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Research Article

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The relationship between unemployment and fertility in Italy: A time-series analysis

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Abstract

BACKGROUND
Many analyses demonstrate that rising unemployment rates generate a feeling of uncertainty that can influence fertility behaviour, inducing a short-term reduction in fertility. The impact of the recent economic crisis in Italy is controversial in the current demographic literature.

OBJECTIVE
We wish to evaluate whether the recent changes in male and female unemployment are differently linked to fertility in different geographic areas of Italy.

METHODS
We used the following official aggregate data for the period 1995–2012: unemployment quarterly rates from the Labour Force Surveys conducted by the National Institute of Statistics (Istat) and quarterly general fertility rates. We applied a monitoring approach for the identification of structural breaks inside both of the time series and used a dynamic regression to identify specific temporal links between unemployment and fertility.

RESULTS
Both male and female unemployment rates are negatively associated with fertility in the northern and central regions of Italy. Unemployment rates seem to be good predictors of fertility in these regions, although male unemployment appears to further reduce fertility beyond the reduction predicted by female unemployment.

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CONCLUSIONS
In northern and central Italy, the recent rise in unemployment is negatively correlated with the fertility rate. The recent economic downturn seems to be linked in a more ambiguous and weak way to the fertility rate in the southern area.

1. Premise

During the last four decades of the 20th century, the average total fertility rate (TFR) has continuously dropped in Europe, as it generally has in Organization for Economic Cooperation and Development (OECD) countries. The aggregate trend covers considerable differences across Europe, with the main differences appearing between northern and southern European countries (Eurostat 2012).

During the same period, important changes have also occurred in the labour market arrangements of both men and women, with changes in individuals' and couples' economic conditions. Whereas by the 1980s the fall in fertility was coupled with a rise in female employment, since the late 1980s the fall has been accompanied by a rise in unemployment, particularly among women.

Explaining the determinants of such a fall in fertility and the links with changes in the labour market statuses of both men and women has become a major topic over the last years (D'Addio and Mira d'Ercole 2005; Kreyenfeld 2010).

The rise in unemployment for women and men in southern and central European countries that occurred during the 1990s has been proposed as an explanation for the more pronounced decrease in the TFR in these countries, as in other countries with low female labour force participation rates (Ahn and Mira 2002; Adsera 2005; Engelhardt and Prskawetz 2004). This evidence highlights the need to further examine the role of unemployment in fertility behaviour.

This paper seeks to describe the connections between fertility and unemployment in Italy from a gender-based and geographic perspective. Italian workers have experienced a rising trend of unemployment – with gender and regional differences – since the mid-nineties, resulting in a feeling of uncertainty about the future. We are in agreement with the hypothesis that macro-level economic conditions are likely to be related to fertility (Brewster and Rindfuss 2000): in particular, economic uncertainty can induce a short-term reduction in fertility that is presumably due to the postponement of decisions to have an (additional) child until the economy recovers.

We utilised time series of aggregate data on fertility and unemployment during the interval 1995–2012, which includes the period of economic downturn that began at the end of 2007.

We began from the hypothesis that the connection between unemployment and fertility differs among the various Italian regions, and we used a regression dynamic model to evaluate whether changes in fertility in different Italian geographic areas are more related to changes in male or female unemployment, as well as the strength of the link. Moreover, we paid particular attention to specific temporal links between the two series in different geographical areas.

The structure of the paper is as follows:

- Discussion of the literature and previous research on the relationship between fertility and unemployment of both men and women. We utilised aggregate data, but we also referred to studies of individual-level data to understand how the issue has been addressed by different approaches;
- Discussion of these relationships in Italy within the European context;
- Methodological approach and analysis of aggregate trends of fertility and unemployment in Italy by gender and geographic area; and
- Discussion of the results.

2. Unemployment and fertility: A complex relationship

A modern discussion on fertility in developed countries began in the 1960s and focused on the importance of socio-economic factors at the community or country level,[4] the incompatibility between work and family, increasing female education, and the roles of women in different contexts related to specific welfare policies (Oppenheimer 1988; McDonald 2006; Pison 2009).

The decrease in fertility rates in the 1960s and 1970s in most industrialised economies was correlated with an increase in female employment (Adsera 2004). This is consistent with the neoclassical theory of fertility formulated by Becker (1960, 1991) and Willis (1973) and its extensions,[5] which emphasise the effects of parental income and the cost of rearing children. The theory posits a negative association between female employment and fertility, which reflects a conflict between the roles of mother and employee (the role-incompatibility hypothesis). The results of several studies carried out at the macro level (Butz and Ward 1979; Ermisch 1979, 1980) and at the micro level (Hotz, Klerman, and Willis 1997) are consistent with this hypothesis.

[4] A full discussion can be found in Oppenheimer 1994; Engelhardt and Prskawetz 2004.

[5] The theory identifies the crucial determinants of fertility in rising rates of female schooling and employment. Also, the Easterlin hypothesis (1987) of relative economic deprivation considers these factors as determinants of fertility. A full discussion can be found in Macunovich 1998.

The theoretical neoclassical model does not univocally predict the effect of unemployment (which is not explicitly considered but represented by wage loss) on fertility behaviour. It predicts a negative effect of unemployment on men's fertility decisions due to the loss of income (the income effect). However, the same model suggests that (high) female unemployment may be positively associated with fertility decisions through a reduction of the opportunity cost of childbirth due to unemployment, providing time for childbearing and child caring (the substitution effect) (Butz and Ward 1979; Rosenfeld 1996). The overall impact is thus more ambiguous for women than for men because the impact depends on whether the income or substitution effect prevails.

Different studies on the relationship between fertility and labour market arrangements differ in the data considered, in the economic indicators utilised, and in the use of the gender-based approach.

The utilisation of individual-level data or aggregate data is an important factor because the relationships at the micro and macro levels may be dissimilar (Rindfuss and Brewster 1996; D'Addio and Mira d'Ercole 2005). Many analyses of the relationship between unemployment and fertility have been carried out in recent decades, utilising both individual data (Ahn and Mira 2001; Baizán 2005; De la Rica and Iza 2005; Mills and Blossfeld 2005) and aggregate data (Ahn and Mira 2002; Engelhardt and Prskawetz 2004).

Recently, the research emphasis of economic demographers has often shifted toward the exploration of the fertility choices of individuals, but interest remains focused on swings in aggregate fertility (Rindfuss and Brewster 1996; Lee 2001; McNown and Rajbhandary 2003; Engelhardt, Kögel, and Prskawetz 2004). Existing macro studies can be divided into studies that analyse macro-level data on a cross-country basis and those that apply time-series analytic methods. The latter method, which is also utilised in the present paper, represents a more dynamic approach because it examines whether a change in economic/labour conditions leads to a change in fertility (Sobotka, Skirbekk, and Philipov 2011).

With regard to the choice of the most suitable economic indicator, many researchers have shown that the level of unemployment – which reflects confidence in the future – can predict the effect of economic downturns on fertility more closely than other indicators[6] because its change can affect, often in different manners, the childbearing decisions of women and men (Eurostat 2012). As Sobotka, Skirbekk, and

[6] The International Labour Organization (ILO) provides the following definitions: a) the labour market participation rate is the percentage of members of the working-age population who are employed or who are unemployed and looking for work; b) the employment rate is the percentage of people aged 15–64 years who are employed; and c) the unemployment rate represents the number of unemployed persons as a proportion of the active population (which comprises all employed and unemployed people).

Philipov (2011) affirm, the economic climate in a country measured by aggregate indicators (e.g., gross domestic product [GDP] or unemployment rate) tends to influence couples' decisions more strongly than their own personal conditions. At the macro level, starting from trends in fertility rates in some OECD countries during the period 1970–2002, D'Addio and Mira d'Ercole (2005) suggest that unemployment is an important concern when couples consider having a child.

A rise in the unemployment rate may induce perceptions and expectations of job instability, economic insecurity, awareness of the crisis, and other factors that are difficult to identify or measure (Andersson 2000; Adsera 2004; Thévenon 2010; Sobotka, Skirbekk, and Philipov 2011; Kreyenfeld, Andersson, and Pailhé 2012). Researchers agree that uncertainty adversely affects fertility, highlighting the negative correlation between unemployment and family formation and reproduction, as Testa and Basten (2014) recently confirmed in their examination of fertility intentions. In addition to unemployment, other indicators reflect aspects of economic uncertainty that have become common in many European countries, such as temporary contracts, part-time work, and flexible jobs.

With regard to gender, attention has generally been paid to the relationship between fertility and female employment status, but many researchers have also considered male employment status because males' 'breadwinning capacity' is considered of primary importance to couples' childbearing decisions. The effect appears to be more ambiguous when the relationship between fertility and female unemployment is considered: this is because of contradictory evidence for women of different countries and ages. The unclear effect of female unemployment is related to the modifications the female role exhibits over time and to family policies and social systems that can mitigate the effects of labour market swings.

A further body of research focuses on the effect of unemployment and other career uncertainty measures on fertility choices from a gender-based perspective. These studies consider not only partners' employment and unemployment but also other dimensions of inactivity, such as housewife and student status (Baizán 2005; González and Jurado-Guerrero 2006; Kreyenfeld 2010; Santarelli 2011; Vignoli, Drefahl, and De Santis 2012). This greater detail allows to individuate a more precise link between income and job (in)stability and the institutional contexts of each country, which differently affect individuals' perceptions of insecurity in the labour market.

3. Previous empirical studies

A number of gender-based studies have analysed the relationship between fertility and male and female unemployment in developed countries. The literature contains a number of common features, but results are not conclusive and sometimes conflicting.

Most of the articles examining male unemployment indicate that it has a clear negative effect on fatherhood for men as well as on couples' fertility decision. At the macro level, Örsal and Goldstein (2010) found a pro-cyclical relation between fertility and male and female unemployment rates after analysing 22 OECD countries. Oppenheimer (1994), who has studied changes in American society during the 20th century, maintains the hypothesis that the loss of the man's income is a key factor in a couple's decision not to have children.

At the individual level, the negative impact of male unemployment is evident in the transition to first birth (Simó Noguera, Golsch, and Stainhage (2002) and Ahn and Mira (2001) for Spain; Mills and Blossfeld (2005) for 14 developed countries; Schmitt (2008) for France, Finland, Germany, and the United Kingdom (UK); and Kreyenfeld and Andersson (2014) confirm results for Germany). Kravdal (2002) found a primarily negative effect of unemployment on all birth parities among Norwegian men. Pailhé and Solaz (2012) confirm that in French couples, male unemployment generally has the strongest negative impact because men are still expected to be the main breadwinners.

No impact of male unemployment on first birth rate emerges in the UK (Francesconi and Golsh 2005) and in Denmark among young men (Kreyenfeld and Andersson 2014), whereas a negative impact emerges among older Danish men.

Although the majority of studies have found a negative impact of male unemployment on fertility, the results for female unemployment are more heterogeneous, sometimes showing a different nexus with respect to birth parity and mother's age.

Still, at the individual level, a positive impact of female unemployment on the transition to first motherhood has been verified for many countries (Schmitt (2008) for Germany, Finland, the UK, and some French regions; Francesconi and Golsh (2005) for the UK; Liefbroer and Corinj (1999) for the Netherlands and Flanders; Andersson (2000) for younger women in Sweden, whereas for other groups of women no important interactions emerge). By contrast, a negative impact of female unemployment on fertility is found in Sweden (Andersson and Guiping 2001), and this impact is found at the municipal levels as well by Hoem (2000). Kravdal (2002) found a (weak) negative influence among Norwegian women on the transition rate to second and higher-order births, whereas an opposite effect emerges for first births. Again in France, Meron and Widmer (2002) found that unemployment clearly delays first childbirth, more noticeably if the unemployment occurred when the women were already living as

part of a couple. On the contrary, Kreyenfeld (2010) did not find any statistically significant impact of unemployment on women's transition to first birth in western Germany.

Santarelli (2011) and Vignoli, Drefahl, and De Santis (2012) analysed the labour force status of both members of married couples in Italy. They consider the interaction of male and female labour market conditions (with a wide set of non-employment positions) to investigate how economic uncertainty influences fertility behaviour. They find higher first birth rates for couples with non-working women, confirming the importance of the man's economic position on the decision of having a first child. These results are partially confirmed by González and Jurado-Guerrero (2006), analysing the transition to motherhood in Italy and Spain, and Baizán (2005), who analysed second or higher order birth rates for Italy, Spain, and Denmark.

Results from micro-level analysis are sometimes conflicting, but they highlight that in European countries where male breadwinning capacity is crucial and labour market institutions are primarily oriented toward male workers – as in Italy, Spain, and Germany – unemployed women show elevated first-birth rates. Contrarily, in countries where female employment is widespread and facilitated by institutional contexts – as in northern European countries – a negative relationship between unemployment and fertility behaviour has been found.

At the macro level, Lanzieri (2013) analysed total fertility rate of employed and non-employed women in 2007–2011 in numerous European countries. In some southern countries for which data are available[7] (such as Portugal and Spain), non-employed women have lower fertility than employed women; the opposite is true for several central and northern European countries (like Germany and Norway). When trends in fertility are considered, changes showed by employed and non-employed women do not identify a clear model. The average TFR across countries shows a very slight drop among employed women (–0.6%) and the most significant reduction among non-employed women (–2.9%), but it is difficult to detect a common pattern across Europe. For example, among southern countries, in Spain and Greece the TFR shows a reduction among unemployed women and an increase among employed women. Portugal reveals a different trend.

This short review confirms that in the European countries the institutional contexts and labour market institutions exert an important role on the relationship between unemployment and fertility behaviour.

[7] Eurostat data on live births by mother's activity status are not available for Italy.

4. Italian fertility and unemployment in the recent European context

Fertility began to drop significantly in Europe during the 1970s and 1980s, although at different paces in different countries. Nordic countries retained relatively high fertility or an early decline of TFR followed by an increase in the 1980s and 1990s, whereas fertility decline was delayed in southern European countries. However, TFR has tended to converge during the last few decades (Eurostat 2012). Three groups of countries within the European Union can be identified according to the level of their TFR in 2012: a) those with fertility rates at or near the replacement level, which include Ireland, France, Sweden, Iceland, and the UK; b) those with a moderately low fertility rate (in the range of 1.6–1.9 births per woman), which include Belgium, Denmark, the Netherlands, Finland, and Norway; and c) those with very low fertility rates (in the range of 1.5 births or less), such as both the southern and eastern European countries of the European Union (EU) as well as Austria and Germany (Eurostat 2014).

Italy shows trends similar to those of other southern European countries. Despite the strong family attachments and the prevalence of traditional family forms within the country, Italy has long been characterised by persistently low fertility levels. After the baby boom in the mid-1960s – mostly ascribed to a variation in the tempo of the childbearing of Italian women – the TFR steadily declined to very low levels (less than 1.5 children per woman) in the mid-1980s, reaching the lowest fertility rates (less than 1.3 children per woman) in the period 1993–2003. The TFR then gradually recovered: it increased from 1.29 in 2003 to 1.42 in 2008. The recovery in the TFR primarily occurred in northern regions, where most of the rise can be attributed to the contributions of foreign women[8] (Caltabiano, Castiglioni, and Rosina 2009; Istat 2014a). The indicator slightly decreased again, reaching 1.40 in 2012 (Table A-1).

The most recent years are mainly characterised by the intense impact of the current economic crisis on European labour markets, which has increased male and female unemployment rates in most countries.[9] Between 2007 and 2011 the total unemployment rate (for those aged 15–64) in the EU-27 varied from 6.7% to 9.7% for men and from 7.9% to 9.8% for women (Eurostat 2014). Data show a high degree of heterogeneity in the gender gaps in unemployment. This may be explained by several factors, including a higher prevalence of temporary contracts among women,

[8] In Italy, the TFR of immigrant women reached 2.37 in 2012, whereas that of Italian women reached 1.29. Children of immigrant women represent 15% of total births. Due to the different proportions of immigrant women of reproductive age in various Italian regions the percentage reaches nearly 22% in the northern regions, whereas these values are 17% and 5% in the central and southern regions, respectively (Istat 2014a).

[9] We emphasise that, in Italy, the rise in unemployment has been alleviated by an increase in the number of workers who have access to welfare transfers and who, as a result, are not counted among the unemployed (Addabbo and Maccagnan 2011).

differences in educational attainment, and labour market segregation (ILO 2012). In addition, the financial and economic crisis had a strong asymmetric impact on unemployment within different countries, and some changes contrast according to gender during the period 2007–2011, as in Belgium, Austria, Finland, and Switzerland (Table 1). The gender impact of the global financial and economic crisis can be related to its immediate impact in some male-dominated areas, such as the construction and industrial sectors (European Union 2013; ILO 2012). Data on unemployment rates confirm the general assumption that changes for women are less pronounced than for men.

The highest changes in unemployment rates are evident for some countries in which the level was quite low in 2007, and unemployment rate changes have different magnitudes among different age groups in the European countries we considered, even when the trends are the same (Table 1 and Table A-1).

Table 1: Changes in unemployment rates and TFR in selected European countries for 2000–2012.

	Changes in unemployment rates 2007–2011 (%)				Changes in total fertility rate (%)	
	Males 15–64	Females 15–64	Males 25–54	Females 25–54	2000–2007	2008–2012
BE-Belgium	7.5	-15.3	8.5	-14.9	9.0	-3.2
DK-Denmark	125.7	81.0	133.3	91.7	4.0	-8.5
DE-Germany	-27.6	-36.0	-26.9	-35.8	-0.7	0.0
IE-Ireland	264.0	159.5	293.0	169.4	6.3	-2.4
GR-Greece	186.8	67.4	208.5	72.5	11.9	-11.3
ES-Spain	232.8	104.6	263.0	115.5	13.8	-9.0
FR-France	17.3	12.8	19.0	11.7	4.8	0.5
IT-Italy	54.0	22.8	65.0	23.9	8.7	-1.4
NL-the Netherlands	60.7	18.9	95.0	16.1	0.0	-2.8
AT-Austria	2.5	-13.7	3.0	-15.6	1.5	2.1
PT-Portugal	88.6	33.7	91.8	28.1	-14.2	-7.9
FI -Finland	30.3	-1.4	34.7	-3.4	5.8	-2.7
SE-Sweden	33.3	21.5	39.0	25.5	22.1	0.0
UK-the United Kingdom	54.4	48.0	70.3	55.3	15.9	0.0
NO-Norway	34.6	20.0	52.6	31.6	2.7	-5.6
CH-Switzerland	26.7	-2.2	39.1	-2.4	-2.7	2.7

Sources: OECD database 2014; Eurostat online database 2014. In Table A-1, unemployment and fertility rates.

During the period 2007–2011, the Italian female unemployment rates were substantially greater than the male rates, although they exhibited less variation (Table 1 and Table A-1). The per cent change in the female unemployment rate for women aged 15–64 was more than 30 points less than the rate change for males (from 7.9% to 9.7% for females and from 5% to 7.7% for males). Changes in female unemployment rates in

Italy are similar to those in Sweden and Norway. For men, the 2007 unemployment rate and its subsequent increase in Italy mirrors the equivalent values exhibited by the UK and the Netherlands. In addition, in Italy changes in unemployment rates for people aged 25–54 of both genders are more pronounced in comparison to changes for all ages, but the magnitude of the change is again higher for men (Table 1).

These different gender-based patterns seem to be consistent with the general assumption that, in countries with low levels of female labour market participation, women who are in the labour force tend to be more highly skilled. This selection effect will tend to reduce the measured gender gap in unemployment rates if unemployment rates are negatively related to skill (Azmat, Güell, and Manning 2006).

Trends in TFR also highlight great variability in rate changes since the beginning of the 21st century (Table 1), but changes in fertility have been similar among European countries from the 2007 crisis through 2012.

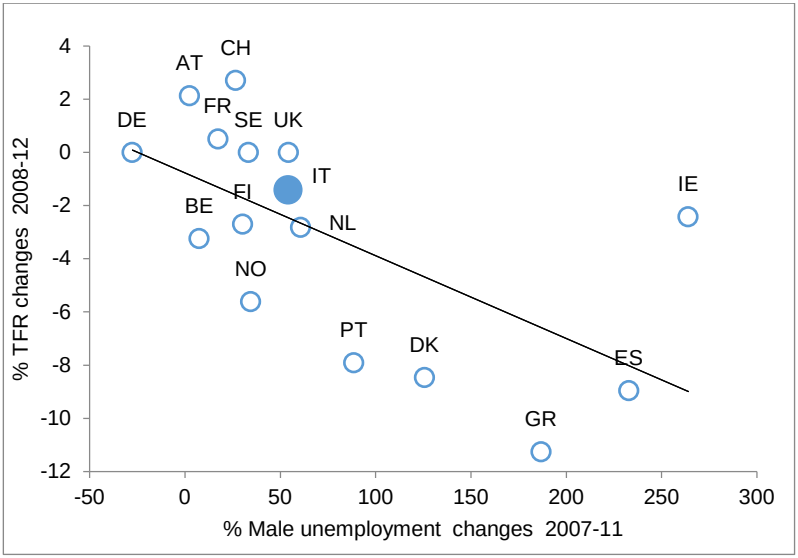
A scatter plot of changes in unemployment rates (ages 15–64) during the period 2007–2011 and in the TFR one year lagged (2008–2012) in some European countries verifies the cross-country negative link between the two indicators in recent years (Figure 1). Italy, where fertility is traditionally very low, exhibits one of the lower negative changes in the TFR as well as middle changes in unemployment rates.

The cross-country correlation between the percentage change in the male unemployment rate and the percentage change in the TFR is significant and equal to 0.63. When female unemployment is considered, the cross-country correlation is significant and lower, reaching 0.47; if Ireland (IE), an outlier country, is excluded, this correlation reaches 0.73.

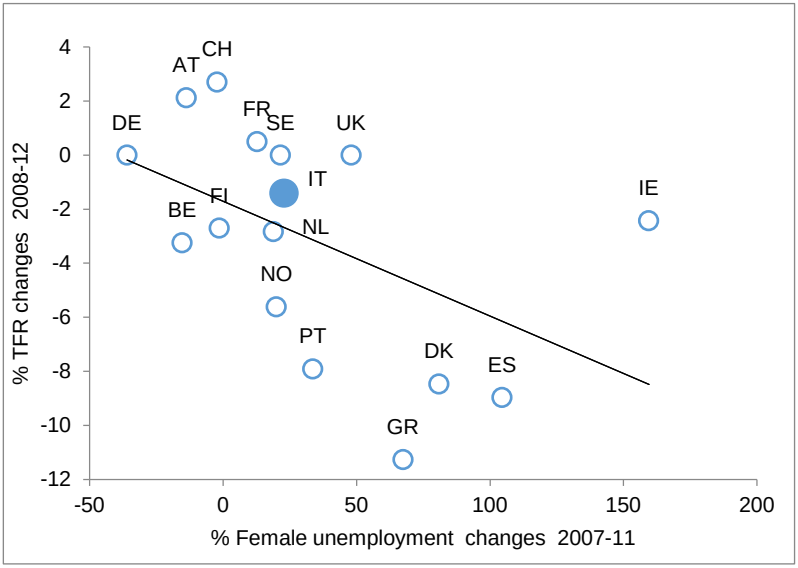
Unemployment reduces the expected safety of the population not only through a lower expected income but also through an increase in employment uncertainty. As stated by Adsera (2004), the spread of unstable contracts, which is common in southern Europe, depresses fertility, particularly for younger women. Goldstein et al. (2013) confirm similar results for southern European countries using cross-national OECD data.

Figure 1: Changes in the TFR and in male unemployment rates in selected European countries

a)



b)



Sources: Our elaborations on OECD and Eurostat online database (2014).

This aspect is important for Italy, where the spread of fixed-term contracts, part-time work, and flexible jobs has been facilitated by the introduction of the 1997 Treu and the 2003 Biagi reform measures[10] (Censis 2003; Schindler 2009). Most of the employment gains that have occurred since 1995 have been in temporary and part-time work (Eurostat 2014). Italian percentages of employees with temporary or part-time contracts are usually not very high in comparison to other European Union countries (EU-15), but their relative increase has been one of the more remarkable ones. Between 1995 and 2011 the share of temporary employment increased from 7.4% to 13.3% in Italy (+79.7%) versus an average increase of between 12.0% and 14.2% (+18.3%) in the EU-15. In the same period the share of part-time employment rose by 138% in Italy (from 6.4% to over 15%), whereas in the EU-15 the relative increase has been almost 40% (from 15.6% to 21.8%).

The importance of welfare policies clearly emerges when the relationship between labour market trends and fertility behaviour is discussed (Rindfuss and Brewster 1996; Hoorens et al. 2011). In countries where unemployment is low and institutions easily accommodate individuals' entry to and exit from the labour market – as in some northern European countries – fertility rates are at approximately the replacement level. In countries where unemployment is high and welfare and labour market policies are weak and rigid – as in southern European countries – fertility rates are low (Adsera 2004; Del Boca 2002; Balbo, Billari, and Mills 2013).

5. Italian regional differences in unemployment and fertility

From 1995 to 2008 both the number of births and the TFR show a positive trend in Italy: since that time the number of births has declined, whereas the TFR rose to 1.42 in 2008 before fluctuating slightly around 1.4 (Istat Warehouse). Between 2008 and 2009 Italian births decreased by 1.4%, more intensely in the central (–3.3%) and southern regions (–1.3%) than in the northern area (–0.6%).[11] Since then the decrease has accelerated, and from 2009 to 2012 the number of births fell by 6.2%. In the northern and southern regions the reduction was greater than 6%, whereas in the central regions it was approximately 4%. The fertility decline observed after 2007–2008 may also include a postponement of childbearing during a period of economic decline that does not necessarily represent a decision to have fewer children (Goldstein, Sobotka, and

[10] Law number 196 of 1997; Law number 30 of 2003 (http://www.camera.it).

[11] In our analysis we have jointly considered the north-western and north-eastern regions. In both areas, changes over time in fertility behaviour and unemployment rate are very similar (Table A-2).

Jasilioniene 2009; Sobotka, Skirbekk, and Philipov 2011; Cherlin et al. 2013; Pison 2011).

Since 2007 the timing and magnitude of changes in both the unemployment rate and the TFR have varied markedly in Italy across regions and by gender (Table A-2). Male unemployment rates in the northern and central regions increased by approximately 70%–100% from 2007 to 2011, whereas in the south the rate increased by approximately 36%. Female unemployment rates showed higher variability between the different regions of the country.

A first analysis on the time series of unemployment rates and general fertility rates (GFR)[12] at the regional level during the period 1995–2012 suggests that a fertility decline occurred within one to two years after a consistent rise in the unemployment rate. This lag could be considered as the time needed for people to act upon fertility decisions. Figure 2 shows a map of Italian regions by sign and correlation level between the time series of annual female unemployment rates and the one-year-delayed GFR. For most regions the correlation is high or very high, but the sign of the relationship is not always the same.

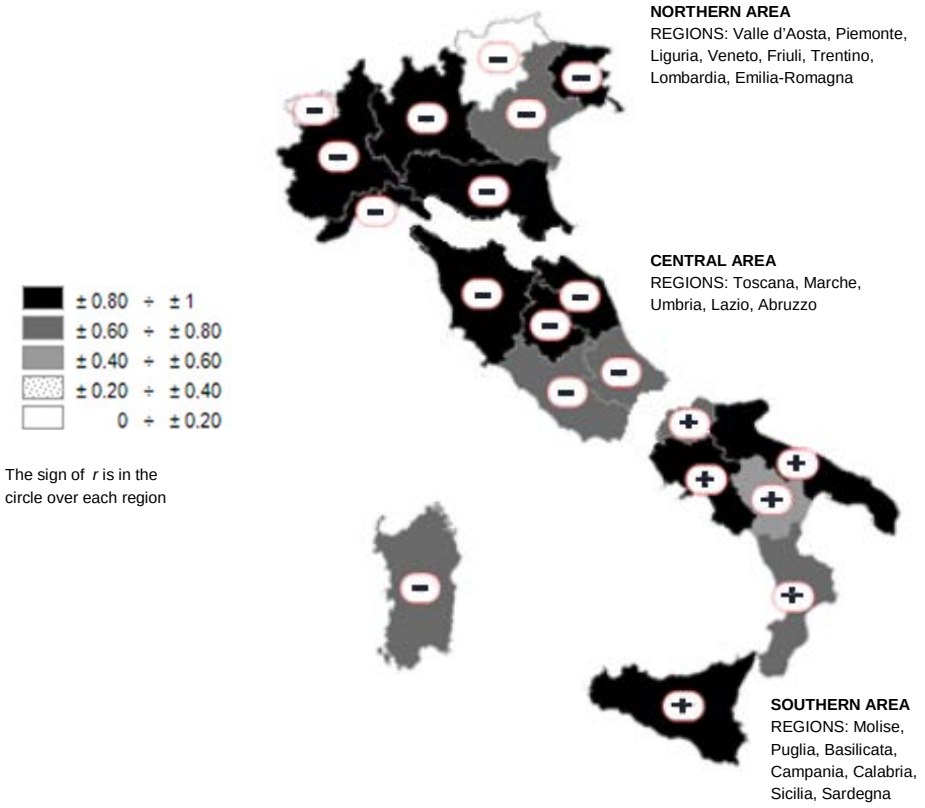
The southern regions show a positive relationship between female unemployment and fertility whereas the central and northern regions show a negative relationship, which reflects what is happening at the European level. This evidence confirms that Italy can easily be divided into the more developed North and the less developed, more welfare-dependent South, which has a very widespread underground economy. These results could also be due to the different characteristics of family networks (Micheli 2012), to the system of local welfare benefits and the availability of public child care (Del Boca 2002), and to different labour market arrangements in the Italian regions.

In Italy throughout the 1990s, substantial powers in health, social services, and job policies were increasingly transferred from the central government to the regional governments in a process of decentralisation. In the economically stronger northern and central Italian regions this new structure gave a new impulse to social services, whereas the southern regions remained more linked to traditional approaches based on fund transfers assigned for emergencies and on institutionalised care. This process has given rise to new inter-territorial inequalities (Hemerijcck 2013). With respect to labour market policies, in the southern regions the focus is on access to social security, whereas the northern regions have more active labour market policies (Ascoli and Pavolini 2012). As we shall see later, employment and unemployment rates in the

[12] The general fertility rate is the number of live births per 1,000 women between the ages of 15 and 49 years. The effects of modifications in age structure during the period 1995–2010 are negligible in our model because each fertility rate is connected with the previous one.

southern regions do not always reflect the actual employment status due to the diffusion of shadow economic activity and undeclared work in the area (Istat 2014b).

Figure 2: Correlation between female unemployment rates and fertility rates in 1995–2012



The direction of the relationship remains constant when considering male unemployment, but the order of magnitude is more variable with respect to female unemployment. The results suggest that the connection between male unemployment

and fertility may be relevant but not well estimated by this simple correlation map, and the results also confirm the need to separately analyse Italian geographic regions.

6. Data and methodological approach

To deepen the connection between trends in male and female unemployment and fertility rates in Italy, we applied a time-series analysis to data for the period 1995–2012, which includes the years after the financial crisis of 2007–2008. As mentioned by Hoorens et al. (2011), the recent financial downturn provides an excellent opportunity to study the relationship between fertility and economic growth, so we paid particular attention to the last six years of the analysed period.

We attempted to verify whether the recent dramatic swings in the labour market are linked to fertility rates and whether we could recognise a different degree of association for male or female unemployment at the macro level in different geographic areas of the country. Moreover, we intended to verify whether our results are consistent with other assumptions obtained from previous studies.

Most Italian studies analysing this issue start from individual data, whereas papers in which aggregate data are utilised are less common. This exploratory approach does not allow us to ascertain conclusions about individual behaviour because the adopted indicators do not reflect individual structure and variance. Time-series analyses of aggregate data – commonly used in demographic, social, or ecological analysis – cannot establish causality (Morgenstern 1998): however, in many cases such analyses are essential to obtain predictions or hypothetic conditions (King 1997).

We used official data from the Labour Force Surveys conducted by the National Institute of Statistics (Istat), considering unemployment quarterly rates[13] and synthesising fertility in the same periods using the quarterly general fertility rates. Due to the different fertility levels and unemployment rates in the Italian regions, this study separately considers the three main areas of the country, assuming that they are sufficiently homogeneous for a macro analysis.[14]

In each area, we evaluated whether fertility was related to male or female unemployment and all the possible reasonable lags between these indicators using time-series techniques. In particular, the use of the dynamic regression models allowed us to identify specific temporal links between variables. The dependent variable Y_t (fertility

[13] The use of quarterly data is due to the nature of the labour force surveys.

[14] We have previously compared two geographic aggregations of Italian regions, with five (north-east, north-west, centre, south, islands) and three (north, centre, south) areas. Considering the stability of the results, we decided on the second aggregation level.

rate) depends on (one or more) lagged variable X_t (unemployment rate) in the general form

$$Y_t = C + f(X_t) + e_t \quad (1)$$

where C is an additive constant term, e_t is an additive disturbance term, and $f(X_t)$ is the transfer function defined as

$$f(X_t) = v_0 X_t + v_1 X_{t-1} + v_2 X_{t-2} + \ldots \quad (2)$$

Dynamic regression models are widely used to improve the estimated values of dependent variables by one or more lagged independent variable, and they may assume some typical forms. For example, if the v_k coefficients are reduced at any time by a constant value $0<|\delta|<1$, and if we consider a dead time equal to k (with no lagged effects for $v_0, v_1,\ldots,v_{k-1}$, as in our case, in which the lagged effects of unemployment on fertility are present for at least three quarters thereafter) we obtain the Koyck transfer function (Pankratz 1991), which may be written as

$$f(X_t) = \delta Y_{t-1} + v_k X_{t-k} \quad (3)$$

We consider male and female unemployment rates in the three different geographic areas (i.e., the northern, central and southern regions of Italy) with regard to four different lags between unemployment and fertility (from three to six quarters). All of these models require detailed calibrations to define the most suitable choice based on different statistical criteria and different demographic assumptions. We prefer to explore the strength of the link between unemployment and fertility by specifying a baseline model common to all the areas. This model uses the transfer function previously defined in the following form

$$F_t = \beta_0 + \beta_1 F_{t-1} + \beta_2 U_{t-k} + \beta_3 I_{tb} + e_t \quad (4)$$

F_t and F_{t-1} are the GFRs for quarters t and $t-1$, respectively; U_{t-k} is the general unemployment rate of k preceding quarters (male and female are $U_{M\ t-k}$ and $U_{F\ t-k}$, respectively); and I_{tb} is a dummy variable of the event $t_b \leq t$ that is used to improve the model fit in the post-crisis period, where t_b is the time k quarters after the unemployment break (the quarter in which a structural change in the unemployment rate emerges). In particular, F_{t-1} takes into account the serial correlation effect and tries to identify the other fertility determinants omitted in the model, which necessarily involves only macro indicators with a small number of covariates (viz., gender and geographic area for unemployment rates and geographic area for fertility rates). In other words, the fertility rate F_t depends on a key variable U_{t-k} and on two other additional

covariates: fertility in the previous quarter[15] (F_{t-1}) and a dummy variable I_{tb} that adjusts the constant term $\beta_{0,}$ including the unemployment step effect.

Male and female unemployment rates are not included together because the simultaneous presence of both indicators U_{Mt-k} and U_{Ft-k} introduces multicollinearity problems, as these variables are highly correlated (r varies from 0.7 to 0.9 in the different areas). Under this condition, confidence intervals for coefficients tend to be very wide, and the coefficient estimates tend to be unstable from one model to another. In addition, multicollinearity may exacerbate possible problems of the models, such as omitted variables.

7. Results

Figures 3 presents trends in male and female unemployment and fertility quarterly rates in the period 1995–2012 by geographic area of Italy, validating the existence of territorial differences in the relationship between unemployment and fertility.

Male and female unemployment rates show different levels at the start of the considered period, but they show a convergence in their final values. In 2012, male unemployment rates were higher than 1995 values in all areas, whereas for females the opposite occurred. For both genders we observed a U-shaped trend, characterised by a decrease until 2007 and a recovery in the most recent years. The northern and central regions of Italy experienced a higher relative increase after 2007 compared to the south, where unemployment rates have always been very high due to lack of participation in the labour market because of poor employment prospects.

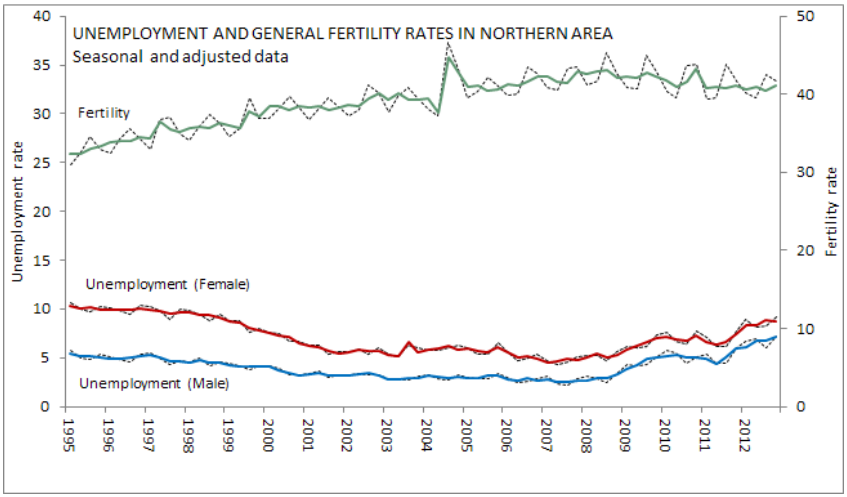
In the northern and central areas the fertility and unemployment indicators present specular patterns. From 1995 to 2008 fertility rates increased in the northern regions (Figure 3a) mainly because of the higher levels of fertility of the numerous immigrant women in this area of the country (Note 5); the central regions (Figure 3b) present the same trends, albeit in a less pronounced form.

The southern regions are characterised by the highest levels of unemployment – near double those of the other regions – and by the highest fertility rates until 2004 (Figure 3c). A number of factors can explain the higher level of unemployment in these regions – such as the previously mentioned particular economic situations – which could make this indicator partly unsuitable for measuring the real labour market conditions.

[15] The relationship between fertility and unemployment should be viewed not only as a dynamic association but also as an autoregressive process (Cheng 1996).

Figure 3: Male and female unemployment rates and fertility rates in Italy, 1995–2012

a)



b)

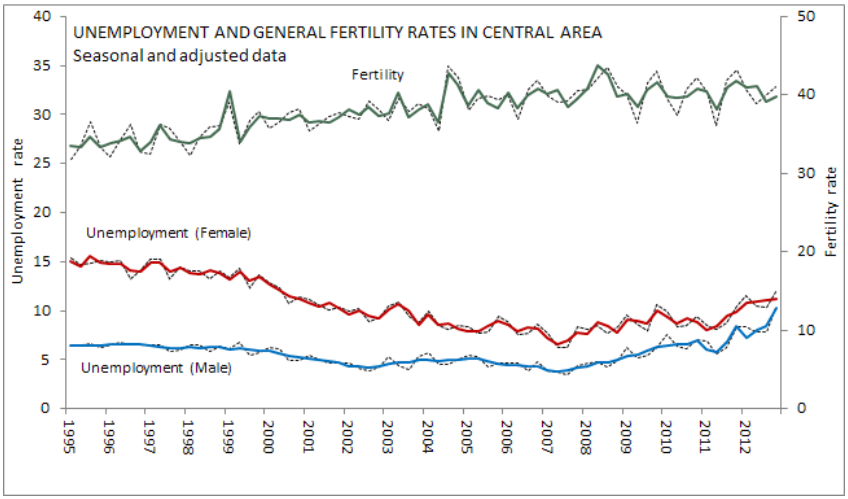
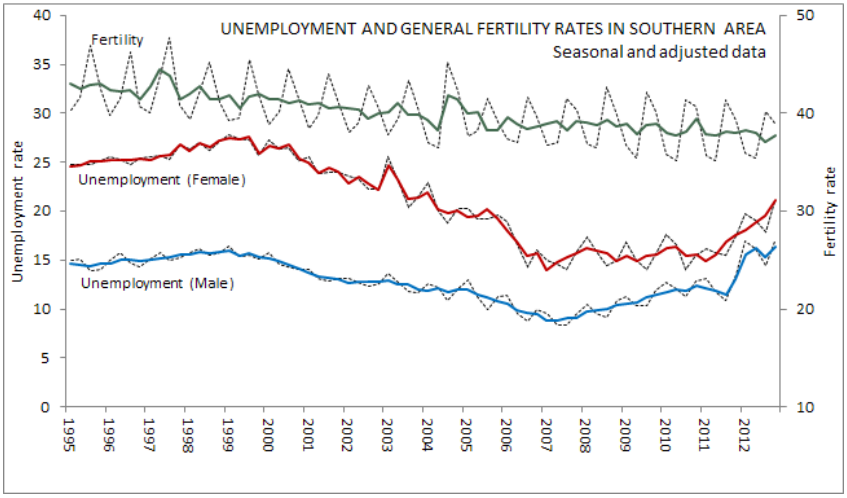


Figure 3: (Continued)

c)



Source: Labour force surveys by the Italian National Institute of Statistics – Istat

After 2007, we observed a structural change in the unemployment rate series in the northern and central regions where delayed fertility change also seems possible, although it does not emerge in the southern regions. We attempted to analytically identify these changes by testing for the presence of a structural break in the territorial series. All of the series have been previously adjusted using the TRAMO-SEATS procedure[16] (the solid lines in Figure 3) to remove the seasonal component and to correct for outliers and missing observations (Gòmez and Maravall 1996). Therefore our results, which reflect changes in the short and medium-term, are not affected by the seasonal component.

We could not use standard tests for the identification of structural breaks within our time series because their application requires a large post-break series size to ensure the convergence of the statistics to their limit distributions. To overcome these problems, we applied the monitoring approach (Chu et al. 1996; Leisch, Hornik, and Kuan 2000; Zeileis et al. 2005), which does not require large post-break series sizes and is useful for the identification of recent observed breaks.

[16] Time Series Regression with ARIMA Noise, Missing Observations and Outliers—Signal Extraction in ARIMA Time Series.

The estimated break point for unemployment in the northern regions seems to be the last quarter of 2007; that break point in the central and southern areas was observed in the second and first quarters of 2007, respectively. The estimated structural changes for fertility are difficult to identify in each area because they are largely dependent on the pre-break interval choice, and they seem to be included in a range varying from a period close to the unemployment break to three or more subsequent quarters. These last values are in agreement with the hypothesis of a postponement of fertility due to the uncertainty linked to the economic decline of the northern and central regions. Again, the evidence of a break is questionable for fertility in the southern regions because its trend is regularly decreasing, with no reversal or discontinuity pattern.

We fit a general dynamic linear regression model that links fertility to unemployment by a properly estimated lag as described in the previous form (4):

$$F_t = \beta_0 + \beta_1 F_{t-1} + \beta_2 U_{t-k} + \beta_3 I_{tb} + e_t \quad (5)$$

The length of k, the period necessary to induce a significant change in the fertility rate after a change in the unemployment rate, is a crucial point. A reasonable hypothesis is that a change in unemployment levels induces a change in attitudes towards having children, which would be suggested by a change in the fertility rate 9–18 months after the change in unemployment levels. To choose the most appropriate value of k and to select the most suitable indicator (viz., the male or female unemployment rate), several models were tested utilising different lags, starting from those suggested by a difference between the estimated break dates for the fertility and unemployment rates.

Different models produce good results assuming k within 3–6 quarters (9–18 months). When we consider the adjusted R^2, it corresponds to the lag $k = 3$ for the northern and central areas, with a slight difference with respect to $k = 4$. Therefore, other goodness-of-fit indicators or some slight adjustments in the model may produce different conclusions. Regardless, $k = 3$ quarters may be considered the minimum expected length of the period required to induce an early change in the fertility rate after a change in the unemployment rate. In this sense, the results in Tables 2, 3, and 4 represent reasonable choices from a set of almost-equivalent models.[17]

[17] In general, for all of the models considered here, the residuals do not exhibit any autocorrelational structure or heteroscedasticity, but they sometimes do not seem to have a precisely normal distribution. All parameter estimates are obtained by ordinary least squares (OLS).

Table 2: Parameter estimates of the dynamic regression model in the northern regions of Italy

	Coefficient	Std. Error	*t*-value	*p*-value	
MALE (adjusted R^2 = 0.85)					
Constant	14.5061	4.0514	3.580	0.0007	**
$U_{M\ t-3}$	-0.6252	0.2289	-2.731	0.0081	**
I_{tb}	1.1419	0.5136	2.223	0.0297	*
F_{t-1}	0.6884	0.0868	7.927	0.0000	**
FEMALE (adjusted R^2 = 0.87)					
Constant	24.2969	4.9816	4.877	0.0000	**
$U_{F\ t-3}$	-0.6255	0.1487	-4.206	0.0000	**
I_{tb}	0.8328	0.3685	2.260	0.0272	*
F_{t-1}	0.4908	0.1043	4.709	0.0000	**

Notes: *p*-value significant to the: ** 1% level; *5% level.

As expected (Figure 2), the correlation between fertility and male and female unemployment is significant and negative in the northern regions (Table 2). The estimated male coefficient of the main variable (unemployment) is $U_{M\ t-3}$ = -0.625: ceteris paribus, a unit change in the level of male unemployment induces a decrease of 0.625 units in the fertility rate three quarters later. Fertility and female unemployment also present an equivalent negative correlation at k = 3 (–0.626). The adjusted R^2 for women (0.87) is almost equivalent to the adjusted R^2 for men (0.85). For this area, the other two independent and ancillary variables I_{tb} (the dummy variable, including a possible unemployment step effect) and F_{t-1} (gross fertility rate for quarter *t-1*) are also significant for both genders and improve the overall fit of the model. The results confirm that an inverse relationship between unemployment and fertility in the most industrialised regions of Italy may be a reasonable assumption.

In the central regions (Table 3) all of the overall fit indicators considered are generally worse than in the northern regions: with regard to the male unemployment rate, we obtain R^2 = 0.62 versus R^2 = 0.85; for female unemployment, the respective R^2 values are 0.72 and 0.87 (Tables 2 and 3). At the same lag k = 3, the unemployment coefficients $U_{M\ t-3}$ = -0.902 and $U_{F\ t-3}$ = –0.775 (Table 3) are both negative and are significant predictors of fertility; their magnitudes are of the same order as those observed in the northern area if the respective standard errors are considered. This equivalence supports a non-negligible fertility reduction related to unemployment for both regions. In the female model for the central regions, the coefficient related to the

previous fertility level (F_{t-1}) is not significant and may be omitted, resulting in a more parsimonious model.

From the data in Tables 2 and 3, we observe that the beta coefficients' 95% confidence intervals overlap between the male and female models[18] for the northern and central regions, suggesting that fertility reactions to unfavourable economic circumstances are similar and not negligible.

Table 3: Parameter estimates of the dynamic regression model in the central regions of Italy

	Coefficient	Std. Error	*t*-value	*p*-value	
MALE (adjusted R^2 = 0.62)					
Constant	27.5927	5.2591	5.247	0.0000	**
$U_{M\ t-3}$	-0.9021	0.2627	-3.433	0.0011	**
I_{tb}	2.2210	0.6302	3.524	0.0008	**
F_{t-1}	0.3924	0.1142	3.434	0.0013	**
FEMALE (adjusted R^2 = 0.72)					
Constant	47.1377	5.8922	8.000	0.0000	**
$U_{F\ t-3}$	-0.7752	0.1220	-6.352	0.0000	**
I_{tb}	0.8788	0.4433	1.982	0.0517	*
F_{t-1}	-0.0224	0.1265	-0.177	0.8598	

Notes: p-value significant to the: ** 1% level; *5% level.

In the southern regions the statistical relationship appears weaker and unstable. The interpretation of results is unclear: the decreasing trend in fertility rate appears to be almost unchanged from 1995 to 2012 (Figure 3c). The estimated correlations (Table 4), which are negative for the northern and central regions, are positive – although low – for the southern regions, suggesting a direct link between fertility and unemployment when male or female unemployment rates are considered as fertility predictors ($U_{M\ t-3}$ = +0.201, $U_{F\ t-3}$ = +0.163). In addition, the step adjustments I_{tb} are not significant for male as well as for female unemployment rates, confirming the absence of a structural break in fertility in the southern regions. All of the results validate that this area exhibits a different demographic context as well as a different link between unemployment and fertility with respect to the rest of Italy. We recall that in these regions the

[18] The beta coefficients' 95% confidence interval is beta ±1.96 times beta standard error.

unemployment rate (alongside other labour market indicators) does not reflect the real conditions because of the spread of irregular jobs and the hidden black economy (Istat 2014b).

Table 4: Parameter estimates of the dynamic regression model in the southern regions of Italy

	Coefficient	Std. Error	*t*-value	*p*-value	
SOUTH (adjusted $R^2 = 0.73$)					
Constant	14.059	3.8692	3.634	0.0006	**
$U_{M\ t-3}$	0.2014	0.0933	2.159	0.0349	*
I_{tb}	-0.2205	0.3679	-0.590	0.5512	
F_{t-1}	0.5869	0.1079	5.440	0.0000	**
SOUTH (adjusted $R^2 = 0.73$)					
Constant	14.6728	3.8306	3.830	0.0003	**
U_{Ft-3}	0.1629	0.0631	2.583	0.0123	*
I_{tb}	0.3538	0.4889	0.724	0.4721	
F_{t-1}	0.5440	0.1107	4.914	0.0000	**

Notes: p-value significant to the: ** 1% level; *5% level.

For all of the variants of the model (i.e., for all of the male or female predictors and the different lags), the most reliable results emerge for the northern regions, where official Istat unemployment data most likely better reflect the real labour market conditions. The inverse relationship between unemployment and fertility that emerges for this area may be considered typical of a more advanced socio-economic context, in which increasing male or female unemployment is followed by a reduction in fertility at the aggregate level, as observed in other analyses (Adsera 2004).

These preliminary results provide useful information for understanding, at the macro level, whether changes in male or female unemployment have similar or distinct importance as potential fertility predictors and whether the relationship between unemployment and fertility greatly varies in different areas of Italy. The first problem may seem trivial because the female unemployment rate is often considered the most immediate economic indicator for explaining changes in women's choice to have children. To establish area by area what is the most appropriate indicator, we referred to the beta estimates and 95% confidence intervals obtained from male and female unemployment rates at various lags (Figure 4). From a strictly statistical point of view, the overlap between the male and female estimated intervals for any area suggests that

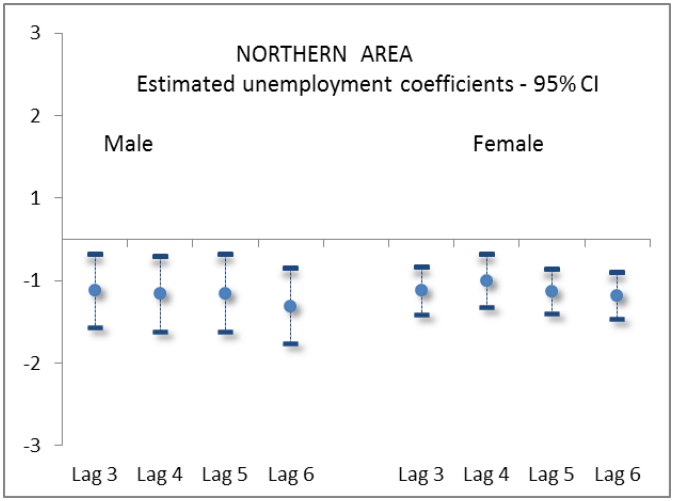
male and female unemployment have the same predictive power in the models predicting fertility.

Furthermore, from a demographic perspective, some additional points should be emphasised for the northern and central areas. All of the beta values in Figure 4a and b are highly significant ($p < 1\%$) and in agreement on gender, with generally higher values for male unemployment than female unemployment. The larger magnitude of the male coefficients is consistent with the hypothesis of greater importance being placed on the male's income in the family budget and subsequently of male unemployment's stronger correlation with fertility. In these similar social contexts, the relationship between male and female unemployment and fertility shows the same direction, even if the strength of the relationship differs in terms of magnitude and variability.

Concerning geographical differences, we can emphasise that the social and economic contexts are indubitably responsible for both the similitude between northern and central areas and for the weak link between unemployment and fertility that emerges in the southern area, where the beta coefficients are close to zero for all lags as well as for both men and women (Figure 4c).

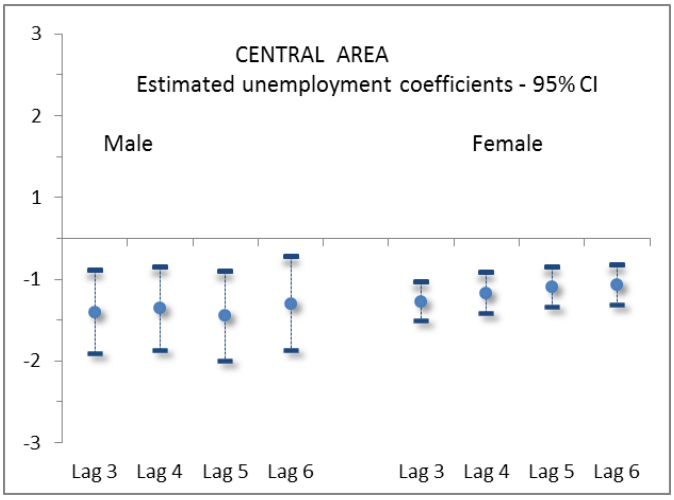
Figures 4: Estimated coefficients for male and female unemployment models in Italy

a)

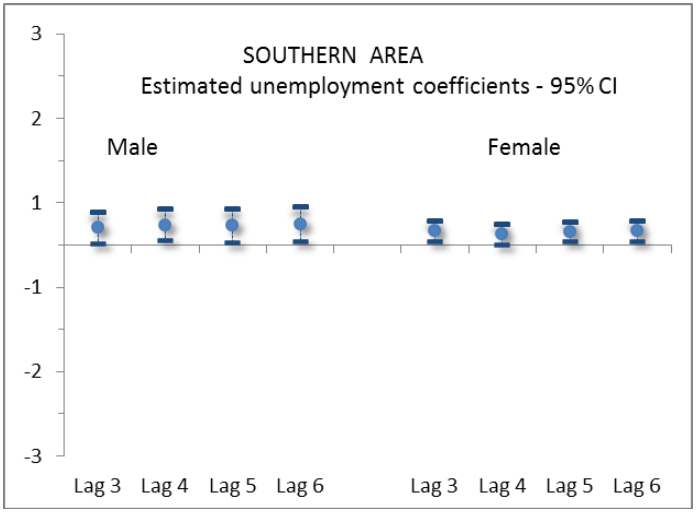


Figures 4: (Continued)

b)



c)



8. Concluding remarks

In this paper our goal was to evaluate whether the recent changes in male and female unemployment are differently linked to fertility in different geographic areas of Italy.

Swings in unemployment may be directly connected to fertility, in the sense that the reduction in family income following job loss may lead to a postponement of fertility until better economic times prevail. However, unemployment swings may be indirectly connected to fertility, considering that high or rising levels of unemployment may create a feeling of general insecurity that even affects people who have not lost their jobs. The results of our time-series analyses confirm the hypothesis that the relationship between male and female unemployment rates and fertility differs between the various Italian areas at the macro level.

The recent increase in male and female unemployment rates seems to be negatively linked to fertility in the northern and central areas, with a lag of almost nine months. This result is in line with the hypothesis that when expected income is decreasing, couples may abandon the idea of having (more) children, particularly if they perceive that having children could negatively influence their own economic well-being. According to the theoretical neoclassical model, in these geographic areas the depressing effect unemployment exerts on fertility (the income effect) dominates the positive effect unemployment exerts on fertility because of the reduced opportunity cost of having children (the price effect). We can assume that in northern (in particular) and central Italy – where fertility is low and some institutional support for children and mothers make the arrangement of work and motherhood to some extent less difficult – the feeling of uncertainty generated by an unexpected unemployment rise may nonetheless upset this precarious stability, generating a not-irrelevant negative correlation with the fertility rate. This hypothesis has been confirmed by researchers who observed that female unemployment (or other forms of non-employment) is associate with low fertility particularly in southern countries, both at the macro (Adsera 2004; Goldstein et al. 2013; Lanzieri 2013) and micro levels (Ahn and Mira 2001 for Spain; Baizan 2005 for Italy and Spain; Vignoli, Drefahl, and De Santis 2012 for Italy).

The results for the southern area are ambiguous. The weak and positive relationship emerging between unemployment and fertility rates could be affected by the uncertain meaning of the local labour market participation data, which do not take into account the correspondent variations of undeclared work occurring in the underground economy. In 2012 the incidence of black economy activity in the southern regions reached 20.9% of total employment, compared with 12.1% in Italy as a whole (European Parliament 2014). In southern Italy, unemployment rates do not seem to have a clear predictive role, whereas in the northern and central regions both the male and female unemployment rates seem to be good predictors of aggregate fertility.

From a statistical point of view, the male and female unemployment rates are strictly correlated in each area and they are included in all the models one at a time. The male unemployment rate generally appears to be the most important predictor of fertility for all of the geographic areas, even though the model fits better for the central regions when the female unemployment rate is considered. In the central regions, the female's income represents an important contribution to the household budget, having greater relevance compared to female income in the northern regions, as confirmed by data derived from the Survey on Household Income and Wealth (Banca d'Italia 2012). Although cautiously, we note that the greater importance of male unemployment correlation is in line with results from most micro-level studies stressing a clear negative impact of male unemployment on fertility, in particular in countries where men are expected to be the main breadwinners (Pailhé and Solaz 2012). The evaluation of our results regarding the link between female unemployment and fertility in comparison with those obtained by micro-level studies is more problematic, because empirical findings from micro-level analysis in previous literature are heterogeneous and often controversial.

Again cautiously, we recall some findings from micro-level analyses that analysed the Italian case from a couple's perspective, considering the interaction of male and female labour market conditions (with a wide set of non-employment positions) to investigate how economic uncertainty influences fertility behaviour. Generally, findings demonstrate that the persistence of the male breadwinner model makes the stability of the man's employment position a necessary requisite for childbearing: when men's situation in the labour market is insecure, as indicated by unemployment, childbearing is severely reduced. The findings of these studies confirm that Italian society is still traditional, but also outline the importance of the employment status of both partners (Vignoli, Drefahl, and De Santis 2012).

Our macro analysis outlines that both male and female unemployment appear as good predictors of fertility**.** Moreover, our data do not allow knowing if the variations in fertility at times of rising unemployment are more important among employed or unemployed women. Empirical findings from previous literature (Lanzieri 2013) on employed and non-employed women are mixed on this point.

Overall – as already suggested by the correlation map for the Italian regions shown in Figure 2 – our results validate the coexistence of two different patterns (Mencarini 2010): a 'positive modern' model in the northern and central regions and a 'negative traditional' model in the southern regions.

9. Limitations and future lines of research

This study has some limitations. Although the time series have been correctly collected in order to cover the male and female unemployment and fertility quarterly rates before and after the economic crisis, we only used a trend model in order to connect these indicators for different lags and in different areas of Italy. The evidence obtained from the analysis offers some interesting suggestions that are not clearly attributable to individual or family behaviour, but which are useful for future further investigation on the same subject. Further research will be able to more accurately measure the link between unemployment and fertility using individual data from retrospective longitudinal surveys or using the results from surveys that include information for a number of years before and after the financial crisis. The longitudinal nature of this information enables accurate modelling of how geographical context and individual conditions (education, income, unemployment, etc.) influenced fertility behaviour in the years close to the recent economic depression. Individual data will allow us to know if changes in fertility at times of rising unemployment are more important among employed or unemployed women. In particular, in future research, we will estimate the impact of total unemployment rates on individual fertility choices from a gender-based and geographic perspective.

10. Acknowledgments

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Appendix

Table A-1: Unemployment rates and TFR in selected European countries for 2000–2012

	Unemployment rates 2007				Unemployment rates 2011				Total fertility rate			
	Males 15-64	Females 15-64	Males 25-54	Females 25-54	Males 15-64	Females 15-64	Males 25-54	Females 25-54	2000	2007	2008	2012
BE	6.7	8.5	5.9	7.4	7.2	7.2	6.4	6.3	1.67	1.82	1.85	1.79
DK	3.5	4.2	2.7	3.6	7.9	7.6	6.3	6.9	1.77	1.84	1.89	1.73
DE	8.7	8.9	7.8	8.1	6.3	5.7	5.7	5.2	1.38	1.37	1.38	1.38
IE	5.0	4.2	4.3	3.6	18.2	10.9	16.9	9.7	1.89	2.01	2.06	2.01
GR	5.3	12.9	4.7	12.0	15.2	21.6	14.5	20.7	1.26	1.41	1.51	1.34
ES	6.4	10.9	5.4	9.7	21.3	22.3	19.6	20.9	1.23	1.4	1.45	1.32
FR	7.5	8.6	6.3	7.7	8.8	9.7	7.5	8.6	1.89	1.98	1.99	2.00
IT	5.0	7.9	4.0	7.1	7.7	9.7	6.6	8.8	1.26	1.37	1.42	1.40
NL	2.8	3.7	2.0	3.1	4.5	4.4	3.9	3.6	1.72	1.72	1.77	1.72
AT	4.0	5.1	3.3	4.5	4.1	4.4	3.4	3.8	1.36	1.38	1.41	1.44
PT	7.0	10.1	6.1	9.6	13.2	13.5	11.7	12.3	1.55	1.33	1.39	1.28
FI	6.6	7.3	4.9	5.8	8.6	7.2	6.6	5.6	1.73	1.83	1.85	1.80
SE	6.0	6.5	4.1	4.7	8.0	7.9	5.7	5.9	1.54	1.88	1.91	1.91
UK	5.7	5	3.7	3.8	8.8	7.4	6.3	5.9	1.64	1.9	1.91	1.91
NO	2.6	2.5	1.9	1.9	3.5	3.0	2.9	2.5	1.85	1.9	1.96	1.85
CH	3.0	4.6	2.3	4.2	3.8	4.5	3.2	4.1	1.50	1.46	1.48	1.52

Sources: OECD database; Eurostat online database. Accessed on March 2014.

Table A-2: Characteristics of unemployment and fertility in Italy, 2004–2011

		2004	2007	2009	2011
Number of unemployed people (thousands)					
Men		925	723	1000	1114
Women		1036	784	945	993
Unemployed (%)					
Northwest		15.97	17.92	21.50	21.93
Northeast		9.95	10.74	13.94	12.77
Centre		16.17	17.72	18.98	18.89
South		57.91	53.62	45.58	46.41
Italy		100.00	100.00	100.00	100.00
Unemployment rate (‰)					
Northwest	Male	3.4	3.0	5.5	5.6
	Female	6.1	4.9	7.1	7.2
Northeast	Male	2.5	2.1	4.5	4.2
	Female	5.7	4.5	6.9	6.2
Centre	Male	4.9	3.9	6.6	6.7
	Female	8.7	7.2	9.0	8.9
South	Male	11.9	8.9	12.0	12.1
	Female	20.5	14.9	15.8	16.2
Italy	Male	6.4	5.0	7.6	7.6
	Female	10.5	7.9	9.7	9.6
Total fertility rate					
Northwest		1.31	1.40	1.48	1.44
Northeast		1.35	1.43	1.48	1.45
Centre		1.29	1.32	1.38	1.39
South		1.35	1.34	1.35	1.33
Italy		1.33	1.37	1.41	1.39

Source: Istat online database 2014: http://seriestoriche.istat.it. Accessed March 2014.