher 2004), although a meta-analysis of micro level studies (Matysiak and Vignoli 2008) indicates that the relationship between FLFP and fertility remains negative, but the size of the association is stronger where the male-breadwinner model prevails (e.g.Southern Europe), and weaker in the Nordic Countries where institutions have implemented more generous protection systems to reconcile motherhood with work (Esping-Andersen 1999; Adserà 2004; Del Boca and Sauer 2009).

[3]Pioneering studies using micro data to examine birth decisions jointly with employment decisions are, for example, Hotz and Miller (1988), Moffitt (1984) and Butz and Ward (1979), which illustrate that the fertility-employment relationship changes over time and differs across countries, depending on preferences, labour market situations and institutions.

been further disincentivized by employers' rising demands for workers flexibility due to the increasing competition in the labour markets. The employment instability and job precariousness increase employment uncertainty and the difficulties among the young workers in their transition to adulthood become more intense: in fact, when they start their labour market careers try to strengthen their economic position and begin to consider family formation (e.g. McDonald 2006).[4]

Using individual data from the longitudinal European Survey of Income and Living Conditions (EU-SILC) from 2005 to 2013, the present study investigates the cross-country short-run effect of *job instability* on the couple's choice of having an addictional child and, then, under a comparative perspective it examines in depth the heterogeneous effects of instability in the labour market on childbearing among different institutional settings of European welfare regimes.

In the recent literature Adserà and Menendez (2011) find that high aggregate unemployment may increase individual unemployment incidence or the risk of losing a job in the forthcoming future or at the same time decline the likelihood of future wage growth. Del Bono et al. (2015) show that job displacement (and not mere unemployed status) has a negative effect on fertility choices in Austria.[5]

The contribution of this paper to the existing literature is threefold. Firstly, I build *job (in)stability* measure for both the partners by the lag of economic activity status had in labour market (that encompasses holding temporary or permanent contract, and being dismessed or unemployed), focusing specifically on childbirth of the active in the labour market couples across European countries. Secondly, I account for the unobserved effects, such as unobserved heterogeneity, feedback effects, and the possible presence of endogeneity due to reverse causality (Browning 1992). It may be that employed women with a short-term contracts may have disparate observed and unobserved characteristics, such as preference for children, individual abilities, and diversity in fecundity. Furthermore, there may be feedback effects, i.e. shocks in the fertility affecting the future dynamics in the labour market. In addition, women with strong preferences for children (and with highest marginal utility of children) could decrease their own levels of education and their labour market attachment, and may choose stable job, but with lower earning profiles (Francesconi 2002). In order to account for the

[4]See McDonald (2002) for an overview of the two main alternative theories of the *risk aversion theory* and of the *uncertainty reduction hypothesis* (Friedman et al.1994) under economic uncertainty.

[5]See also Sobotka et al.(2011) for a recent review on the effects of economic recession on fertility.

unobserved heterogeneity and potential presence of endogeneity, I estimate a Two Stage Least Square Model in first differences and, under sequential moment restriction, I use the first-order lag of my variable of interest (the economic activity status at the time $t-2$) as instrument to test to possible presence of endogeneity problem (Wooldridge 2010; Picchio and van Ours 2016).[6]

As I declared in the chapter 2, only a few empirical studies have dealt with this issue. Modena and Sabatini (2012) use as instrument of job precariousness the share of precarious workers over the labour force in the Italian region of residence; the same one for Auer et al. (2013) but they add an specification of industry levels. Finally, also Del Bono et al. (2015) use as instrument for unemployment the interaction between firm closure and dummies for years, quarters, regions and industries.[7]

Thirdly, this paper contributes to the existing literature providing new results on fertility choises analyzing the phenomenon in a comparative perspective. Following the aggregation suggested by the European Commission (EC 2006 and 2007) modified by Boeri (2001) I group countries in Continental (Austria, Belgium, France and Luxembourg), Southern European (Spain, Italy, and Greece) Eastern (Czech Republic, Poland, Bulgaria and Hungary) Baltic (Estonia, Latvia and Lithuania), Nordic (Norwey Finland, Denmark and Iceland) and Anglo-Saxon (United Kingdom, Cyprus) countries. So, I can estimate the heterogeneous effects of instability in the labour market on childbearing among different institutional settings of European welfare regimes.

The principal result is that the cross-country average effect of job instability on couple's fertility decisions is not statistical relevant because of the huge country-specific fixed effects. Only when I analyze these impacts, distinguishing through the six different welfare regimes, the institutional structure and linked social active policies reveal varying family behaviour about fertility choices.

The remaining structure of this paper is organized as follows: in section

[6]Contrary to the empirical analisys in the chapter 2, I have changed my interest variables to measure the effect of job instability and, consequently, the building of my instrumental variables too.

[7]This literature documents other attempts to identify the correlations of labour market institutions that increase instability—such as temporary contracts, part-time work, flexible jobs, or job displacement—have been rather isolated (De la Rica and Iza 2005; Gonzalez and Jurado-Guerrero 2006; Adserà 2011, Modena and Sabatini 2012; Vignoli et al. 2012; Del Bono et al. 2012, 2015). See also Kohler and Kohler (2002), Ranjan (1999), Kreyenfeld (2010), Schimitt (2012) for studies trying to associate the fertility decline with general economic uncertainty, while Fiori et al. (2013) and Modena et al. (2014) analyse economic insecurity effect on the fertility intentions in Italy.

3.2, I review the relationship between labour market outcomes and fertility, focusing on the job instability; in section 3.3, I describe the sample selection process and the data; in section 3.4, I explain the methodology; the main results and heterogeneous effects are presented in section 3.5; the paper closes in section 3.6 with a conclusions and brief discussion on policy implications of the analysis.

3.2 Labour market outcome and fertility in Europe

3.2.1 Literature review

As previously discussed, in the New Home Economic theory, decreasing fertility levels have been explained as an overall result of the increasing level of education among women, which is strengthening their labour market attachment and career aspirations. In the absence of possibilities for combining work and family life and the presence of a strong division in gender roles, increasing career and income options for women lead to the fact that women tend to replace work with childbearing (substitution effect). In contrast, increasing career and income options for their male partners rather favour fertility decisions (income effect) (Becker 1991).

Increasing possibilities for combining work and family life, which are often accompanied by weakening normative gender roles (McDonald 2000), may result in the income effect dominating the substitution effect for women: in those countries where parents can successfully combine work and family life, women's labour market participation is likely to facilitate the decision to start or 'enlarge' a family: the negative substitution effect of female employment on fertility gets weaker while the positive income effect of female employment on fertility gets stronger. The successful integration of both partners and the presence of a dual-earners model can increase household income, tackle better the 'new' social risks of economic uncertainty born during the 1990s by the increasing competition in the labour markets and employers' rising demands for workers flexibility and then can affect family formation as well as fertility choices (Esping-Andersen 1999).

As this ability also depends on a country's degree of support for combining work and family, the relation between female employment and fertility might differ across countries. In low-fertility countries, however, the impact of parents' successful labour market integration might be ambiguous, due to the scarcity of child care options (Matysiak and Vignoli 2008): a childbirth would imply a reduction in family income, as at least one partner has to stop or reduce his or her labour market activity in order to care for the child. Consequently, couples with both partners active in the labour market might be more likely to decide against childbirth as compared to couples with one partner already inactive. Hence, regarding the impact of women's activity status on childbirth, various side effects come into play. These may be institutional or individual (like education and individual income options), or they may relate to the couple's joint level of income before and after childbirth.

Since not long ago, literature which relates labour market conditions to

fertility has started to study the idea of labour market "instability" as a significant determinant of the recent trends in fertility rates observed in many European countries. Ahn and Mira (2001) show negative correlations between choices of fertility and males' past unemployment and temporary contracts in Spain. De La Rica and Iza (2005) show that Spanish women holding fixed-term contracts and lacking stable employment prospects delay entry into motherhood compared to female workers holding open-ended contracts. Adserà (2005) using cross-country variation of labour market institutions in OECD nations documents that there is a reduced fertility in countries that have experienced grave unemployment.

Santarelli (2011) focuses on the transition to the first child for European married couples over the period 1994-2001 and finds that single-earner couples have their first child earlier than dual earner couples, but the type of contract does not seem to matter much. She also tests the impact of couple's income on first birth risks, but without controlling for the couple's employment instability.

Modena and Sabatini (2012) find that in Italy having a precarious job is a deterrent to planning parenthood rather than a persuasive factor to childbearing through a decrease in the opportunity cost for women.

Del Bono et al. (2012) show that an unexpected career interruption reduces significally the number of children for women in Austria, especially in the case of women in white collar occupations.

Finally, Greulich et al.(2016) find that, on average within European countries, women in stable employment have a significantly higher probability of second childbirth than inactive or unemployed women. Furthermore, they present heterogeneous results across the countries, in fact, while female employment generally favours a transition to second childbirth in high-fertility countries, the impact is ambiguous in low-fertility countries.

3.2.2 The EU stylized facts

Currently, all countries in Europe have TFR rates below replacement level (Eurostat 2011). The situation was particularly acute at the turn of the century in Southern, Central and Eastern Europe where TFR rates were at or below 1.3 (Billari and Kohler 2004). Since 2000, period fertility in most of these low and lowest-low fertility countries has been steadily rising but, currently, over 50% of the EU-27 countries having TFR rates at or below 1.5. The average of TFR in Europe (EU-27) stands at 1.57 (Eurostat 2011): Eastern, Southern and German-speaking European countries tend to have the lowest TFRs compared to Western and Northern European countries. In fact, in 2011 the TFRs record 1.36 in Germany, 1.30 in Poland and 1.36 in

Spain and all have low TFRs (Eurostat 2011). Conversely, countries such as Denmark (1.87), France (2.03), Sweden (1.9) and the UK (1.98), which were amongst the first to see below replacement rate fertility in the 1960's and 1970's, have all increased their TFR in the last decade (Eurostat 2011).[8] This heterogeneity is important to suggest propery polices designed to raise fertility in Europe.

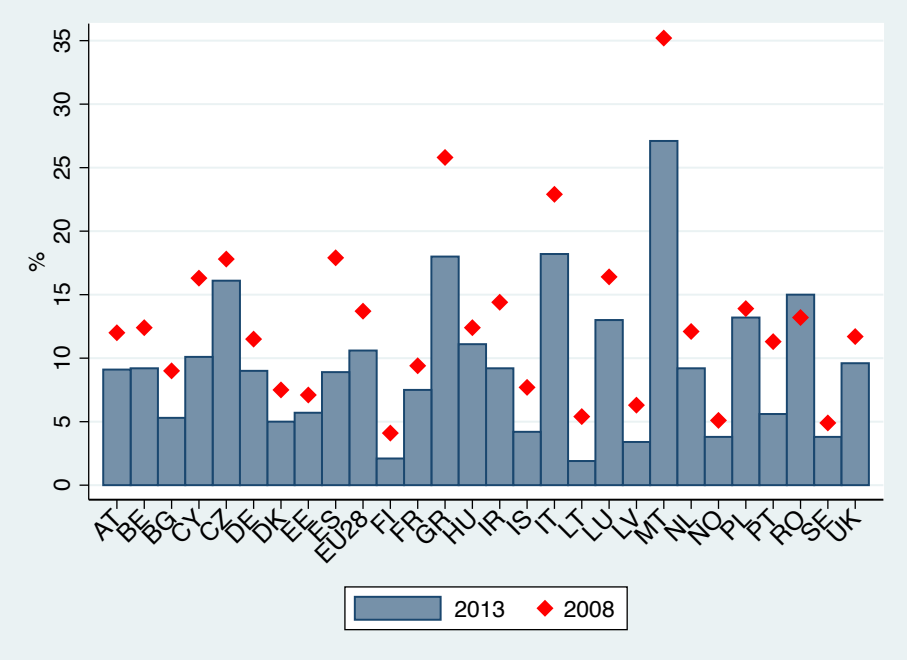
During the past three decades, in some European countries labour market institutions have aimed for women in order to conciliate career and family, causing a switch in the sign of the relationship between labour market outcomes and fertility at the macro level. Thus, the correlation between female participation in the labour force and fertility turned positive at the end of the 1980s across OECD countries (Ahn and Mira, 2002; Billari and Kohler, 2004; Engelhardt and Prskawetz, 2004). Scholarship explains it as resulting from the increasing availability of childcare services and part-time jobs, especially in Nordic countries (Del Boca and Locatelli 2006; Del Boca et al. 2009).

With regard on labour market, in 2013, the Eurostat data show that the average female activity rate of the 15–64 years age group in EU28 increased steadily from 63.6% in 2008 to 66%. Conversely, in the same period, the male activity rate was higher and roughly stable at around 78%. However, the EU average combines a high degree of heterogeneity across countries. In general, comparison of activity rates in 2008 and 2013 shows that the male activity rate declined. On the one hand, this downfall was recorded especially large in Ireland (-3.8%), Denmark (-3.7%), Portugal (-2.7%), Norway (-2.5%), and Iceland (-2.1%), while, on the other hand, it exhibited a positive variation in Central and East European countries. Conversely, the female activity rate increased substantially in almost all countries except for a few countries with the highest FLFP rates, such as Denmark and Norway respectively by -1.4% and -1.2%. The upturns were recorded at 2.4% in EU28 and more than 3 percentage points by Hungary, Lithuania, Czech Republic, Luxembourg, Malta, Poland, and Spain.

These results disclose significant cross-country differences in FLFP rates. While the EU average rate for women stood at almost 66% in 2013, rates were particularly low in Italy, Malta and Romania, oscillating between 50.2% and 56.3%. Conversely, Northern countries such as Denmark, the Netherlands and Sweden had particularly high female participation rates in the labour market, exceeding the 74%. The cross-country variation in male activity rates is smaller: in 2013, the EU average is 77.9% and the country specific rates are just above 70% at the lower end in Hungary, Belgium, Bulgaria and Italy, while between 80% and 85% at the higher end in Germany, the

[8]See Fig. 3.4 in the Appendix.

Figure 3.1 – Gender gap in employment rates, EU countries, 2008-2013



Source: Own elaboration from Eurostat, Labour Force Survey data

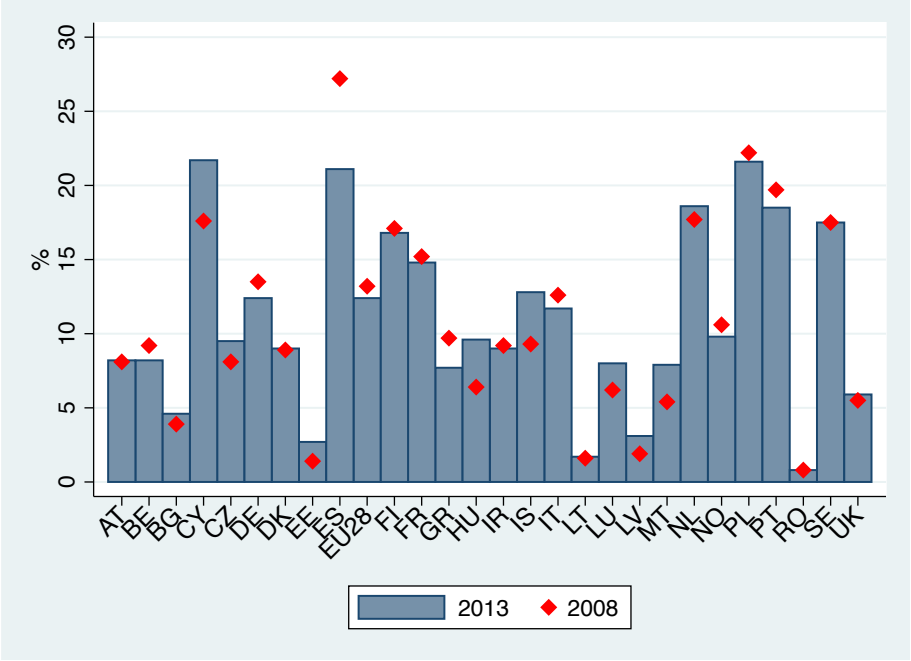
Netherlands, Denmark, and Sweden.

The gender gap in participation rates in labour market decreased between 2008 and 2013 in all countries except Romania. Nevertheless, the EU average gender gap stood at 10.6 percentage points in 2013. The gender gap persisted at particularly high rates, ranking from 18 percentage points and 28 percentage points in Greece, Italy, Malta and Romania, while in Finland, Lithuania and Sweden, it fell below 5 percentage points (Figure 3.1).

Since the quality of participation in the labour market is as important as the quantity of participation. Eurostat data show that women are overrepresented in temporary and part-time jobs in EU with respect to men: during the years 2008-2013, the evolution of the EU share of temporary workers in total employment for women has been always higher than men's one, passing respectively from 15% and 13.3% in 2008 to 14.2% and 13.2%. The decline affected women more than men, so, in average, there was no significant change in the share of temporary workers among men over the 2008–2013 period, while the share declined by almost 0.8 percentage points in the women's case.

The Figure 3.2 shows female temporary employees on the total employment (15-64 years age group) across EU countries in 2008 and 2013 in order to make it clear the country-specific adoptions of these flexible forms of job,

Figure 3.2 – Female temporary employees on total employment, EU countries, 2008-2013



Source: Own elaboration from Eurostat, Labour Force Survey data

at least for women.[9] This share was particularly low in Latvia, Lithuania and Romania, all below 3%. Cyprus, the Netherlands, Poland and Spain had the highest shares of temporary employment among women, and in Poland for example the share reaches at 21.6%.

Finally, in general, workers with temporary contracts face an higher risk of unemployment than those on standard contracts. Thus, I sum up a cross-country institutional framework to access to social protection for temporary workers, focusing on unemployment benefits.[10] In all countries ecxept for Czech Republic and Poland,[11] being in a temporary rather than a permanent job does not present a difference to formal entitlement to unemployment benefits, but in practice workers in temporary jobs could be less likely to be eligible for unemployment insurance benefits because of their inadequacy of contributions.

Eurofound (2013) documents that, even if they do qualify, they might receive a lower amount because the benefit is related to duration in employment or to total earnings over a specified period of time and it could be happened that they might be ineligible for benefit because they have earned

[9]Eurostat data show that the cross-country variation in the share of temporary workers among men tends to exhibit similar trends.

[10]Income support for the unemployed can take one of two forms. Firstly, those out of work known as unemployment insurance benefits are typically contributory, financed through earnings-related social contributions levied on employers and employees. In this case the eligibility depends on having a sufficient contributions record based on proof that the person concerned has been employed, and paid contributions, for a minimum period of time. While the amount payable is in most cases earnings-related but can also be flat rate, or may include both a fixed and earnings-related component. All the European countries covered here have unemployment insurance schemes, although the eligibility conditions and the amount of benefit payable vary greatly. Secondly, if the workers are not eligible for unemployment benefits or if they have exhausted their entitlement, the unemployed might be able to receive unemployment assistance, which is non-contributory and mostly financed through general taxation.This is generally less generous than unemployment benefit and often means-tested, assessed at the household rather than individual level so that young people living with their parents are not eligible. The amount received can be a flat-rate, or designed to bring a household's income up to a minimum level, or a combination of both (Eurofound 2013).

[11]Eurofound (2013, p.20) states: "In the Czech Republic, those on a type of temporary contract known as an 'agreement on work performance' are not eligible for unemployment benefits if their wage is below CZK 10,000 (around € 390) a month, because they do not pay social contributions. In Poland, on the other hand, people working on civil law contracts are not entitled to unemployment benefit at all unless they are employed on a 'contract of mandate'. There are other ways in which young people in temporary jobs are disadvantaged if they become unemployed. In the UK, for instance, those under 18 are not eligible for any kind of unemployment insurance benefit, irrespective of the type of employment contract they have. In Italy, Ireland and the UK, younger workers' benefit rates are lower than those for older workers."

less than a minimum amount or worked too few hours. Thus, in a general thought, the shorter is the time for which contributions must be paid to qualify for unemployment insurance benefits, the more likely it is that young people in temporary jobs will be able to access them. In the Netherlands, Ireland, Latvia and Poland employees with temporary contracts are likely to find more difficult to meet qualifying conditions for unemployment benefits than those in France, Spain and Greece.[12]

In the European countries the maximum duration of benefits varies in line with how long the contributions have been paid and, in a number of countries, with age, again potentially disadvantaging those on temporary contracts except for Denmark, Sweden, the UK, Cyprus, and the Czech Republic. Finally, in Greece, Spain, France, Austria and Portugal, young workers in temporary jobs may, in practice, have more limited access to unemployment assistance, as well as insurance benefits, than those on standard contracts of employment due to eligibility for unemployment assistance requires previous receipt of unemployment insurance benefit.

[12]See Fig. 3.5 Qualifying period for unemployment benefits - EU countries for a detailed summary of the eligibility criteria for these benefits in Appendix.

3.3 Data

For the analysis I use the longitudinal data of the EU-SILC (European Statistics on Income and Living Condition), across the years 2005-2013. This survey was created in 2003 to replace the European Community Household Panel (ECHP) and now includes thirty-one European countries. It captures individual and household situations by using a large number of economic and social variables that may be considered determinants in deciding to have children.[13] Grouping together harmonized survey data for a large set of countries allows us to obtain large sample sizes; each wave is representative of the whole European population and it drawns a sample of 102,700 households and of 1,211,300 respondents that will be followed for four years using a rotational design in which the 25% of sample changes every year.

As in the chapter 2, I build the whole dataset combining all waves of each country (each one of four years)[14] of the longitudinal dataset from 2005 to 2013, and I deleted the repetitions of the respondents appearing simultaneously in two or more waves. I am left with an unbalanced panel of 992,094 individuals for a total of 3,943,327 records. In this analisys, I have choosen to start at 2005 because EU-SILC was expanded in 2005 to cover all of the EU25 Member States together with Norway and Iceland.[15] To improve interpretation of results I group countries according to their welfare system. First, I follow the seminal work on the taxonomy of socio-economic systems developed by Esping-Andersen (1990)[16] because several studies covering a wide range of subjects (such as welfare, labour market, innovation and healthcare) seem to confirm the original taxonomy and it is in line with my reserch purpose to focus on classification based on job flexibility and the diffusion of unemployment benefit which might affect the decisions to leave the parental home and family formation. Thus, I adjust the classification including Greece

[13] All of these informations are rarely available in other surveys; some exceptions are the European Labour Force survey that contains information on work, but not on income, while other surveys that include both demographic and economic variables have a national focus and run in only one given country (e.g. the German Socioeconomic Panel, the American Panel Study of Income Dynamics, or the Italian Survey on Household Income and Wealth).

[14] In a few countries (France, Lithuania, Luxembourg, Norway, Portugal and Slovakia), some individuals are observed for more than four years.

[15] The 27 countries are: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Spain, Finland, France, Greece, Hungary, Ireland, Iceland, Italy, Lithuania, Luxembourg, Latvia, the Netherlands, Norway, Poland, Portugal, Sweden, Slovenia, Slovakia, UK and Romania. Longitudinal data is not available for Germany and Switzerland.

[16] The author classified the welfare systems of developed economies into three models: Liberal, Conservative and Social Democratic.

among the Mediterranean countries (Boeri and Perrotti 2002) and I enlarge it inserting the new group of Eastern countries following the aggregation suggested by the European Commission (2006).[17]. Finally, I choose to separate the Baltic countries from the Eastern countries because, with regard to family formation, these countries show different pattern as compared to Easter ones, while they move closer to Continental countries with 50% of young people leave parental home in line with the EU average (Eurofound, 2016). Thus, I select 21 countries which reflect the peculiarities of these six welfare regimes: *Continental* welfare regime which provide benefits targeted to individuals who belong to specific categories, such as families or a specific type of worker (Austria, Belgium, France and Luxembourg). *Southern* regime (Spain, Italy, Greece and Portugal) where welfare coverage is often residual and left to the family, with limited social benefits (Ferrera 2005), *Nordic* one (Norway Finland, Denmark and Iceland), *Anglo-Saxon* or *Liberal* (United Kingdom, Cyprus), *Eastern* one (Czech Republic, Poland, Bulgaria and Hungary) and finally *Baltic* one (Estonia, Latvia and Lithuania).

Furthermore, I match all the women with their own partners (co-living) and with their own children. In order to investigate the short-run effect of job instability on the couple's choice of having at least an another child, I draw all women of childbearing age between 15 and 45 years old, living with the partner, and who are active in the labour market. I am left with a panel of 155,371 individuals and 391,437 observations in which I can control jointly for the both partners' socio-economic characteristics to avoid an overestimation of the negative effects of women's employment outcomes on fertility (Matysiak and Vignoli 2008).

Contrary to chapter 2, I build job instability measure for both the partners by the lag of the economic activity status in the labour market: in this case, for each year there are three different economic statuses (unemployed, temporary employee,[18] and permanent employee). Thus, I have to follow the units at least over three subsequent years always because of the lack of the

[17]Moreover, this classification has been largely confirmed by the findings of Eurofound (2016) about the different dynamics among the EU member states in young people's transition to adulthood. See Offe and Fuchs (2007) to follow up on welfare state formation in the enlarged European Union after the entry of the Post-Communist new member States

[18]Eurostat, EU-SILC Description of Target Variables: "In the case of a work contract of limited duration the condition for its termination is generally mentioned in the contract. To be included in these groups are: person with a seasonal job, person engaged by an employment agency or business and hired out to a third party for the carrying out of a 'work mission' (unless there is a work contract of unlimited duration with the employment agency or business), person with specific training contracts but if there exists no objective criterion for the termination of a job or work contract these should be regarded as permanent or unlimited duration".

synchronicity that occurs between the getting pregnant and the childbirth and, hence, the other lagged socio-economic covariates. As I include women who were first interviewed between 2005 and 2010 and re-interviewed at least three subsequent years, the sample becomes of 15,091 individuals and 20,000 records. In the last one 2,886 women have had a childbirth during the previous year and for physiological reasons they could not have another one in the period of analysis. So, I decide dropping out them to avoid underestimating of the probability to have at least a child. Finally, the sample consists of 12,205 couples and 17,114 observations across the countries, as follow in Tab.3.1.[19]

Table 3.1: Sample's composition by Country and Welfare Regimes

Country	N. of bservations	Percentage value
AT	473	2.76
BE	749	4.38
BG	648	3.79
CY	476	2.78
CZ	577	3.37
DK	8	0.05
EE	1,026	6.00
ES	1,704	9.96
FI	28	0.16
FR	2,026	11.84
GR	91	0.53
HU	1,523	8.90
IS	8	0.05
IT	2,051	11.98
LT	1,083	6.33
LU	1,364	7.97
LV	984	5.75
NO	58	0.34
PL	2,071	12.10
SE	43	0.25
UK	123	0.72

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[19]Portugal and Netherland disappear from the panel when I build my variables of regression.

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Wefare Regime	N. of bservations	Percentage value
Continental	4,612	26.94
Southern	3,846	22.47
Nordic	145	0.87
Anglo-saxon	599	3.50
Eastern	4,819	28.15
Baltic	3,093	18.07
Total	17,114	100.00

Source: Own calculation from longitudinal EU-SILC (2005-2013) dataset

The main independent variables are dummies representing women's and men's economic activity status recorded at time $t-1$. The Table 3.2 show that, under a gender perspective, in our sample we have a larger proportion of women with a temporary job as compared to men (respectively, 11.4% versus 7.6% at time $t-1$ and 12.4% versus 7.5% at time $t-2$), while the unemployment status is more widespread among men than women (respectively, 10% versus 4% at time $t-1$ and 15.2% versus 5.6% at time $t-2$).

Table 3.2: Economic activity status

Variable	Absolute frequencies	Relative frequencies	Std. Dev.
Women's economic activity status $(t-1)$***:***			
Permanent contract	14462	0.845	0.361
Temporary contract	1967	0.114	0.318
Unemployed	685	0.040	0.197
Partners' economic activity status $(t-1)$***:***			
Permanent contract	14101	0.824	0.381
Temporary contract	1301	0.076	0.265
Unemployed	1712	0.100	0.300
Women's economic activity status $(t-2)$***:***			
Permanent contract	14033	0.820	0.384
Temporary contract	2123	0.124	0.33
Unemployed	958	0.056	0.229

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Variable	Absolute frequencies	Relative frequencies	Std. Dev.
Partners' economic activity status $(t-2)$***:***			
Permanent contract	13229	0.773	0.419
Temporary contract	1284	0.075	0.263
Unemployed	2601	0.152	0.359
N^o of observations	17114		

Source: Own calculation from longitudinal EU-SILC (2005-2013) dataset

Descriptive statistics are reported in Table 3.3. The dependent variable is the dummy Fertility that represents the event to "have an additional child" at time t: 24.9% of the couple records they had. As in the chapter 2, the other control variables for couple's characteristics are age, marital status, number of children, presence of young children (0-5 aged) in the family, health status, level of education, job-skills, household (and female) disposable income.

Table 3.3: Summary statistics

Variable	Mean	Std. Dev.
Fertility	0.249	0.433
Marital status:		
- Married couples	0.848	0.359
- More uxorio couples	0.152	0.358
N^o Child(ren)	1.917	1.416
Child(ren) under 5 years old	0.284	0.451
Age	37.5	5.371
Partner's Age	41.92	9.072
$HealthStatus_{t-1}$:		
- Good	0.836	0.370
- Fair	0.148	0.354
- Bad	0.016	0.126
$Partner'sHealthStatus_{t-1}$:		
- Good	0.836	0.370
- Fair	0.148	0.355
- Bad	0.016	0.124
Household Disposable Income Classes:		

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Variable	Mean	Std. Dev.
- Low Income	0.52	0.500
- Lower-Middle Income	0.276	0.447
- Upper-Middle Income	0.127	0.333
- High Income	0.045	0.207
Education:		
- Intermidiate Secondary	0.132	0.338
- Higher Secondary	0.495	0.500
- University or more	0.374	0.484
Partner's Education:		
- Intermidiate Secondary	0.196	0.397
- Higher Secondary	0.537	0.499
- University or more	0.267	0.442
$JobSkill_{t-1}$:		
- High Skilled White Collar	0.412	0.492
- Low Skilled White Collar	0.338	0.473
- High Skilled Blue Collar	0.05	0.219
- Low Skilled Blue Collar	0.159	0.366
- Unemployed	0.04	0.197
$Partner's JobSkill_{t-1}$:		
- High Skilled White Collar	0.35	0.477
- Low Skilled White Collar	0.161	0.368
- High Skilled Blue Collar	0.203	0.402
- Low Skilled Blue Collar	0.216	0.412
- Unemployed	0.069	0.254
N^o of observations	17,114	

Source: Own calculation from longitudinal EU-SILC (2005-2013) dataset

The average age is 37 for women and 42 for men, the average numbers of children is 1.91, and the 28.4% of the sample have the presence of children of which one at least is 0 – 5 years old.[20]

The marital status of all sample is in consensual union: the 84.8% with a legal basis, and the rest 15.2% has a consensual union without legal basis.[21]

[20]See the Table 3.6 Number of children by woman age cohorts - Percentage values and the Fig.3.6 Number of children across EU countries in Appendix to have informations about the distribution of number of children among female age cohorts and across European countries.

[21]I cannot account for couples' union duration because this information is not available in EUSILC data.

The age of the woman is coded into five cohorts: up to 25, 26-30, 31-35, 36-40, and 41-45.

In the dataset, the health status of each partner is broken down into five categories (very good, good, fair, bad, and very bad) and I sort them in three classes, such as good, fair, and bad and I use the one-year lagged data.[22]

The women's and the partner's education are grouped into three categories, consistent with the International Standard Classification of Education (ISCED). The lowest category corresponds to lower secondary school, primary school, or lower education. In the intermediate level we find people who received upper secondary education or post-secondary, but non-tertiary, education. Individuals with tertiary education are assigned to the highest category.

The women's and the partners' economic conditions are described through six variables, reflecting their gross and disposable income in the reference period (January 1st to December 31st of the previous year). The indicator used for household income is the sum of various types of income sources of the family components, such as employee cash income, non cash income (e.g., company car and associated costs, free or subsidised meals), and social transfers after tax. I build the household disposable income, after the subtraction of the female net income, so I create four classes of income: low income (less than 30,000 euro per year), lower-middle income (between 30,000 and 50,000), upper-middle income (between 50,000 and 75,000), and high income (more than 75,000).

Furthermore, the EU-SILC regulation refers to the classification ISCO-88 until 2010 and the classification ISCO-08 from the 2011 (both in 2 digits) to describe labour information on current activity status and current main job, including information on last main job for previously active people. I merged the two classifications to become a single one at 1 digit. I sort the types of occupation in five groups: high skilled white collar, low skilled white collar, high skilled blue collar, low skilled blue collar, and unemployed (for the persons who are seeking their first job). This job-skill variable is refered to the previous year.

Finally, by weighted cross-sectional EU-SILC dataset (from 2004 to 2012), I build the historical series of female unemployment rate, its variation, the share of temporary contracts of the total ones, and its variation, combining

[22]For women I could take two-year lagged information to prevent that an hypothetical pregnancy could tamper with the health condition and, thus, to avoid possible presence of endogeneity with the dependet variable. But, to regard with my instrumental variables, I need to have all one-year lagged control covariates to remove as much as possible the presence of endogeneity between job instability and childbearing. See the next paragraph to have more information.

with year t-1, age cohorts, job skill classes by countries in order to have a measure of country specific business cycle.

3.4 Methodological framework

I model chidbearing, called Fertility, as a binary choice. The dependent variable y may only take the values 1 and 0, which indicate whether the women had at least an another child in the last year or not. At the first step, the conditional probability that y_{it} is equal to 1 is specified, for $t = 1, ..., T$ and $i = 1, ..., N$, as follows

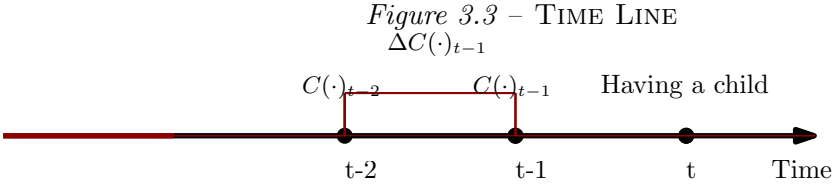
$$\begin{aligned} P(y_{it} = 1|C(\cdot)_{it-1}, X_{it-1}, Z_i, c_i) = \\ = E(y_{it}|C(\cdot)_{it-1}, X_{it-1}, Z_i, c_i) = \\ = C(w)'_{it-1}\beta_1 + C(p)'_{it-1}\beta_2 + X'_{it-1}\delta + Z'_i\gamma + c_i, \quad (3.1) \end{aligned}$$

where $C(\cdot)_{it-1}$ indicates my two interest variables, such as Cw_{it-1} for woman and Cp_{it-1} for partner, and they are vectors 3×1 concerning the time-varying dummy variables related to the three possible economic activity status in labour market (Tab. 3.2). X_{it-1} is a vector of time-varying control variables of the woman and her partner, such as job-skill levels, class of disposable income, health status, and age cohorts. Z_i corresponds to time-invarying control variables of the woman and her partner, such as education levels, countries, marital status, and number of children. Finally, c_i is unobserved heterogeneity. The model in Equation (3.1) is in the error equation form as

$$y_{it} = Cw'_{it-1}\beta_1 + Cp'_{it-1}\beta_2 + X'_{it-1}\delta + Z'_i\gamma + c_i + \varepsilon_{it}, \quad (3.2)$$

where ε_{it} is an idiosyncratic error term. The coefficients of interest are β_1 and β_2, which are the marginal effect of couples' economic activity status had in the previous year on the probability of having an additional child at time t. If c_i were not correlated to Cw_i and Cp_i, where $C(\cdot)_i \equiv [C(\cdot)_{it}, C(\cdot)_{it-1}, C(\cdot)_{it-2}, ..., C(\cdot)_{i1}]$, and $C(\cdot)_i$ were strictly exogenous, i.e. $E(\varepsilon_{it}|C(\cdot)_i, X_i, H_i, Z_i) = 0$ for all $t = 1, ..., T-1$, then the Ordinary Least Square (OLS) estimator of Equation (3.2) would return unbiased and consistent estimates of β_1 and β_2 and would ignore the presence of c_i. However, the study of the association between female activity status in labour market, especially precarious status, and fertility may be driven by several unobserved factors. First, employed women with a short-term contracts are not a

Figure 3.3 – Time Line



random sample of population, and it may be a problem of selection bias: in fact, they may have disparate observed and unobserved characteristics, such as preference for children, individual abilities, and diversity in fecundity. If $Cov(C(\cdot), c_i) \neq 0$, I cannot consistently estimate Equation (3.2) by OLS simply ignoring c_i. Second, there may be feedback effects, i.e. shocks in the fertility affecting the future economic activity status in the labour market. For instance, couples with a positive transitory shock in the probability of childbirth might have a different behaviour (also by gender) in future career paths, in accumulating human capital, and, thereby, in job stability choices. In addition, the analysis of this phenomenon may lead to be a problem of 'reverse causality': women with strong preferences for children (and with highest marginal utility of children) could decrease their own levels of education and their labour market attachment, and may choose stable job, but with lower earning profiles (Francesconi 2002).

To solve the unobserved heterogeneity problem I take the first difference of both sides of Equation (3.2), so I get rid of the fixed effects c_i (and Z_i that corresponds to time-invarying control variables of the woman and her partner), as following:

$$\Delta y_{it} = \Delta Cw'_{it-1}\beta_1 + \Delta Cp'_{it-1}\beta_2 + \Delta X'_{it-1}\delta + \Delta\varepsilon_{it}. \tag{3.3}$$

$\Delta C(\cdot)_{it-1} = C(\cdot)_{it-1} - C(\cdot)_{it-2}$ becomes the first difference of each of the three economic activity status for women and for partners had from time t-2 to time t-1; their values are -1 or 1 whether it recorded a change of type of contract or unemployment status and 0 otherwise.

Under the strict exogeneity assumpion, the OLS estimator produces unbiased estimates of the coefficients in Equation (3.3). However, as mentioned in the Chapter 2, the possible presence of feedback effects from y_{it} to $C(\cdot)_{ir}$ with $r \geqslant t$[23] (i.e. shocks in the fertility affecting the future activity status in

[23]In this case the equivalence is valid because there is a temporal synchronicity between getting pregnant and the economic activity status but I consider childbirth as dependent variable so the timing shifts on one period.

the labour market) would fail the strict exogeneity assumption. I relax this assumption and replace it by the sequential moment restriction (Chamberlain 1992): $E(y_{it}|C(\cdot)_{it-1}, C(\cdot)_{it-2}, ..., C(\cdot)_{i1}, X_{it-1}, Z_i, c_i) = 0$ for all $t = 1, ..., T$. So, I allow correlation between ε_{it} and the current and future occupational transitions $(C(\cdot)_t, C(\cdot)_{t+1}, ..., C(\cdot)_{t+T})$: in other words, I assume that once I condition on $(C(\cdot)_{it-1}, X_{it-1}, Z_i, c_i)$, a shock in pregnancy at time t could have an effect on activity status in the future (Wooldridge 2010; Picchio and van Ours 2016).

Henceforth, under the sequential moment restriction, the longitudinal dimension of the panel provides available instruments to take into account the potential endogeneity of $\Delta C(\cdot)_{it-1}$ in Equation (3.3) because of feedback effects: the lag of my indipentent variable of interest $C(\cdot)_{it-2}$ should be not correlated to $\Delta\varepsilon_{it}$ and it is a strong predictor of $\Delta C(\cdot)_{it-1}$ by construction. So, I use the Two Stage Least Square (2SLS) estimator with $C(\cdot)_{it-2}$ as instrument for $\Delta C(\cdot)_{it-1}$ to consistently estimate Equation (3.3) in presence of endogeneity.[24]

[24]Find valid instruments is a very nontrivial question for this literature. In order to confirm the validity of the exclusion restriction assumption, in the future, I could estimate the model using $C(\cdot)_{it-3}$ as the instrumental variables, even if the size of the panel reaches the order of 6,000 units and it drops the number of countries and the importance of interpretation of the results. Furthermore, I consider that, controlling for all previous covariates and getting rid of unobserved effects, this process of choice affected more by the first-order lag of economic activity status than the further lags. It seems to be confirmed by the results of chapter 2. However, the interpretations of the results as causal effects must be done with caution.

3.5 Main results and heterogeneous effects analyses

3.5.1 Main results

Table 3.4 reports the cross-country estimation results in level and in first-differences of the Linear Probability Model in Equation (3.1) with the type of economic activity status recorded in the labour market by both partners as the measure of job instability. The First Differences OLS is more advisable than the Levels OLS because the First Differences OLS does not ignore the presence of unobserve heterogeniety. Because I can account for the possible presence of endogeneity of $\Delta C(\cdot)_{it-1}$ in First-Difference 2SLS model. An Hausman test is used and it rejects absence of endogeneity (F(4, 12204) = 2.57; p-value = 0.0363) and the instruments are correlated with the regressors and not weakly (Kleibergen-Paap Wald rk F statistic is major than the rule of 'thumb' level of 10) and they are valids. So, using a 2SLS model in first difference I estimate the cross-country average effects of job instability (with respect to workers in job stability) on childbirth for both the partners in order to avoid to produce a bias in the estimations due to lack of partnern's characteristics (Matysiak and Vignoli 2008).

Table 3.4: Estimation results of the model for fertility in levels and first differences

	Levels OLS			First-difference OLS			First-difference 2SLS, instruments c_{it-2}		
Fertility	Coeff.		Robust S.E.	Coeff.		Robust S.E.	Coeff.		Robust S.E.
Woman's economic activity status - Reference: Permanent contract									
Temporary contract	0.007		0.0100	0.013		0.0091	0.077	**	0.0259
Unemployed	0.013		0.0111	-0.001		0.0116	0.059		0.0365
Partner's economic activity status - Reference: Permanent contract									
Temporary contract	0.009		0.0098	0.011		0.0109	0.007		0.0149
Unemployed	-0.009		0.0100	0.003		0.0083	-0.010		0.0123
Woman's Job Skills - Reference: Unemployed									
High skilled white collar	0.049	**	0.0176	-0.008		0.0091	-0.008		0.0091
Low skilled white collar	0.042	**	0.0151	0.002		0.0134	0.002		0.0132
High skilled blue collar	0.046	*	0.0233	-0.006		0.0146	-0.004		0.0144
Low skilled blue collar	0.028		0.0170	-0.016		0.0152	-0.016		0.0151
Partner's Job Skills - Reference: Unemployed									
High skilled white collar	-0.014		0.0101	-0.033	***	0.0035	-0.033	***	0.0035
Low skilled white collar	-0.016	*	0.0091	-0.026	**	0.0061	-0.026	***	0.0059
High skilled blue collar	-0.003		0.0131	0.032	***	0.0128	0.032	**	0.0124
Low skilled blue collar	-0.023	**	0.0091	0.041	***	0.0053	0.041	***	0.0051
Woman's Age Cohorts - Reference: 15-25 age									
26-30 age	0.050		0.0262	0.010		0.0195	0.015		0.0197
31-35 age	0.026		0.0332	0.042		0.0269	0.043	*	0.0259
36-40 age	-0.010		0.0366	0.014		0.0104	0.014		0.0104
41-45 age	0.012		0.0394	0.005		0.0076	0.005		0.0077
Woman's Health - Reference: Good									

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	Levels OLS			First-difference OLS			First-difference 2SLS, instrument c_{it-2}		
Fertility	Coeff.		Robust S.E.	Coeff.		Robust S.E.	Coeff.		Robust S.E.
Fair	0.006		0.0087	0.004		0.0083	0.004		0.0083
Bad	-0.002		0.0251	0.004		0.0173	0.003		0.0170
Partner's Health - Reference: Good									
Fair	0.008		0.0075	0.004		0.0092	0.004		0.0087
Bad	0.023		0.0136	-0.018		0.0200	-0.016		0.0194
Household Disposable Income (with Transfers) - Reference: Low income/1000									
Lower-mid income/1000	0.010		0.0142	0.002		0.0148	0.003		0.0150
Upper-mid income/1000	-0.016		0.0183	0.006		0.0148	0.007		0.0143
High income/1000	-0.021		0.0176	0.008		0.0154	0.008		0.0152
Number of children	0.077	***	0.0070	–		–	–		–
Presence of 0-5 aged child	0.148	***	0.0125	–		–	–		–
Marital status - Reference: Married									
More uxorio union	0.028	***	0.0091	–		–	–		–
Woman's Education - Reference: Primary and lower secondary									
Upper secondary	-0.011		0.0126	–		–	–		–
University and more	0.006		0.0197	–		–	–		–
Partner's Education - Reference: Primary and lower secondary									
Upper secondary	0.001		0.0094	–		–	–		–
University and more	-0.007		0.0132	–		–	–		–
Country - Reference: France									
Austria	0.049	***	0.0066	0.002		0.0047	0.002		0.0052
Belgium	-0.042	***	0.0108	-0.101	***	0.0132	-0.100	***	0.0133
Bulgaria	-0.088	***	0.0141	-0.166	***	0.0046	-0.165	***	0.0045

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	Levels OLS			First-difference OLS			First-difference 2SLS, instrument c_{it-2}		
Fertility	Coeff.		Robust S.E.	Coeff.		Robust S.E.	Coeff.		Robust S.E.
Cyprus	0.020	***	0.0065	0.049	***	0.0035	0.049	***	0.0036
Czech Republic	0.146	***	0.0196	0.147	***	0.0136	0.149	***	0.0132
Denmark	-0.248	***	0.0138	-0.284	***	0.0098	-0.283	***	0.0105
Estonia	-0.300	***	0.0212	-0.383	***	0.0135	-0.381	***	0.0141
Spain	-0.093	***	0.0130	-0.145	***	0.0065	-0.142	***	0.0069
Finland	-0.049	***	0.0079	-0.117	***	0.0048	-0.118	***	0.0048
Greece	0.093	***	0.0218	0.161	***	0.0235	0.162	***	0.0234
Hungary	-0.250	***	0.0198	-0.362	***	0.0077	-0.360	***	0.0080
Iceland	-0.240	***	0.0092	-0.163	***	0.0045	-0.158	***	0.0065
Italy	-0.152	***	0.0129	-0.217	***	0.0078	-0.215	***	0.0081
Lithuania	-0.216	***	0.0177	-0.307	***	0.0094	-0.305	***	0.0097
Luxembourg	-0.027	**	0.0116	-0.073	***	0.0058	-0.071	***	0.0056
Latvia	-0.225	***	0.0150	-0.304	***	0.0079	-0.303	***	0.0082
Norway	-0.084	***	0.0159	-0.074	***	0.0052	-0.076	***	0.0054
Poland	-0.145	***	0.0159	-0.199	***	0.0045	-0.196	***	0.0048
Sweden	-0.125	***	0.0090	-0.080	***	0.0106	-0.075	***	0.0105
United Kingdom	-0.027	**	0.0129	-0.100	***	0.0101	-0.099	***	0.0091
temp-contr	0.015		0.0096	0.013		0.0141	0.013		0.0142
Δ*temp-contr*	-0.008		0.0061	-0.006		0.0100	-0.006		0.0099
fur	-0.028		0.0533	-0.097		0.0577	-0.098	*	0.0578
Δ*fur*	0.042		0.0444	0.063		0.0475	0.063		0.0484
Year's dummies - Reference: 2009									

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	Levels OLS			First-difference OLS			First-difference 2SLS, instrument c_{it-2}		
Fertility	Coeff.		Robust S.E.	Coeff.		Robust S.E.	Coeff.		Robust S.E.
2009	-0.034	**	0.0151	-0.055	**	0.0216	-0.055	***	0.0209
2010	-0.039	**	0.0172	-0.056	**	0.0229	-0.056	**	0.0224
2011	-0.066	***	0.0220	-0.088	***	0.0293	-0.088	***	0.0287
2012	-0.079	**	0.0292	-0.103	***	0.0336	-0.103	***	0.0328
2013	-0.083	**	0.0383	-0.114	**	0.0466	-0.114	**	0.0458
Constant	0.175	***	0.0280	0.471	***	0.0261	0.470	***	0.0267
# of observations NT (N)	17114 (12205)			17114 (12205)			17114 (12205)		
R2	0.2168			0.1270			–		
Hausman Test of endogeneity	–			–			F(4, 12204) = 2.57		
	–			–			p-value = 0.0363		
Weak identification test (cluster robust):									
Kleibergen-Paap Wald rk F statistic	–			–			46.262		

Notes: * Significant at 10%; ** Significant at 5%; *** Significant at 1%.The standard errors are robust to heteroskedasticity and within-individual correlations. "First-difference" refers to the model in which I use the first differences of C_{it-1} to avoid the unobserved heterogeneity. "2SLS, instruments C_{it-2}" refers to the model in which I use the 2SLS estimator with C_{it-2} as valid instruments for ΔC_{it-1} to test the presence of endogeneity.

Source: Own estimations from longitudinal EU-SILC (2005-2013) dataset

In general terms, the cross-country average effects of recording previous events of unemployment on childbearing do not present statistical relevance for men and for women with respect to couples with permanently employed, while for women with a temporary job increase the likelyhood of having an addictional child by 7.7 percentage points and for men it is not statistical significant. As we consider several European countries, the average impact of job instability would be explained like a drop of opportunity-cost of childbearing is larger of the raising of a sort of "economic stability effect" for women *ceteris paribus*. It should be interesting drawing the subsamples of women with one child and of childless ones to focus on the possible heterogeneity of the opportunity-cost of childbearing during the time (Greulich et al. 2016, Auer et al. 2013).

As far as the women's occupational skills is concerned, we can observe that only for men all the classes have statistical relevance, but with different magnitudes and signs. As the findings of Auer and Danzer (2015) using German data, with respect to be unemployed, the blue collar workers affects positively and significantly the having an another child by 4.1 percentage points for low-skilled workers and by 3.2 percentage points for high-skilled ones; while the white collar workers affects negatively and significantly the childbirth by 2.6 and 3.3 percentage points rspectively for low-skilled workers and high-skilled ones.

With respect to female age cohort, being between 31 and 35 years old has a statistical significant effect on childbearing by 4.3 percentage points and it is in line with the European parenthood trends.

As expected, increasing levels of household disposable income (at net of woman's earning) has an positive impact but without a statistical relevance, but it could be owed to an inappropriate classification of the income groups for all different European countries.

As argue Sobotka et al. (2011), the year's dummies reflect a wide depression on the probability to the childbirth during all the concerned years of economic recession and also controlling for the female unemployement rate of aech country reveals a negative and statistical significant impact.

Finally, the more relevant aspect that emerges from these results is that the average of effects across countries are hugely characterized by the country fixed effects. With respect to France (known for efficient pro-fertility policies), all the other countries are statistically significants with the only exception of Austria. Most of the countries have an negative impact that does not reach the 10 percentage points only for the Continental countries and Nordic ones. The sign becomes positive only for Cyprus, Czech Republic, and Greece, where there are different welfare regimes, concerning respectively the groups of Anglo-saxon, Eastern, and Southern Europe.

3.5.2 Heterogeneous effects analysis

On base of the previous findings, I consider that it could be appropriate to repeat the estimation selecting 21 countries which reflect the peculiarities of different six welfare regimes (cfr the 3.3 paragraph). Continental welfare regime provides benefits targeted to individuals who belong to specific categories, such as families or a specific type of worker, and groups Austria, Belgium, France and Luxembourg. Southern European regime is composed by Spain, Italy, and Greece, where welfare coverage is often residual and left to the family, with limited social benefits (Ferrera 2005). Nordic one is composed by Norway Finland, Denmark, and Iceland, which characterized by universalistic welfare systems with large social supports pro work and family policies and against unemployment. The Anglo-Saxon one (United Kingdom, Cyprus) is liberal welafre regime, but without rigidities to (re)entry into the labour market. Finally, Eastern Europe regime with Czech Republic, Poland, Bulgaria and Hungary presents for temporary workers limitations in qualifying of eligibility for unemployment benefits[25], and Baltic one with Estonia, Latvia and Lithuania those show very low shares of female temporary workers on total employment and below 3%.[26]

Accounting for unobserved heterogeniety, the Table 3.5 show the First Differences OLS and the First Difference 2SLS model, where I interact six dummy variables of welfare regimes with the woman's and partners' economic activity status to estimate the probability of having an addictional child in Equation (3.1). I choose the 2SLS model because I account for the possible presence of endogeneity of $\Delta C(\cdot)_{it-1}$ in First-Difference 2SLS model using as instruments $C(\cdot)_{it-2}$, each one interacts with six dummy variables of welfare regimes. An Hausman test is used and it rejects the null hypethesis of absence of endogeneity (F(24, 12204) = 14.32; p-value = 0.0000) and the instruments are correlated with the regressors and not weakly, in fact the Kleibergen-Paap Wald rk F statistic is equal to 172.468, major than the rule of 'thumb' level of 10.

[25]See footnote 10.

[26]See Figure 3.2. Furthermore, concerning family formation trends, these countries move closer to Continental countries with 50% of young people leave home in line with the EU average (Eurofound 2016).

Table 3.5: Estimation results of the model for fertility controlling for welfare regimes' heterogenious effects in first differences

	First-difference OLS		First-difference 2SLS, instruments c_{it-2}	
Fertility	Coeff.	Robust S.E.	Coeff.	Robust S.E.
Group of Contries: Continental				
Woman's economic activity status - Reference: Permanent contract				
Temporary contract	-0.027 *	0.0130	-0.266 **	0.1220
Unemployed	-0.020	0.0148	-0.193 **	0.0874
Partner's economic activity status - Reference: Permanent contract				
Temporary contract	-0.007	0.0190	-0.248 ***	0.0855
Unemployed	-0.070 ***	0.0186	-0.182 ***	0.0461
Group of Contries: Eastern				
Woman's economic activity status - Reference: Permanent contract				
Temporary contract	0.006	0.0099	0.097	0.0883
Unemployed	0.002	0.0287	0.124	0.1101
Partner's economic activity status - Reference: Permanent contract				
Temporary contract	0.015	0.0089	0.074	0.0746
Unemployed	-0.003	0.0295	-0.011	0.0941
Group of Contries: Nordic				
Woman's economic activity status - Reference: Permanent contract				
Temporary contract	0.185	0.1168	-0.128	0.2885
Unemployed	0.160	0.1697	0.046	0.2414
Partner's economic activity status - Reference: Permanent contract				

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	First-difference OLS		First-difference 2SLS, instrument c_{it-2}	
Fertility	Coeff.	Robust S.E.	Coeff.	Robust S.E.
Temporary contract	- 0.002	0.1264	-0.115	0.1401
Unemployed	-0.076	0.1280	-0.210 *	0.1144
Group of Contries: Baltic				
Woman's economic activity status - Reference: Permanent contract				
Temporary contract	0.048 *	0.0230	0.270 ***	0.0815
Unemployed	0.051 *	0.0248	0.278 ***	0.0738
Partner's economic activity status - Reference: Permanent contract				
Temporary contract	-0.002	0.0121	0.207 **	0.0989
Unemployed	0.011	0.0174	0.230 ***	0.0867
Group of Contries: Southern				
Woman's economic activity status - Reference: Permanent contract				
Temporary contract	0.024 *	0.0131	0.077	0.1026
Unemployed	-0.027	0.0295	0.026	0.1086
Partner's economic activity status - Reference: Permanent contract				
Temporary contract	0.025	0.0382	0.024	0.0669
Unemployed	-0.001	0.0354	-0.018	0.0671
Group of Contries: Anglo-saxon				
Woman's economic activity status - Reference: Permanent contract				
Temporary contract	0.076	0.0540	-0.133	0.1320
Unemployed	0.048 *	0.0273	-0.167 **	0.0759
Partner's economic activity status - Reference: Permanent contract				

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	First-difference OLS			First-difference 2SLS, instrument c_{it-2}		
Fertility	Coeff.		Robust S.E.	Coeff.		Robust S.E.
Temporary contract	0.070	***	0.0072	-0.375	***	0.0769
Unemployed	-0.066	***	0.0170	-0.293	***	0.0434
Woman's Job Skills - Reference: Unemployed						
High skilled white collar	-0.012		0.0138	-0.014		0.0144
Low skilled white collar	-0.007		0.0132	-0.002		0.0131
High skilled blue collar	-0.000		0.0157	0.007		0.0150
Low skilled blue collar	-0.019		0.0190	-0.016		0.0179
Partner's Job Skills - Reference: Unemployed						
High skilled white collar	-0.057	***	0.0077	-0.055	***	0.0075
Low skilled white collar	-0.036	***	0.0062	-0.034	***	0.0064
High skilled blue collar	0.054	***	0.0127	0.053	***	0.0126
Low skilled blue collar	0.064	***	0.0081	0.065	***	0.0076
Woman's Age Cohorts - Reference: 15-25 age						
26-30 age	0.046		0.0299	0.039		0.0262
31-35 age	0.061		0.0305	0.062	**	0.0292
36-40 age	0.017	*	0.0126	0.015		0.0122
41-45 age	-0.005		0.0099	-0.001		0.0102
Woman's Health - Reference: Good						
Fair	-0.006		0.0108	-0.005		0.0114
Bad	-0.000		0.0209	0.001		0.0237

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	First-difference OLS			First-difference 2SLS, instrument c_{it-2}		
Fertility	Coeff.		Robust S.E.	Coeff.		Robust S.E.
Partner's Health - Reference: Good						
Fair	-0.006		0.0108	-0.005		0.0114
Bad	-0.000		0.0209	0.001		0.0237
Household Disposable Income (with Transfers) - Reference: Low income/1000						
Lower-mid income/1000	-0.000		0.0155	-0.003		0.0151
Upper-mid income/1000	0.052		0.0308	0.050	*	0.0283
High income/1000	0.066	**	0.0269	0.057	**	0.0243
temp-contr	0.051	**	0.0235	0.051	**	0.0224
Δ*temp-contr*	-0.031	*	0.0165	-0.031	*	0.0159
fur	-0.315	**	0.1451	-0.300	**	0.1380
Δ*fur*	0.192		0.1140	0.204	*	0.1138
Year's dummies - Reference: 2009						
2009	-0.053	**	0.0225	-0.057	***	0.0215
2010	-0.046	*	0.0257	-0.054	**	0.0255
2011	-0.058	*	0.0300	-0.063	**	0.0303
2012	-0.067	*	0.0338	-0.070	**	0.0353
2013	-0.104	**	0.0408	-0.107	***	0.0404
Constant	0.290	***	0.0576	0.289	***	0.0571
# of observations NT (N)	17114 (12205)			17114 (12205)		

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	First-difference OLS		First-difference 2SLS, instrument c_{it-2}	
Fertility	Coeff.	Robust S.E.	Coeff.	Robust S.E.
R2		0.0347		–
Hausman Test of endogeneity		–		F(24, 12204) = 14.32
		–		p-value = 0.0000
Weak identification test (cluster robust):				
Kleibergen-Paap Wald rk F statistic		–		172.468

Notes: * Significant at 10%; ** Significant at 5%; *** Significant at 1%.The standard errors are robust to heteroskedasticity and within-individual correlations. "First-difference" refers to the model in which I use the first differences of C_{it-1} to avoid the unobserved heterogeneity. "2SLS, instruments C_{it-2}" refers to the model in which I use the 2SLS estimator with C_{it-2} as valid instruments for ΔC_{it-1} to test the presence of endogeneity.

Source: Own estimations from longitudinal EU-SILC (2005-2013) dataset

As expected, the results show the presence of heterogeniety in job instability effects on childbearing among welfare regimes.

In general terms, the previuos findings relative to the economic activity status of the couple are very different when I classify the countries into the welfare groups, while the other results appear in line with those of benchmark model.

In particular, in Continental countries, with respect to have a stable job, instability in the labour market presents a negative sign that becomes always statistically significant in First Difference 2SLS model for women and for men with temporary jobs as well as in unemployment: for both genders, the size of the temporary job's effects is larger than unemployement's one. Thus, the finding of the Italian case in chapter 2 seems to be confirmed: the job instability affects negatively chilbearing following a lower opportunity-cost. Furthermore, under a 'gender perspective', the gender gap blows up but it is narrow; it could confirm the presence of suitable gender equality policies in these countries.

As far as the Baltic countries are concerned, for women, with respect to have a permanent contract, both the unemployment and the temporary contracts affect positively and statistical significantly the probability of childbearing, while for men these effects have a statistical relevance in First Difference 2SLS model. It might be explained by the current socio-cultural traditions that I have described earlier. The scarce use of job instability (in term of share) could explain as 'voluntary' choice linked to the low of opportunity-cost of childbearing. It could also clear because these effects are larger for unemploymed status.

For Anglo-saxon countries, instead, the unemployment has a different pattern by gender with respect to the stable job in First Differences OLS model: for women it encourages the childbearing, while, for men, not work discourages it, while the men with a temporary contract have a positive effects. While in First Difference 2SLS model these findings change and all ones become negative. Only the temporary work for women is not statistical significant. They could be in line with the reason that in a labour market with limitated welfare policies the loss of job discourages fertility choices, but the degree of job flexibility is such that a temporary work does not affect the fertility.

As far as the Southern European countries, for women only have a temporary contract has a statistical relevance and the impact is positive compared to permanet job in First Differences OLS model. It could be linked with the Grecian positive large effect recorded in the main estimation. These countries have a socio-cultural linkage with the family institution. This effect disappears in First Difference 2SLS model. Also for the Eastern European

countries, the results are no statistical significantly. In all the two cases, the reason could be that the impact of parents' successful labour market integration might be ambiguous in low-lowest fertility countries, due to the absence of child care options (Matysiak and Vignoli 2008).

Finally, as far as Nordic countries are concerned, all the economic activity statuses have not statistical relevance, but it do not surprise because we know that in these countries there are large social supports and policies (e.g. Danish flexicurity model) and they might withdraw the job instability effects.

3.6 Conclusions and policy implications

The empirical analysis of this study focus on European countries during the years of recent economic recession started in 2008, in which the puzzle is varying, where higher-low fertility countries are mixed with lower-low fertility ones, as well as with regards to female labour force participation rates, and different welfare regimes with own institutional support for workers.

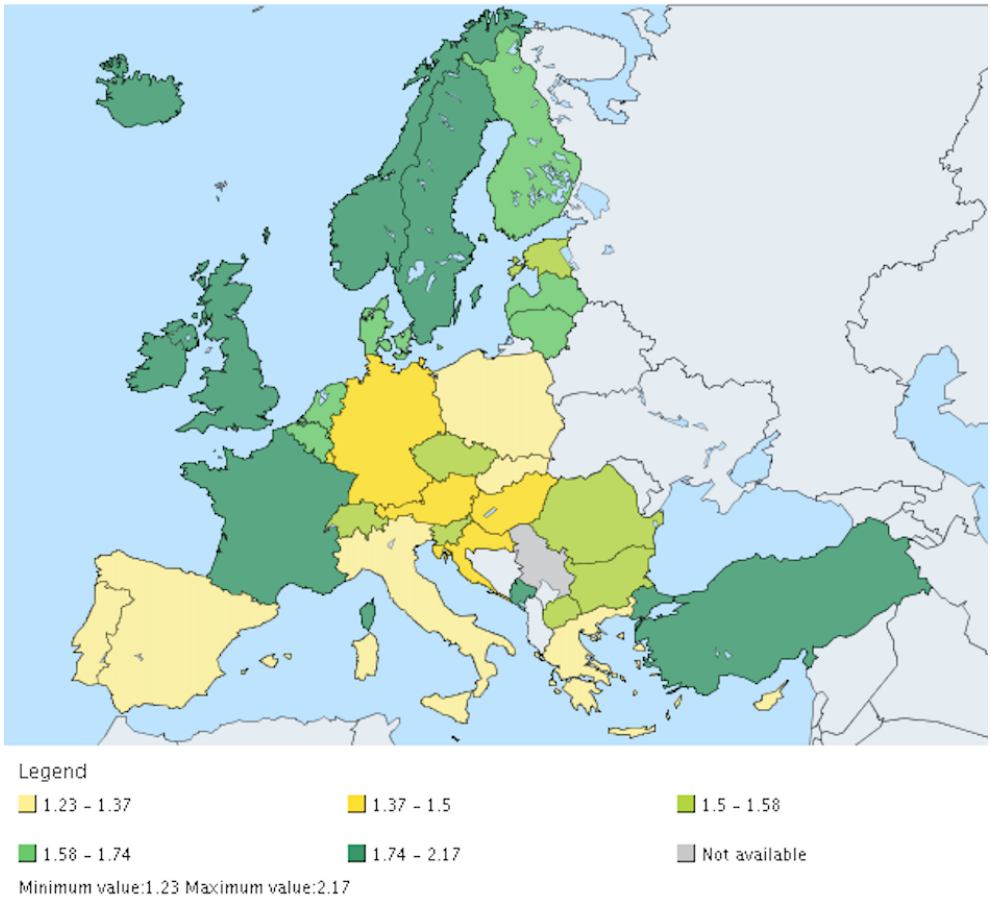
The principal result is that in this specific pattern the cross-country average effect of job instability on couple's fertility decisions is not statistical relevant because of the huge country-specific fixed effects. Only having a temporary job for women encourages chilbearing, in average, and this effect is in line with the mainstream theory that explains the fertility choice in based on the opportunity-cost of childbearing.

Furthermore, when I analyze these impacts, distinguishing through the six different welfare regimes, I can capture more information about the couples' fertility choices: the more relevant one is how much the institutional structure and linked social active policies weights in the family behaviour, overall in a framework of economic uncertainty.

As this ability also depends on a country's degree of support for combining work and family, the relation between female employment and fertility might differ across countries. In low-fertility countries, however, it is confirmed that the impact of parents' successful labour market integration might be ambiguous, due to the absence of child care options (Matysiak and Vignoli 2008).

3.7 Appendix

Figure 3.4 – Total Fertility Rate, 2013 - EU countries



Source: Own elaboration from Eurostat data

Figure 3.5 – Qualifying period for unemployment benefits - EU countries

	Number of months of work/ insurance/contributions (a)	Reference period (b)	Ratio (a/b)	Comments
NL	6 months	8 months	0.75	*Maximum duration 3 months. Those employed for 52 days or more in 4 of 5 last years qualify for benefit for no. of months in work up to 38. Voluntary unemployment insurance scheme for self-employed.*
LV	9 months	12 months	0.75	*Person has also to be insured for at least a year. Self-employed are not eligible for unemployment benefits.*
IE	9 months of paid/credited contribs (at least 3 months paid)	12 months	0.75	*Total of 24 months paid contributions also required. Self-employed are not eligible for unemployment benefits.*
PL	12 months	18 months	0.67	*Voluntary unemployment insurance scheme for self-employed.*
BG	9 months	15 months	0.60	*Self-employed are not eligible for unemployment benefits.*
BE	10-20 months	18-36 months	0.56	*Varies with age of worker. Self-employed are not eligible for unemployment benefits.*
CZ	12 months	24 months	0.50	*Before 2012, reference period was 3 years.*
DE	12 months	24 months	0.50	*Voluntary unemployment insurance scheme for self-employed.*
IT	12 months	24 months	0.50	*2 years of insurance also required.* *Self-employed are not eligible for unemployment benefits.*
PT	12 months	24 months	0.50	*Before 2012, reference period was 22 months. Self-employed are not eligible for unemployment benefits (except bogus self-employed).*
RO	12 months	24 months	0.50	*Voluntary unemployment insurance scheme for self-employed.*
AT	12 months	24 months	0.50	*6 months of insurance in 12 months for <25.* *Voluntary insurance for self-employed.*
LT	18 months	36 months	0.50	*Self-employed are not eligible for unemployment benefits.*
SK	24 months	48 months	0.50	*2 years of insurance in 4 for temporary workers. Self-employed without employees are not eligible for unemployment benefits.*
LU	6 months	12 months	0.50	
SE	6 months	12 months	0.50	*6 months of work with at least 80 hours a month. Earnings-related benefit: optional for employees and self-employed.*
SI	9 months	24 months	0.38	*Previously 12 months in 18 months.*
EE	12 months	36 months	0.33	*Self-employed are not eligible for unemployment benefits.*
HU	12 months	36 months	0.33	
DK	12 months	36 months	0.33	*Voluntary unemployment insurance scheme for self-employed (as for employees).*
FI	8 months	28 months	0.29	*Basic unemployment allowance: + min 18 hours of work per week. (18 months in the last 48 months for self-employed).* *Earnings-related unemployment allowance: optional for employees and self-employed.*
MT	4.5 months	24 months	0.19	*Total of 50 weeks of paid contributions also required. Self-employed are not eligible for unemployment benefits.*
EL	4 months	24 months	0.17	*For first-time claimants (for 2nd claims: 6 months in the last 14 months). Self-employed are not eligible for unemployment benefits.*
ES	12 months	72 months	0.17	*Voluntary unemployment insurance scheme for self-employed.*
FR	12 months	28 months	0.14	*Voluntary unemployment insurance scheme for self-employed.*
CY	12 months	-	-	*In addition, paid insurance of at least 26 times weekly basic earnings (€170) and in relevant contribution year, 20 times or more. Self-employed are not eligible for unemployment benefits.*
UK	-	-	-	*No qualifying period, but contributions in 2 tax years of at least 50 times basic weekly contribution and in 1 of 2 at least 26 times. Self-employed are not eligible for unemployment benefits.*
NO	-	-	-	*Income from work of at least 1.5 times Basic Amount (€10,842) in previous calendar year or average of at least Basic Amount in last 3 years. Self-employed are not eligible for unemployment benefits.*

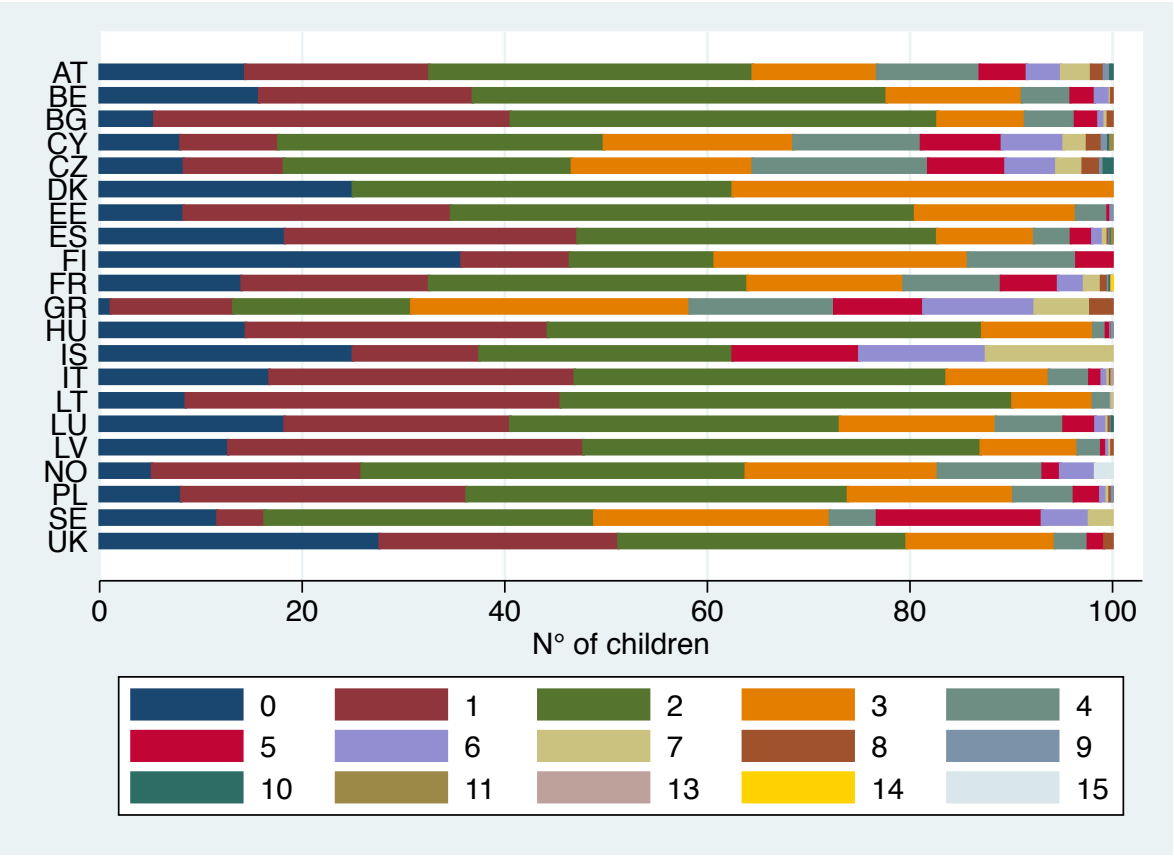
Source: Eurofound (2013), p. 41, Annex table 8

Table 3.6: Number of child(ren) by woman age cohorts - Percentage values

	Number of Child(ren)																
Age Classes	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
15-25	54.83	28.35	9.03	5.61	0.62	0.62	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
26-30	36.30	33.95	17.36	6.71	2.73	1.42	0.98	0.16	0.27	0.05	0.05	0.00	0.00	0.00	0.00	0.00	100
31-35	16.26	30.79	33.58	9.75	5.36	2.10	1.15	0.49	0.27	0.14	0.11	0.00	0.00	0.00	0.00	0.00	100
36-40	7.15	24.48	41.96	14.52	6.06	3.15	1.32	0.82	0.36	0.06	0.10	0.00	0.00	0.02	0.00	0.00	100
41-45	7.12	22.33	42.55	15.85	6.36	2.87	1.45	0.74	0.41	0.13	0.08	0.05	0.00	0.02	0.02	0.02	100
Total	13.10	26.15	37.13	12.97	5.56	2.59	1.29	0.64	0.34	0.10	0.09	0.02	0.00	0.01	0.01	0.01	100

Source: Own calculation from longitudinal EU-SILC (2005-2013) dataset

Figure 3.6 – Number of children across EU countries



Source: Own calculation from longitudinal EU-SILC (2005-2013) dataset

Final remarks

Neoclassical microeconomic models of fertility relate the fertility decline with the parallel increase in women labour force participation (Willis 1973; Butz and Ward 1979; Becker 1981; Cigno 1991): the rise of female activity levels should stimulate the demand for children (positive income effect) but also should enlarge the opportunity cost of childbearing (negative substitution effect), especially given the increase in the level of educational attainment of the younger cohorts of women (Bratti 2003; Adserà 2004; D'Addio and D'Ercole 2005).

Since the mid-1980s the cross-country association between female labour force participation (FLFP) and fertility (TFR) has become positive (Ahn and Mira 2002; Engelhardt and Prskawetz 2004; Billari and Kolher 2004), by contrary at micro level this is not yet: a meta-analysis by Matysiak and Vignoli (2008) indicates that the relationship between FLFP and fertility remains negative in micro level studies, but the magnitude of the association is stronger where the male-breadwinner model prevails (e.g.Southern Europe), and weaker in the Nordic countries where more generous protection systems have been implemented to reconcile motherhood with work (Esping-Andersen 1999; Adserà 2004; Del Boca and Sauer 2009).

During the 1990s, the increasing competition in the labour markets and employers' rising demands for workers flexibility have further discouraged childbearing in general (Mills and Blossfeld 2005). The employment instability and job precariousness increase employment uncertainty and the difficulties among the young workers in their transition to adulthood become more intense: in fact, when they start their labour market careers try to strengthen their economic position and then begin to look upon family formation idea (e.g. McDonald 2006; Vignoli, Drefahl and De Santis 2012). Start developing a recent branch of literature that uses dynamic models to analyse the interplay between fertility, labour force participation, and marriage (or co-living) during the current years in which the presence of economic uncertainty and the job instability have become other 'significant' determinats of fertility choices. But the evidence employed by studies of this topic is still scarce.

The first empirical analysis of this study focus on Italy during the years of recent economic recession started in 2008, an interesting society with joint features, such as the 'lowest-low' TFR, a low FLFP, and a modest institutional support for working women.

Mainstreaming theoretical predictions according to which female participation in the labour market may be underlying cause of the drop in fertility are not supported by empirical results of this work. On the contrary, women are far from being encouraged to bear children when they remain in precarious job; even if they have a lower opportunity-cost of leaving the labour market than those with a permanent job, they are definitely less likely to plan to have children. Reamining in unemployement also affects negatively childbearing but it has a lower size. The situation is different for men; job precariousness is not a deterrent discouraging fertility but only to become unemployed impacts negatively on it.

The empirical analysis of this study focus on European countries during the years of recent economic recession started in 2008, in which the puzzle is varying, where higher-low fertility countries are mixed with lower-low fertility ones, as well as with regards to female labour force participation rates, and different welfare regimes with own institutional support for workers.

When I extend the pattern of analisys to 21 European countries, the principal result is that country-specific fixed effects are largerly relevant. Only having a temporary job for women encourages chilbearing, in average, and this effect is in line with the mainstream theory that explains the fertility choice in based on the opportunity-cost of childbearing.

Furthermore, when I distinguish through the six different welfare regimes, I can capture more information about the couples' fertility choices: the more relevant one is how much the institutional structure and linked social active policies weights in the family behaviour, overall in a framework of economic uncertainty.

In low-fertility countries, however, it is confirmed that the impact of parents' successful labour market integration might be ambiguous, due to the absence of child care options.

Thus, I suggest that public actions aimed at raising fertility should also take into account targeted labour market policies. Precarious workers have low-paid jobs with scarce career prospects. Temporary female workers are well aware that in most cases a pregnancy would be a reason for dismissal, possibly causing a worsening in the financial situation of the couple. The resulting trade-off between completed fertility intentions and employability may be incompatible.

The demographic consequences of this drop in birthrate are doomed to become stronger because of growing of the share of precarious workers in

the labour and of the ageing of the population. Improving suitable gender equality and family friendly policies for the future promotes rising of the participation (and occupation) to the labour market, in particular for women and youngers, in order to reach the European targets to move toward a flexicurity model that guarantees for (economic) uncertainty due to job instability and reverses the lowest-low fertility trend.

Job Instability and Fertility Choices during the Economic Recession: European Countries

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