TRENDS IN FERTILITY BY PARITY IN EUROPE

Daniel Devolder, Maria José González
i Karine Gavino

203

TRENDS IN FERTILITY BY PARITY IN EUROPE

Daniel Devolder, Maria José González
i Karine Gavino*

203

Aquest treball s'inscriu en els projectes BSO2000-0477 *Población y migraciones en Cataluña. Estudio territorial, histórico y prospectivo*, finançat pel Ministerio de Ciencia y Tecnología. Programa Nacional de Promoción General del Conocimiento. Plan Nacional I+D+I 2000-2003 i en el FENICs'99, *Female Employment in National Institutional Contexts*.

(*) Karine Gavino ha col.laborat en aquest treball com a membre del projecte Marie Curie Fellowships Training Sites "*Demography, Family and Spatial Redistribution. A Southern European Perspective (DEMOS)*" contracte HPMT-CT-2000-00057, finançat per la Comissió Europa dins del V Programa Marc (*Improving Human Resource Potential & Socio-economic Knowledge Base*).

Centre d'Estudis Demogràfics

2002

Resum.- En aquest article s'analitza, des d'una òptica de la fecunditat per rang, la recent evolució de la fecunditat i les diferències entre països europeus, Estats Units i Canadà. A partir de les dades de la FFS (Fertility and Family Survey) s'estima la fecunditat per als 11 països analitzats. S'utilitza com a indicador base les probabilitats d'engrandiment del moment, ja que ofereixen una visió més detallada del procés de formació de les famílies que el tradicional Índex Sintètic de Fecunditat (ISF). A més, aquest darrer indicador ofereix una estimació esbiaixada del nivell de la intensitat de la fecunditat i es pot arribar a un resultat més acertat combinant les probabilitats per a tots els rangs.

Paraules clau.- Fecunditat, Rang, Països desenvolupats.

Resumen.- En este trabajo se analiza la reciente evolución y las diferencias de fecundidad entre países europeos así como los Estados Unidos y Canadá, poniendo el enfoque en la fecundidad por rango. Se estima la fecundidad para los 11 países analizados a partir de los datos de los FFS (Fertility and Family Survey). Usamos como indicador de base las probabilidades de agrandamiento del momento, puesto que ofrecen una visión más detallada del proceso de formación de las familias que el tradicional Indicador Sintético de Fecundidad (ISF). Además este último indicador ofrece una estimación sesgada del nivel de la intensidad de la fecundidad y podemos llegar a una mejor resultado combinando las probabilidades para todos los rangos.

Palabras claves.- Fecundidad, Rango, Países desarrollados.

Summary.- In this work we review and assess current trends and differences in fertility in European countries, and also the USA and Canada, with a particular emphasis on birth by order. Fertility levels are estimated for 11 countries using FFS data. We use indicators known as the Period Parity Progression Ratios (P-PPRs). These offer a more detailed view of the family formation process than the traditional Total Fertility Rate (TFR). They also yield better estimates of period total fertility intensity, because these ratios are free of the effects of changes in mean age at childbearing and in the distribution of births by order that affect the TFR.

Keywords.- Fertility, Parity, Developed countries.

Résumé.- Dans ce travail, nous examinons l'évolution récente et les différences de fécondité entre pays européens ainsi que les États-Unis et le Canada, en mettant l'accent sur la fécondité par rang. La fécondité est estimée pour les 11 pays analysés à partir des données FFS (Fertility and Family Surveys). Nous utilisons comme indicateurs de base les probabilités d'agrandissement du moment, car elles offrent une vue plus détaillée du processus de formation des familles que l'Indicateur Synthétique de Fécondité (ISF) utilisé traditionnellement. De plus ce dernier n'offre qu'une approximation biaisée de la valeur de l'intensité de la fécondité du moment, et l'on peut arriver à une meilleure estimation de cette intensité par combinaison des probabilités.

Mots clés.- Fécondité, Rang, Pays développés.

CONTENTS

TEXT FIGURES

TEXT TABLES

TRENDS IN FERTILITY BY PARITY IN EUROPE

1.- Introduction

This chapter[1] deals with the analysis of fertility trends in European countries, with an emphasis on birth by parity. We are mainly concerned in comparing between countries, with a view on identifying the main demographic factors that created the differences in family formation patterns between contemporary European societies. This chapter is mainly descriptive, but it is conceived as a preliminary step before we engage in following chapters in the study of the relationship between women's family life and labour force participation.

Our main interest is fertility intensity measurement and the role of each parity in the explanation of the difference in total fertility between countries. It is well known that period indicators of total fertility, such as the total fertility rate (TFR), are often bad indicators of the actual number of children women have, due mainly to the distortion effect of the changes in the birth-timing and changes in the parity (i.e. birth order) distributions. In the last two decades delayed motherhood and the reduction of fertility for higher parities had a strong depressing effect on the level of period fertility as measured by the TFR. One obvious way to solve the problem is to measure fertility intensity using cohort indicators. But as we are interested here by final intensity, which can be accurately measured only for women aged at least 45 years, this would make impossible the analysis for recent periods. This explain why we use instead period indicators, the Period Parity Progression Ratios (P-PPRs) which have the advantage of being free of distortion effect of changes in tempo and parity distribution, and also of offering a more detailed perspective on the process of family formation than an indicator of total fertility.

[1] *The author wish to thank the Advisory Group of the FFS programme of comparative research for its permission, granted under identification number 76, to use the FFS data on which this study is based. Special thanks also go to Joan García (computing assistant at the CED) for his help in the FFS data handling*

2.- Recent Fertility Trends

Fertility decline is the main driving force in the transformation of Western families in recent times. The reduction started around the mid-1960s in most Western European countries, and in the mid-1970s in southern European countries. Today, the total fertility rate (TFR) continues to be rather low in most western countries (see Figure 1). This is partly explained by the postponement of childbearing toward 30 years of age and even beyond, related with the postponement of marriage and the increase in consensual unions which usually have lower fertility levels than marital unions (aspect further developed in Chapter 5).

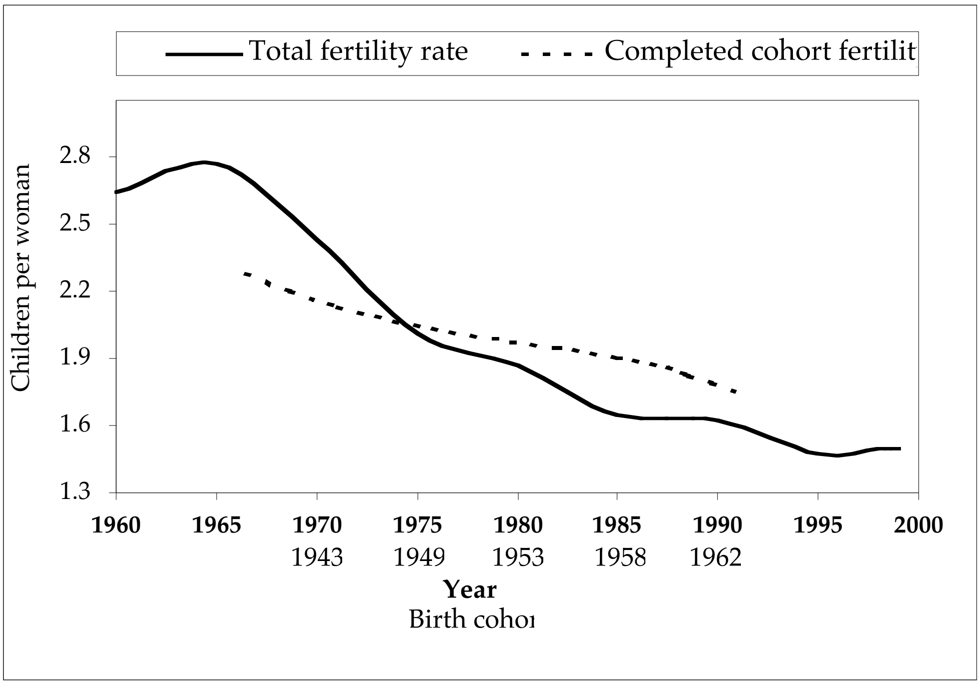
Fertility decline and the stagnation at low fertility levels have triggered a great deal of debate as to whether the TFR is a valid indicator of fertility intensity. Low fertility is normally associated with levels below 2.1 children per woman, which is the level that guarantees the replacement of generations in the absence of migration. Both the period and cohort fertility for European Union as a whole are lower than that level since the second half of the 1970s and for the cohort born from the 1950s onwards (see Figure 1. In this Figure cohort levels are compared with period one 30 years after the cohort birth year, roughly equal to the cohorts mean age at childbearing. This way we compare for each year the fertility level of the most representative cohort with the period level). This long period of low fertility has been an ongoing political worry, first in countries like France always interested by population issues, but this preoccupation has been more recently shared by other countries mainly due to the effects of a permanent low fertility level on population age structure and the consequences this could have in the future on the social security system.

But as we can see from Figure 1, completed cohort fertility (CF) and period fertility (TFR) tend to differ in level, and the recent decline in fertility is much more pronounced if we follow the period index only, which could easily reinforce the pessimism about future evolutions.

Generally speaking, time variations in the TFR are higher than for the CF, due to short-term changes in the age pattern of fertility. In particular the increase in the mean age of childbearing in most European countries during the last twenty years explain why period levels are lower than cohort levels. The main problem with fertility analysis is that cohort indicators, which give a more accurate picture of behaviours than period one, can be completely estimated for cohort born at least 45 years before. This always leave us to guess, as we can see from Figure 1, what could or will be the corresponding level of the cohort curve for the last ten years of the period curve, something that depend in fact on births that will bear in the next 10 or 15 years women now aged 35 years or less.

So there is a risk of making statements about family formation processes, inherently cohort oriented, from fertility indicators like the TFR, which tend to be dominated by period or transient effects and over- or underestimate the cohort fertility level.

Figure 1.- Total fertility rate and completed cohort fertility of women in the European Union (EU-15)



Source: Eurostat (2000).

Note: the TFR is the mean number of children women would have if at each age their childbearing conformed to the current rate for their age group. It is calculated by a sum of current age-specific fertility rates over the fecund lifespan, whereas completed cohort fertility refers to the mean number of children born to a birth cohort of women when their childbearing is completed usually at age 50 years.

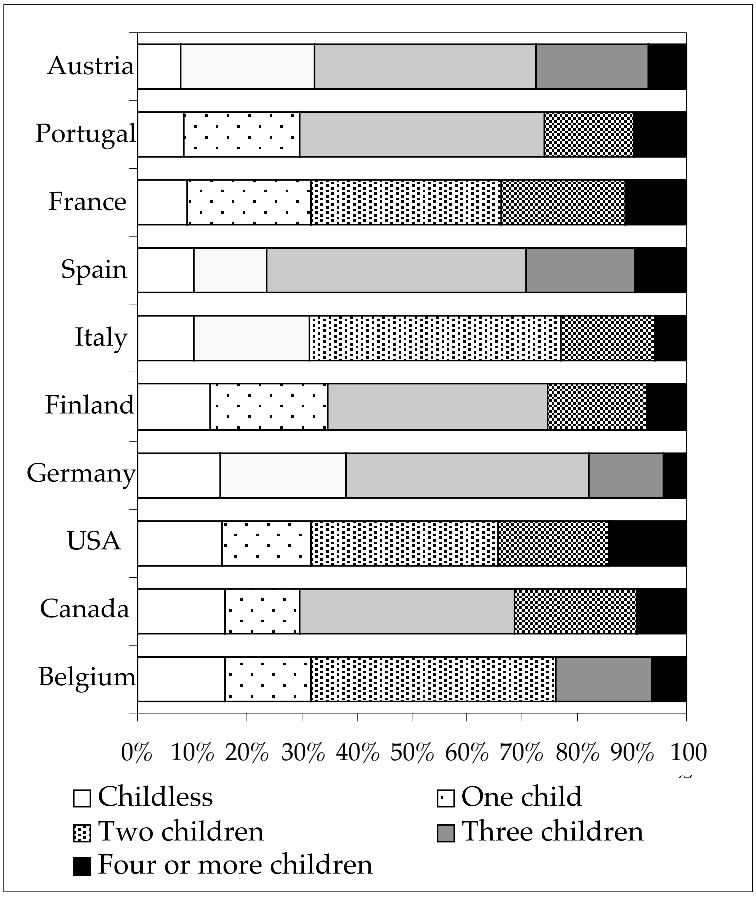
The acute trend toward declining fertility has inspired Kohler, Billari and Ortega (2001) to use the term 'lowest-low fertility' in relation to the group of countries with a TFR below 1.3 children per woman. According to these authors, this level was never reached before, much less sustained for a prolonged period of time in Western societies. In 1999 there were 14 countries below this level of fertility, located in Southern Europe (Spain, Italy and Greece) and Eastern Europe (mainly Ex-Soviet Republics). They explain these 'lowest low fertility levels' by the late entry in motherhood associated with the women's increase in human capital investment, the youth economic uncertainty and the social interaction that reinforces the adjustment towards low fertility. But these authors agree with the idea that the TFR levels are low partly due to the transient effects we noted before, and that it is essential to obtain a correct estimate of the permanent or true level of fertility in order to arrive at a correct diagnostic of the consequences of low fertility on family formation in the future.

Another problem with the TFR is that it does not give an exact view of the effects of fertility on family formation as it ignores the sequence of births, i.e., the fact that only women who are currently at parity zero, one or two are exposed to the risk of giving birth to their first, second or third child. And in fact as we will see later, the same level of total fertility is obtained by combinations of very different distributions of birth by parity, so in fact the TFR often hides more than it informs about the effects of fertility on family formation.

Differences in birth parity distribution across countries in the late nineties are shown in Figure 2. The parity distribution is estimated for women who had nearly completed their childbearing (40-45 years old). Countries are sorted according to their proportion of childless women. This figure clearly illustrates the differences across countries regarding the proportion of childless women, as well as the varied weight of the third child.

Most demographers agree that there is a need for a better period indicator of fertility, but there is still no consensus on a specific one. For example Bongaarts and Feeney (1998) proposed a new indicator called the tempo-adjusted total fertility rate to measure the women's true propensity to bear children for each period. They propose an adjustment that takes account of the biases caused by changing age patterns of childbearing and in parity distribution. This new indicator allows the separation of the TFR into a quantum and a tempo component. The quantum component is the TFR that would have been observed in the absence of changes in the timing of childbearing during the period of observation, while the tempo component measures the degree of the distortion of the TFR due to the changes in time of the age pattern of childbearing for each parity. Kohler and Ortega (2001), however, argued that this is a problematic measure because the adjustment assumes that all women postpone order-*i* birth by the same amount within a calendar year, which leads them to suggest a refined adjustment procedure.

Figure 2.- Women's birth parity distribution (age group 40-45) European countries in the late nineties



Source: FFS.

Note: women aged 40-45 were born in 1953 in Germany (only women aged 39), 1950-56 in Austria, 1950-51 in Belgium (only women aged 40-41), 1950-55 in Canada, 1950-55 in Spain, 1944-50 in Finland, 1950-559 in Italy, 1949-53 in France, 1952-57 in Portugal and 1950-55 in USA (see year of interview in Annex 1).

Other authors prefer not to correct the TFR, but try a different approach altogether to the problem of measuring the period quantum of fertility, or true intensity. In the next section we use one of those different methods to estimate the 'true' or unbiased period total fertility through the estimate of indicators of fertility by parity. Doing so we not only obtain a more accurate estimate of the level of fertility for each period, but we are also able to measure the influence of changing births parity distribution on the evolution of the total fertility intensity or quantum. We hope that this exercise will provide a clearer picture of the dynamics of the fertility decline in Western societies, but also may help in the formulation of good questions about the causes of fertility evolution and family formation processes in the recent period.

3.- Revisiting Fertility Indicators: The Period Parity Progression Ratio

The method we use to estimate a better estimate of period total fertility level is based on the calculation of parity progression ratios (PPR). PPRs are the proportion of women who have a given number of children and advance to another child. The data required for the estimation of those ratios are births distributed by order and by duration since the preceding event (birth of previous order or birth of the mother for the first order). PPRs can also been calculated from distribution of women by age and by number of births, but we prefer to use here duration since last birth instead of age due to the fact that PPRs based on age are affected by the same kind of distortion effect we want to correct. The data have been obtained from the FFS. We concentrated on parities one to four both for simplicity sake as well as to take account of the fact that the number of cases is quite small in the survey when we move to high birth order.

The PPRs was introduced and fully studied long time ago by Louis Henry (1953). More recently others authors have followed him with the attempt of providing alternative measures of fertility by applying this or similar indicators (For example Ní Bhrolcháin 1987, Feeney and Yu 1987, Rallu and Toulemon 1993). PPRs can be estimated from a cohort or a period perspective. Here we use a period approach: therefore it is more appropriate to refer to them as *period parity progression ratios* (P-PPRs). From the P-PPRs we can then estimate a total fertility indicator analogue to the TFR as follows:

$$PF = p_0 + p_o \cdot p_1 + p_0 \cdot p_1 \cdot p_2 + \dots$$

where PF is a corrected TFR which measure the intensity of total fertility in the period analysed and p_i is the P-PPR at order i, which is the probability of progressing from this parity to the next. More precisely p_i is the proportion of women at parity i in past years who have a birth of order i+1 in the current year. In our case, as we limit ourselves to the study of the first four ratios, we used the following approximate formulae:

$$PF \approx p_0 + p_o.p_1 + \frac{p_0.p_1.p_2}{1 - p_3}$$

Table 1 presents the value of this total fertility index, which is a measure of the quantum or intensity of the fertility in the period, compared with the corresponding value of the TFR in 1990. The ratio between the two indices gives us an idea of the distortion due to transient or tempo effects, which represented between 8% and 39% of the value of the TFR that year. We can note also that the TFR underestimated the quantum of fertility in all the countries analyzed, which is the normal case for the recent period, beginning with the 1970s.

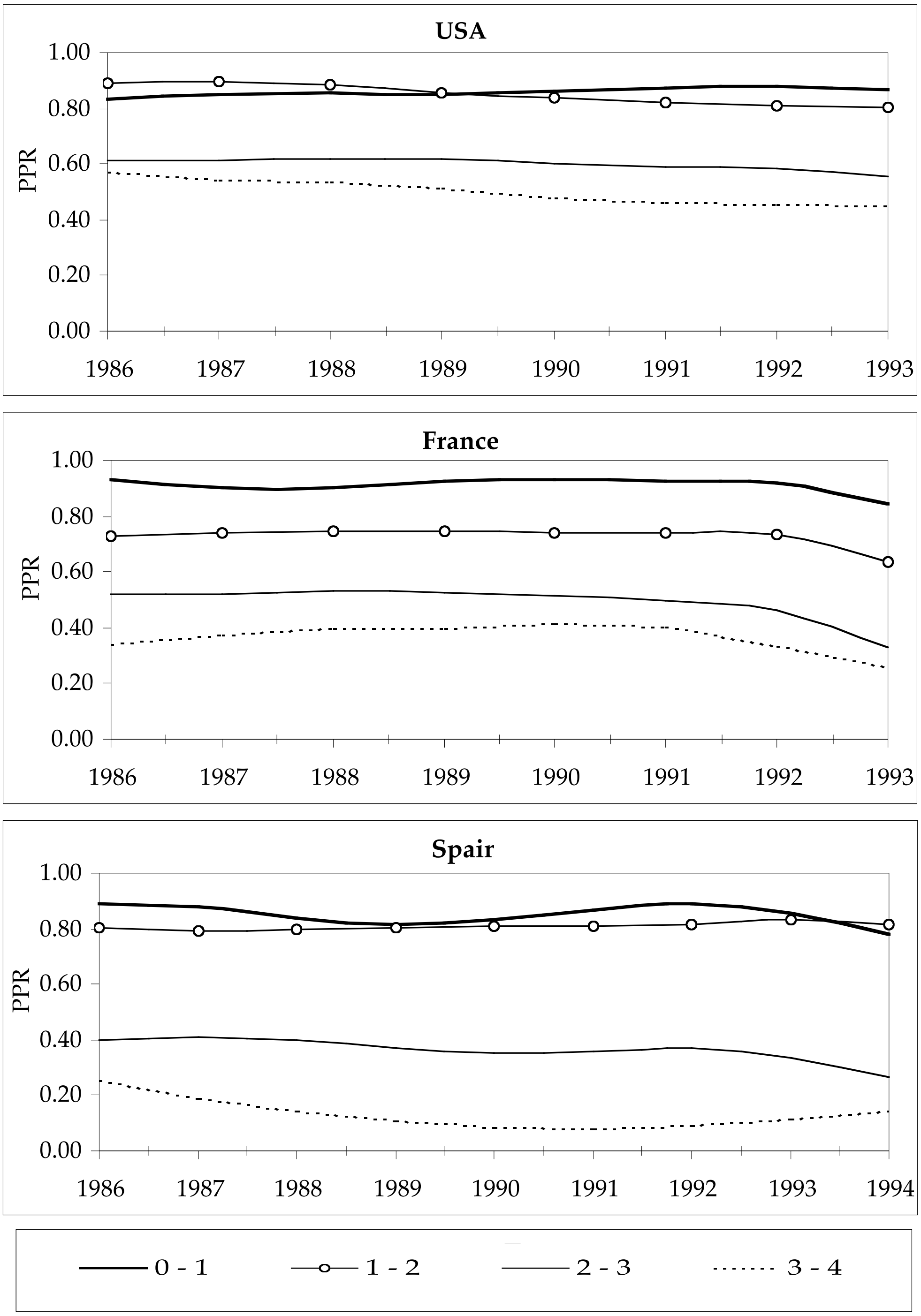
Table 1.- Period quantum or intensity of fertility compared with TFR value in 1990

	Spain	Italy	Portugal	France	Belgium	Germany	Austria	Finland	Canada	USA
PF	1.77	1.59	1.80	2.23	1.81	1.56	2.01	1.86	1.86	2.40
TFR	1.36	1.33	1.57	1.78	1.62	1.45	1.45	1.70	1.71	2.08
PF/TFR	1.30	1.20	1.15	1.25	1.12	1.08	1.39	1.09	1.09	1.15

Source: FFS for the PF, UN Demographic Yearbook for the TFR. Note: 1989 for Germany and 1988 for Finland.

Figure 3 shows the first four period parity progression ratios for the USA, France and Spain during the late 1980s and early 1990s. We have selected these three countries on the basis of the fact that the evolution and level of their TFR was opposite during the period analysed. In the USA the total fertility was the highest for our group of countries and increasing; in France the total fertility was also quite high, but decreasing; in Spain the total fertility was one of the lowest and also decreasing. At first glance we see that the probability of progressing to the 1st child had kept relatively stable over the observed period in the three countries with a fluctuation around 0.8 and 0.9. The probability of progressing to the 2nd child suffered more fluctuations, but always within a range of 0.7 to 0.9. Figure 8 also shows that the proportion of women who had a first child and progressed to a second was similar in the USA and Spain when it was higher in France. In the French case, however, the likelihood of progressing to a second child have decreased since the early 1980s and stabilised after 1986 at around 0.7.

Figure 3.- Period parity progression ratios in the USA, France and Spain between the late 1980s and early 1990s



Source: FFS.

Note: Smoothed data. USA women were born in 1950-1980, French women in 1944-1973 and Spanish women in 1945-1977.

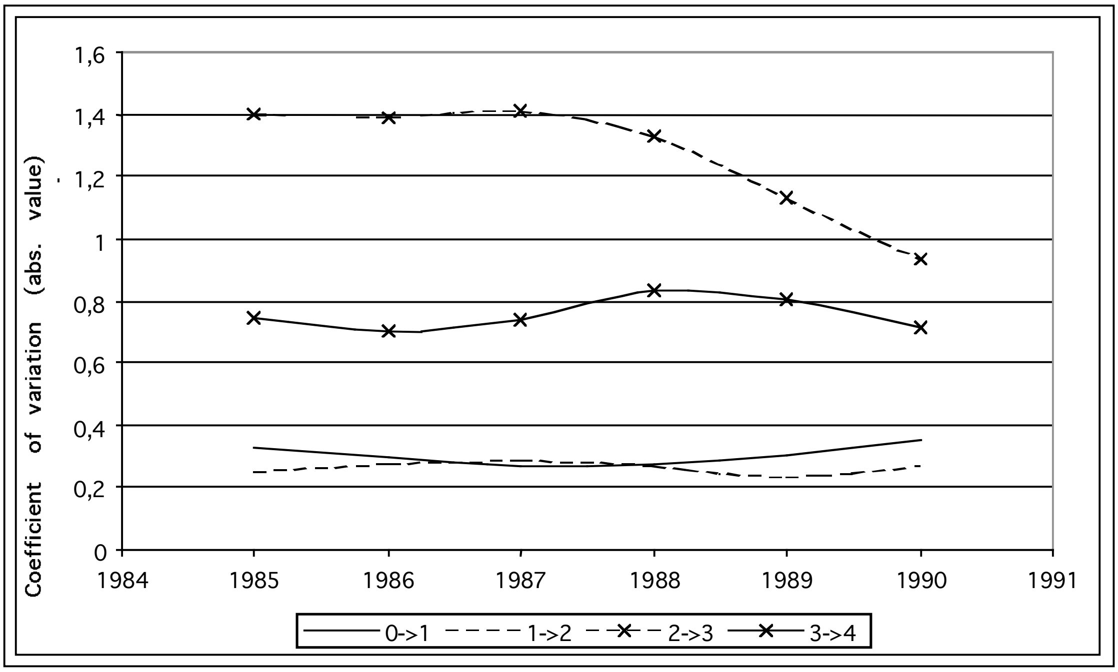
This is slightly lower than the 2nd order probability in USA and Spain. What is striking here is that USA and Spain had similar value for their first two parity progression ratios for the period analysed when the distance between their TFR was very high at the beginning of the 1990s (more than 2 children per women for the USA and less than 1.4 for Spain). So for the two first parity progression ratios we can speak both of their stability in time and also of their relative homogeneity across the three countries.

We observe that the difference in total fertility is accounted mainly by the fertility at parity 3 and more. In the USA women had the higher period parity progression ratios for transition from the 2nd to the 3rd and from the 3rd to the 4th child. The difference between these three countries being the highest for the transition from the 3rd to the 4th child with a value of 0.5 in the USA, 0.3 in France and 0.1 in Spain in 1992.

If we consider the 10 countries we analyzed at the same time (see P-PPRs data in Annex 2), we find a confirmation for the previous analysis. For example there is a greater homogeneity across countries for first birth orders (1st and 2nd) and of a much larger dispersion for higher birth orders (3rd and 4th). This is shown in Figure 4 which gives the coefficient of variation of the logit of these parity ratios, for the 1985-1990 period. To understand why we use the logit scale for the coefficient of variation, we have to take account of the fact that parity progression ratios are (ex post) probabilities, so their range of variation is 0 to 1, those two limits acting as a kind of downward and upward constraints. So an increase of 0.05 of their value does not represent the same variation for an initial value of 0.5 or for a value of 0.9 or 0.1. The logit transformation, defined as ln p / (1-p), allows for a more accurate comparison of the variation in the parity ratios for all the range of values. From this figure, it is interesting to note that the dispersion between countries is higher for the probability of having a third child than for the fourth, which signals that parity as the most interesting for a differential analysis of the determinants of fertility in the context of family formation.

But this analysis somehow hides an important point, the fact that even if the variability of the parity ratio for the first birth is relatively low, there is a duality between two groups of countries, one with a lower level of childlessness, around 10-15% (Spain, France, Portugal, Austria, Finland, the USA) and another group with a strikingly high level at around 20-25% (Belgium, Italy, West Germany, Canada). For this last group the period level of childlessness is much higher than the cohort level we observed in Figure 2, which indicate that this is the result of a recent evolution. This level of childlessness is an historical maximum for the last two centuries, and only some European peasants community of the eighteenth centuries, for which there were constraints on the access to land, achieved such a high level of childlessness.

Figure 4.- Coefficient of variation of the logit of the P-PPRs: 1985-1990



Source: Data in Annex 2 (transformed using the logit scale). The coefficient of variation is the standard deviation divided by the mean of the transformed ratios. In this graph we give the absolute value of this coefficient. Note: Finland was not included in this coefficient given that for this country we only have data in the period 1986-88.

The observation of this polarization between two opposite levels of childlessness leads us to the analysis of the relation between the intensity (or quantum) of total fertility as measured by the indicator PF and the level at each parity, that is the extent to which period fertility trends have been determined the change in its level for the different birth orders. The answer is found in table 2, which gives the contribution of the four first birth orders to the variation of the intensity of fertility. In order to arrive at a decomposition, we take the value of the PF at the beginning and the end of the time period analyzed and we use the total differential rule:

$$dy = \frac{\partial y}{\partial x_1}.dx_1 + \frac{\partial y}{\partial x2}.dx_2 + \ldots + \frac{\partial y}{\partial x_n}.dx_n$$

For example the absolute level of the contribution of the first parity progression ratio to the variation in time of PF is:

$$\frac{\partial PF}{\partial p_0}.dp_0 = dp_0.p_1.\left[1 + \frac{p_2}{p_3}\right]$$

and so on. In table 2 we express the contribution of each parity as a proportion of the total variation of PF, our estimator of the quantum of fertility in the period. As the differential rules holds in continuous, we have only an approximation of the true formulae in our discrete case. So there is an "interaction effect" that is always quite small, as we can see from the results.

Table 2.- Contribution of each parity in the variation in the intensity of total fertility in the period, for selected FFS countries

	Time period	**PF***		**P0->1**	**P1->2**	**P2->3**	**P3->4**	Interaction effect	Total %
Spain	1985-1994	2.00	1.61	53.63	4.19	29.27	14.11	-1.20	100.00
USA	1984-1993	2.59	2.26	-56.34	37.86	32.46	91.86	-5.84	100.00
Portugal	1985-1995	2.02	1.62	65.78	5.91	30.16	-1.84	-0.01	100.00
France	1982-1992	2.23	2.06	-41.42	134.53	39.56	-32.71	0.04	100.00
Italy	1985-1992	1.52	1.65	57.42	40.29	0.00	2.29	0.00	100.00
Finland	1979-1988	1.91	1.86	319.68	-43.86	-18.28	-160.26	2.72	100.00
Canada	1984-1994	1.98	1.80	39.10	0.30	28.05	33.19	-0.65	100.00
Belgium	1980-1989	1.66	1.81	65.12	-3.99	-21.38	62.04	-1.78	100.00
Germany	1983-1990	1.53	1.40	30.75	79.92	5.19	-15.84	-0.02	100.00
Austria	1984-1992	2.05	1.99	-148.75	-2.23	167.64	84.68	-1.34	100.00

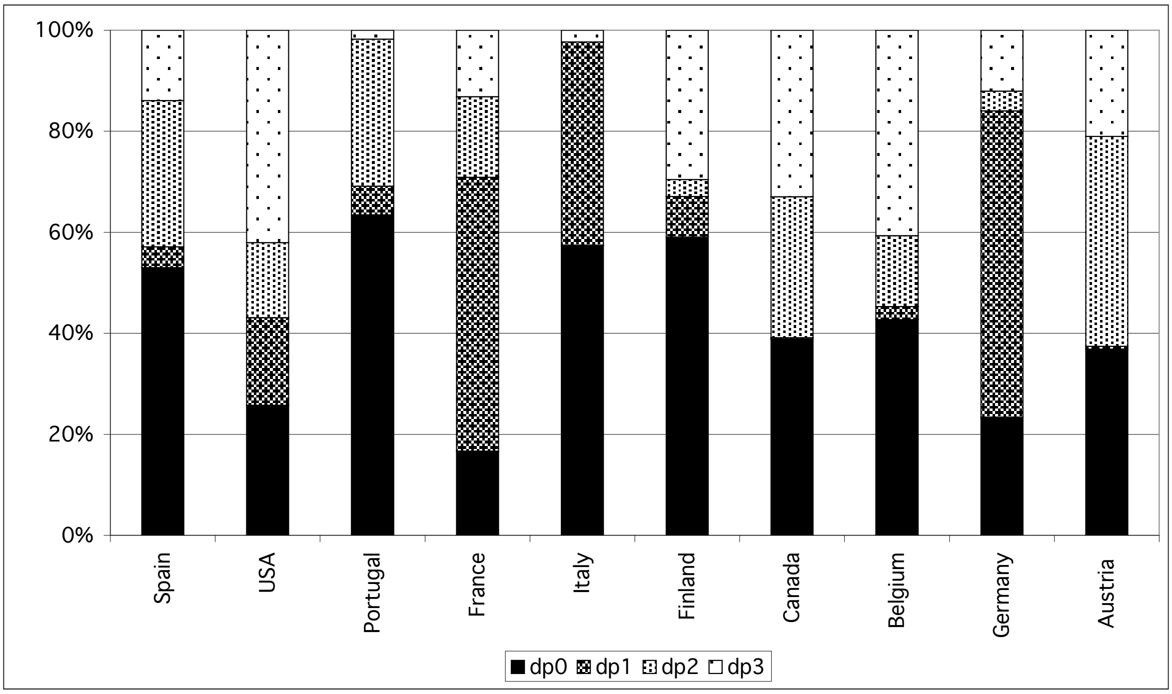
* PF at the beginning and end of the time period.

Source: FFS data

For example we can see from the table that the variation of the parity ratio for the firth birth order "explained" 53.6% of the variation of the intensity of period fertility (the PF index) between 1985 and 1994, when the ratio for the second order accounted for only 4.2%. The results in this table are at time difficult to summarize, due to the fact that when total fertility and the fertility by order had an opposite evolution in time, the contribution turns negative, as was the case for example for the first birth order in the USA. So in order to ease the interpretation of the results, we also give the absolute value of the contribution of each birth order on the variation of the total fertility intensity index PF (Figure 5).

From these results it is clear that the total fertility, as measured by PF, varied mainly due to the changes in the first two parity ratios which accounted for 40 to 90% of the total variation in time for each country. We can observe also that in general the importance of the two first birth orders is similar for countries with a lower and a higher level of total fertility, for example for Spain and Portugal compared with France and the USA. So even if it is correct to say that low fertility is the consequence of a secular process of reduction of fertility for higher birth orders, in recent period variations in total fertility in European countries are dominated by changes in fertility for low birth orders.

Figure 5.- Relative contribution of each birth order to the explanation of Total Fertility change in time (FFS data, circa 1985-1994)



Source: absolute value of data in table 2.

4.- Discussion

The aim of this chapter was to describe the main characteristics of current fertility decline in comparative perspective. The Fertility and Family Survey had been used to analyse fertility and, more precisely, birth parities and period fertility reached in recent years. We use here a cross-sectional perspective and include a large range of countries.

In the last fifteen years fertility in European Countries fertility is stagnating at a low level, but there are still significant differences in total fertility between countries. There is a group of countries, in Southern and Eastern Europe with a very low level of fertility, with a mean number of children per women lower than 1.3 at the end of the 1990s. In order to analyse in greater details what are the demographic dimensions of that low fertility, we have measured the level of fertility by parity or birth order using data for 10 countries from the FFS files. This allowed us to show that this low level of fertility is in part explained by transient or "tempo" effects, and that in fact the quantum or intensity of period fertility is substantially higher in most cases.

If we focus on the parity analysis of the quantum of fertility, our conclusion is that the differences between countries are higher for the fertility at parity 3, so it would be useful to look at the determinants of the variation across countries for that order if we want to understand better why fertility is low.

But if the interest is to explain the evolution in time of total intensity for each country, it is better to focus on the first two birth orders which accounted for more than half of the total variation in the period analysed. In that perspective we believe that the analysis of the recent increase of childlessness, which reached an unprecedented level of around 25% of women for some European countries, should be the main priority for studies with a social policy concern.

These observations lead to our policy recommendations. First, and if low fertility is a political concern, we think that it would be better to concentrate resources on the first and the second children, as this is where the effects should be higher in term of the variation in the TFR. Second we argue that the very significant increase of the proportion childless in the recent period should be of a great political concern, as this is probably a symptom of social difficulties for a growing group of women.

We must say that the conclusion of our analysis of fertility by parity have to be relativized, since the time period at our disposal is quite limited and somewhat dated, due to the fact that the last round of the FFS taken place more than 5 years now. Also we have to take account of the fact that for 7 or the 10 countries studied, fertility was already at a low level, and in some case even increasing, when for the 3 Southern European countries (Italy, Portugal and Spain), it was still in the phase of decline corresponding with what have been called by demographers the “second demographic transition”. It would be better to base our analysis on more recent data, with a longer time period, and also to compare countries not on a chronological basis, but for the same phase of their specific second demographic transition.

References

BONGAARTS, J. and FEENEY G. (1998) "On the quantum and Tempo of Fertility", *Population and Development Review,* 24(2): 271-291.

EUROSTAT (2000) *Statistiques sociales européennes: Démographie. Thème 3: Population et conditions sociales.* Luxembourg: Office des publications officielles des Communautés européennes.

FEENEY, G. and YU, J. (1987) "Period Parity Progression Measures of Fertility in China", *Population Studies,* 41: 77-102.

HENRY, L. (1953) "Fécondité des mariages, Nouvelle méthode de mesure", *Travaux et documents,* Cahier, 16. Paris: Institut National d'Études Démographiques (INED), Presses Universitaires de France.

KOHLER, H.-P. and J. A. ORTEGA (2001) 'Tempo-adjusted period parity progression measures: Assessing the implications of delayed childbearing for fertility in Sweden, the Netherlands and Spain', Max Planck Institute for Demographic Research, Rostock, Germany, *Working Paper #2001-035* (available at http://www.demogr.mpg.de).

KOHLER, H.-P., BILLARI, F. C. y ORTEGA, J. A. (2001) 'Towards a theory of lowest-low fertility', *MPIDR Working Paper 032* (available at http://www.demogr.mpg.de)

LESTHAEGHE, R. and WILLEMS, P. (1999) 'Is Low Fertility a Temporary Phenomenon in the European Union?', *Population and Development Review* 25(2): 221-228.

NI BHROLCHÁIN, M. (1987) "Period Parity Progression Ratios and Birth Intervals in England and Wales, 1941-1971: A Synthetic Life Table Analysis", *Population Studies,* 41:103-125.

RALLU, J. L. and TOULEMON, L. (1993) "Les mesures de la fécondité transversale. I.-Construction des différents indices", *Population,*1: 7-26.

Annex

Annex 1.- FFS Sample

	Female sample (non-weighted)	**Age group**	**Survey year**
Austria	4500	20-54	1995-96
Belgium	3200	21-40	1991-92
Canada	4200	15-54	1995
Finland	4200	22-51	1989-90
France	2900	20-49	1994
Germany	6000	20-39	1992
Italy	4800	20-49	1995-96
Portugal	6000	15-54	1997
Spain	4000	18-49	1994-95
USA	10500	15-44	1995

Annex 2.- P-PPRs and PF (index of total fertility)

Spain

□	0->1	1->2	2->3	3->4	PF
1986	0.888	0.803	0.400	0.252	1.982
1987	0.876	0.795	0.411	0.193	1.927
1988	0.839	0.795	0.397	0.145	1.816
1989	0.817	0.806	0.368	0.110	1.748
1990	0.834	0.810	0.354	0.087	1.771
1991	0.869	0.808	0.361	0.081	1.847
1992	0.888	0.813	0.371	0.091	1.905
1993	0.856	0.834	0.338	0.117	1.843
1994	0.781	0.817	0.264	0.146	1.616

Note: women born between 1945 and 1977.

Italy

□	0->1	1->2	2->3	3->4	PF
1985	0.762	0.729	0.321	0.140	1.525
1986	0.765	0.734	0.333	0.144	1.545
1987	0.756	0.734	0.355	0.161	1.546
1988	0.747	0.741	0.363	0.162	1.540
1989	0.755	0.761	0.342	0.153	1.562
1990	0.773	0.778	0.305	0.140	1.588
1991	0.793	0.778	0.298	0.144	1.625
1992	0.797	0.775	0.321	0.151	1.648
1993	0.784	0.765	0.316	0.153	1.608
1994	0.777	0.752	0.278	0.152	1.553

Note: women born between 1946 and 1975.

Portugal

□	0->1	1->2	2->3	3->4	PF
1985	0.898	0.736	0.413	0.402	2.015
1986	0.886	0.722	0.423	0.408	1.983
1987	0.867	0.735	0.443	0.436	2.005
1988	0.858	0.744	0.420	0.478	2.010
1989	0.862	0.736	0.349	0.447	1.897
1990	0.872	0.721	0.310	0.348	1.800
1991	0.876	0.709	0.319	0.291	1.777
1992	0.857	0.708	0.330	0.290	1.746
1993	0.813	0.722	0.324	0.337	1.687
1994	0.778	0.734	0.308	0.401	1.643
1995	0.778	0.718	0.297	0.414	1.620

Note: women born between 1947 and 1982.

France

□	0->1	1->2	2->3	3->4	PF
1983	0.911	0.834	0.486	0.242	2.158
1984	0.936	0.786	0.484	0.285	2.170
1985	0.946	0.748	0.505	0.317	2.177
1986	0.931	0.730	0.518	0.340	2.144
1987	0.902	0.737	0.523	0.375	2.123
1988	0.899	0.745	0.531	0.397	2.159
1989	0.923	0.745	0.527	0.400	2.215
1990	0.930	0.742	0.517	0.417	2.232
1991	0.922	0.740	0.498	0.406	2.176
1992	0.918	0.733	0.464	0.336	2.061

Note: women born between 1944 and 1973.

Belgium

□	0->1	1->2	2->3	3->4	PF
1980	0.764	0.802	0.428	0.083	1.663
1981	0.779	0.799	0.386	0.094	1.667
1982	0.778	0.798	0.318	0.124	1.624
1983	0.775	0.794	0.322	0.164	1.627
1984	0.775	0.787	0.394	0.220	1.693
1985	0.780	0.786	0.424	0.279	1.754
1986	0.786	0.792	0.412	0.327	1.790
1987	0.788	0.797	0.405	0.364	1.816
1988	0.795	0.797	0.411	0.371	1.843
1989	0.808	0.797	0.388	0.306	1.812

Note: women born between 1951 and 1970.

Germany

□	0->1	1->2	2->3	3->4	PF
1983	0.742	0.752	0.334	0.188	1.529
1984	0.778	0.745	0.366	0.200	1.623
1985	0.797	0.748	0.374	0.205	1.674
1986	0.797	0.759	0.381	0.224	1.699
1987	0.795	0.767	0.373	0.261	1.713
1988	0.786	0.743	0.369	0.275	1.667
1989	0.762	0.701	0.366	0.266	1.563
1990	0.722	0.650	0.324	0.262	1.397

Note: women born between 1952 and 1972.

Austria

□	0->1	1->2	2->3	3->4	PF
1984	0.878	0.791	0.462	0.329	2.051
1985	0.897	0.787	0.475	0.292	2.077
1986	0.913	0.777	0.467	0.234	2.055
1987	0.921	0.769	0.443	0.220	2.031
1988	0.924	0.768	0.404	0.242	2.012
1989	0.921	0.767	0.377	0.284	1.999
1990	0.916	0.776	0.369	0.304	2.004
1991	0.914	0.788	0.369	0.278	2.002
1992	0.920	0.792	0.355	0.236	1.987
1993	0.926	0.803	0.341	0.237	2.002

Note: women born between 1941 and 1976.

Finland

□	0->1	1->2	2->3	3->4	PF
1979	0.861	0.820	0.383	0.216	1.912
1980	0.852	0.783	0.424	0.245	1.894
1981	0.844	0.768	0.466	0.312	1.931
1982	0.835	0.783	0.505	0.385	2.026
1983	0.831	0.805	0.519	0.398	2.077
1984	0.828	0.814	0.496	0.372	2.034
1985	0.822	0.810	0.463	0.376	1.982
1986	0.813	0.804	0.441	0.410	1.955
1987	0.801	0.812	0.418	0.410	1.912
1988	0.788	0.838	0.392	0.370	1.859

Note: women born between 1938 and 1967.

Canada

□	**0->1**	**1->2**	**2->3**	**3->4**	**PF**
1984	0.807	0.815	0.463	0.406	1.977
1985	0.787	0.820	0.441	0.348	1.869
1986	0.783	0.829	0.422	0.324	1.837
1987	0.786	0.849	0.418	0.329	1.869
1988	0.790	0.859	0.421	0.341	1.902
1989	0.796	0.833	0.421	0.349	1.888
1990	0.800	0.816	0.412	0.335	1.857
1991	0.796	0.819	0.398	0.306	1.822
1992	0.804	0.822	0.405	0.300	1.847
1993	0.819	0.827	0.429	0.318	1.922
1994	0.778	0.815	0.415	0.325	1.802

Note: women born between 1941 and 1980.

USA

□	**0->1**	**1->2**	**2->3**	**3->4**	**PF**
1983	0.796	0.855	0.655	0.584	2.548
1984	0.801	0.869	0.625	0.600	2.585
1985	0.812	0.879	0.611	0.591	2.592
1986	0.831	0.890	0.610	0.570	2.620
1987	0.851	0.896	0.615	0.545	2.644
1988	0.857	0.882	0.617	0.536	2.618
1989	0.853	0.858	0.617	0.516	2.518
1990	0.859	0.839	0.600	0.480	2.411
1991	0.875	0.824	0.587	0.462	2.383
1992	0.877	0.812	0.586	0.459	2.360
1993	0.865	0.803	0.554	0.448	2.257

Note: women born between 1950 and 1980.