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Job bust, baby bust: The Spanish case

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JOB BUST, BABY BUST: THE SPANISH CASE

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Abstract: The unemployment rate in Spain has been exceptionally high for more than two decades by now. During the same period the fertility rate dropped dramatically reaching the lowest level in the world. In this study we look for evidence of a link between the 'unemployment crisis' and the 'fertility crisis' in Spain. We examine the factors that affect individuals' ages at marriage and childbirth, focusing on the effects of male employment status. Our results suggest that spells of non-employment have a very strong negative effect on the probability of marriage and childbearing. Part-time or temporal employment also shows negative (but smaller) effects relative to full-time or permanent employment. These effects are strongest on the age at marriage and the age at first birth, while the effects on subsequent births are considerably reduced. Our results suggest that lack of stable jobs among young men is one important factor that has forced many young people to delay their marriage and childbearing, lowering the period fertility rate in Spain to the lowest level in the world.

Key words: unemployment, age at marriage, age at first birth, birth intervals.

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1. Introduction

During the last several decades, two of the most prominent sociodemographic trends taking place across the developed world have been the decline of fertility and the increase in female labor market participation rates. As a consequence, the relationship between fertility and female labor supply has been one of the most important research topics among social scientists of various disciplines. An example of this is in the "New Home Economics" initiated by the studies of Becker (1960) and Mincer (1963). By putting female time allocation decisions at the center of economic models of fertility, they explained the above mentioned secular trends in fertility and female labor supply. Increases in female wages were seen as one of the main forces driving these changes. However, the negative relationship between fertility rates and female labor market participation rates does not seem to hold any more as we show in another paper (Ahn and Mira, 1998). Using aggregate data for OECD countries we find that this relationship has become positive and significant since the late 1980s. We note that unemployment rates were increasing during the same period. We suggest that male employment status may have played an important role in the dramatic fertility decline in some low participation countries such as Spain and Italy, helping to bring about the reversal in the correlation between fertility and female employment. In this paper we explore in depth the relationship between fertility, marriage and male employment status using micro data from Spain.

Traditionally, studies of family formation have focused on females, looking at female education, female wages and female labor market participation as the main determinants of marriage and fertility. In these studies men played at most a secondary role as an exogenous factor. However, historical observations as well as more recent experiences suggest the importance of male employment in explaining the fluctuations in fertility and marriage. The lack of jobs during the Great Depression and full employment during the 1950s and 1960s were closely matched by corresponding fluctuations in fertility. Southall and Gilbert (1996) find a strong negative correlation between the marriage rate and the unemployment rate during the second half of the 19th century and the early 20th century in England and Wales.[1] Several studies using time series data of the last several decades for developed countries also indicate a significant negative effect of unemployment on fertility (Ahn and Mira, 1998; Gauthier and Hatzius, 1997;

[1] See other references in their article for more historical evidence.

Macunovich, 1996). Most recently, the experience of East Germany, Russia and other Eastern European countries also suggest the existence of strong negative correlation between unemployment and family formation (Eberstadt, 1994; Witte and Wagner, 1995). For example, in East Germany the total fertility rate has fallen below one since reunification while the unemployment rate increased to a level close to 20 percent.

Among Western European countries, the above mentioned trends in fertility and participation have been specially pronounced in Spain during the last two decades, as shown in Figure 1a and 1b.[2]

(Figure 1a - 1d)

The total fertility rate dropped from a level around 3 until the mid-1970s which was among the highest in Western Europe to the lowest level in the world, 1.2 children per woman since the mid-1990s. On the other hand, the female participation rate increased slowly but continuously from under 30 percent to more than 45 percent among the working age females, but much more rapidly among younger women (for example, from 30 to 70 percent among those aged 25-34).

However, the most striking development in the Spanish labor market has been the evolution of the unemployment rate. The unemployment rate increased from a level below 5 percent through the mid-1970s to around 20 percent since the mid-1980s (Figure 1c). This change is specially relevant for marriage and fertility because the burden of unemployment has fallen disproportionately on young workers. Among those aged 16-29, the unemployment rate has been around 40% during the last decade. One may point out that unemployment declined during the second half of 1980s while fertility continued its downward trend. One thing to notice is that even during this expansion period the unemployment rate was never below 16%. Therefore, over time it was becoming obvious in people's mind that high unemployment is likely to persist for a long time. This change in expectation for the future could have affected even further the decisions of family formation among young people.

Another factor to account for the continued fertility decline in Spain in spite of the decreasing or stabilizing unemployment rate is the rapid increase in the proportion of workers holding a temporary contract following a change in the labor market regulations in 1984. During the late 1980s and early 1990s most job openings were under temporary contracts, which has

[2] Also, see Bover and Arellano (1995) and Ahn (1997).

greatly increased the proportion of temporary contract holders among young workers. The proportion of males aged 25-39 with a permanent work contract has declined from 55% during the mid-1980s to less than 40% during the 1990s (Figure 1d).[3] High youth unemployment together with a rising proportion of temporary contract holders have brought enormous uncertainty regarding future careers and income as well as lower current income for many individuals and households. Our conjecture is that the two have combined to inhibit marriage and childbearing, both of which involve long-term commitments.

Further insights may be obtained by examining the evolution of age-specific fertility rates in Spain, which is shown in Figure 2. Although fertility rates have fallen for all age groups, the decline was most dramatic among those aged 20-29. During the last two decades, the fertility rate for this age group dropped by 70 percent. Furthermore, there is no sign of reversal in the downward trend for women aged 20-29 while fertility of women in their 30s seems to have recovered slightly during the last 10 years. At a purely descriptive level, these trends seem consistent with the difficult conditions faced by the Spanish youth in the labor market.

(Figure 2)

In this paper we estimate discrete time proportional hazard models in order to learn about the relationship between men's labor market experience and their family formation behavior in Spain. We use individual data from the Socio-demographic Survey which contains information on current and past economic and family situations of the members of Spanish households. First, we examine the determinants of the age at marriage and the age at first birth. Second, we examine the intervals from the first to the second birth and from the second to the third birth. Our emphasis is on the effects of individuals' labor market situation but we also consider the impact of family characteristics (parents' education, father's line of employment) and other relevant factors (cohort, region, and characteristics of previous children in the analyses of inter-birth intervals). Our results suggest that unemployment was indeed a very important factor contributing to the delay of marriages and childbearing in Spain during the last two decades.

2. Marriage and Childbearing: Theoretical Background

[3] The decline of permanent contract holders was even greater among younger workers. For example, among males aged 20-24 this proportion fell from 28% to 12 % between 1987 and 1997.

A popular theory of marriage by Becker (1974) suggests that there are gains to marriage due to specialization in the production of household goods and the joint production of children and other marriage-specific capital, and that individuals will choose to marry if and when the utility in the married state exceeds the utility when single. The timing of marriage may be influenced not only by the direct benefits of marriage, but also by the costs of finding a suitable mate and the opportunity costs of being married. Since a marriage occurs when the decisions of two individuals agree, attractiveness of own characteristics is as important as that of potential spouses. Therefore, an individuals' labor market situation is likely to be one of the important determinants of the availability and the quality of potential spouses, and in turn, of the age at marriage. Furthermore, marriage usually entails fixed costs in terms of housing and basic household equipment. Due to this basic expenditure the timing of marriage is likely to be affected by one's savings and past employment history as well as current situation. The characteristics of the parental home may also influence the age at marriage since potential spouses may consider it as a factor that determines the desirability of the individual as a marital partner. Similar theoretical implications are obtained from dynamic optimization and search theory applied to the marriage market (Montgomery and Trussell, 1986).

In a simplest search theory concept, unmarried individuals would have reservation characteristics (or reservation value) on the one hand, and on the other hand there are offered characteristics (or offered value) of available partners in the marriage market. When offered value is greater than reservation value one will accept the offer and get married. How would unemployment affect the age at marriage? When one becomes unemployed, if offered value in the market for the newly unemployed drops more than the reservation value he considers as a marriageable partner, marriage for this individual is likely to be delayed.

Most empirical studies of the age at marriage use hazard models to estimate reduced form equations. Anderson et. al. (1987), using data from Malaysia, found that skilled employment of both husbands and wives delays marriage relative to unskilled employment or non-employment. Keeley (1977) found, using US data, that high wage males marry earlier than low wage males, which is what a theory based on specialization in the household would predict. However, Bergstrom and Schoeni (1996) found, also using US data, first a positive association between male income and age at first marriage under age 30, then a negative association for those who

married after age 30. A negative effect of difficulties in men's career transitions on marriage probability has been shown in recent US data (Oppenheimer et al., 1997).

The first "New Home Economics" models of fertility were formulated within a static framework in which single-period or lifetime decisions were made on the number of children (Willis, 1973). Although it is easier to obtain predictions of the effect of changes in the economic environment on fertility within static models, this is done at the cost of disregarding important aspects of childbearing decisions such as their irreversible nature, uncertainty about future wages and prices, unknown biological capacities and imperfect birth control, etc. This has lead to the development of dynamic, sequential theories of life-cycle fertility (see for a survey Hotz et al. 1997; Arroyo and Zhang, 1997). Hotz et al. (1997) distinguish four basic elements which are necessary in economic theories of fertility in a life-cycle setting: (i) models of optimal life-cycle consumption, (ii) models of life-cycle labor supply decisions, (iii) models of human capital investment and accumulation, and (iv) stochastic models of human reproduction.[4]

Due to the difficulties involved in considering all these elements most empirical studies based on dynamic fertility models have employed a strategy of reduced form estimation[5]. Most studies focus on the effects of female and male wages on fertility. In a wide range of models a negative effect of female wage and a positive effect of male wage are predicted and empirical results generally have conformed to the prediction. However, there are few studies which examine the impact of male employment status on childbearing. In this paper we adopt a reduced-form estimation strategy and we focus on the implications of male unemployment on the timing of childbearing. In theory, the effect of male unemployment on fertility should be similar to that of a drop in current period household earnings, with an additional impact through expected lifetime income if unemployment is expected to last. As long as children are a normal good, this drop in current and expected household income should decrease the probability of childbearing. Additional negative effects might arise if a housewife decides to enter the labor market or if a

[4] From a different perspective, Easterlin (1980), in an attempt to explain the postwar baby boom and subsequent baby bust, emphasizes the importance of intergenerational relative income across cohorts in the formation of desired standard of living and preferences for children of young adults. The main prediction is that lower real income of current generation relative to that of their parents will lead to lower fertility. Under a presence of high unemployment Easterlin's theory will argue for the importance of relative job stability in preference formation, predicting lower fertility among the generations faced with lower job stability.

[5] Some studies have implemented empirical structural models. The models incorporate many simplifying assumptions in order to make the models empirically tractable. See a survey in Hotz et al. (1997) and Arroyo and

working wife delays her exit from the labor market in order to maintain household income. Empirical studies for developed countries tend to find positive effects of male income or male employment on fertility (Hotz and Miller, 1988; Heckman and Walker, 1990).

3. Estimation Method

In this paper we analyze decisions on the timing of marriage and childbearing within the context of a proportional hazard model. Because our data only provides yearly information on all the events of interest, we use a discrete time hazard estimation method as in Allison (1982).[6]

The hazard function at time t is assumed to take a proportional hazard form

$$h_i(t, z_i(t)) = h_0(t)\exp(z_i(t)'\beta) \qquad \mathbf{1}$$

where $h_0(t)$ is an unknown baseline hazard for the period t, $z_i(t)$ is a vector of explanatory variables, possibly time-varying, and β is the corresponding parameter vector.

For the analyses of age at marriage and age at first birth, we construct person-year data for each year since the completion of schooling (from age 20 for college sample) until the time of the event occurrence (completed duration) or until the survey time (censored duration). For the analyses of inter-birth duration we construct similar person-year data starting at the time at the birth interval of interest. Using retrospective information about individuals' work histories, we construct individuals' yearly employment status. Unfortunately, within non-employment periods we cannot further distinguish between unemployment and out of labor force states. However, considering that our working samples contain only prime-aged males, we think it is reasonable to interpret non-employment periods as periods of unemployment.

4. Covariates and Sample Selection

The data are drawn from the Spanish Socio-demographic Survey (Encuesta Sociodemográfica) carried out by the Spanish Statistical Institute (INE) during the third quarter of 1991. The principal objective of the Survey was to gather information about individuals' history of family situation, residence and housing, economic activities and occupation, and education. The

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Zhang (1997).

[6] See Jenkins (1997) for an easy-to-use implementation of this model in STATA.

Survey contains information on 159,154 principal interviewees (a representative sample of the Spanish population of ages 10 and over) and their households.

We limit our analysis to prime-aged males. We do this because our survey (as most other surveys) records labor market histories only for the principal respondents (one person for each household surveyed). Given our interest in the effect of male employment status on marriage and fertility, this limitation is overcome by taking the male respondents as our working sample. An important advantage of using male samples and focusing on the effect of male employment status is that, unlike female employment status, male employment status can be treated more safely as exogenous with respect to the decisions of marriage and childbearing. For example, recent work by Angrist and Evans (1998) shows strong evidence of endogeneity of female labor supply and for exogeneity of male labor supply in childbearing decisions among couples in the United States.

In most societies the ages at marriage of male and female spouses are highly correlated. The correlation coefficient for Spain in our data is 0.97 and highly significant. Given that most childbearing occurs within stable unions (births from non-stable unions accounted for less than 5% in our data), the father's and mother's ages at birth are also highly correlated. Therefore we think the results of the analysis of the age at marriage and childbearing for males can be interpreted as applying to both sexes once we adjust for the age gaps between husbands and wives.[7]

Our working sample consists of all principal male respondents aged 26-40 at the time of survey. The reason why we do not include people younger than 26 is that the majority (60 percent) of Spanish males are still unmarried by this age. By excluding those over 40 we reduce recall error about life histories arising from the retrospective nature of the Survey. Since most marriages and births occur after age 20, almost all the decisions recorded in our sample correspond to the 1970's and 80's, including the period of rapid fertility decline which started in the mid-1970s.

One of the main factors examined in numerous studies of age at marriage and childbearing is completed education (Montgomery and Trussell, 1986; Schultz, 1997; Hotz et al., 1997). The results show almost unanimously a strong delaying effect of education on marriage and fertility. This effect is even stronger in less developed countries. However, a conceptual problem is that

[7] Appendix 1 gives some descriptive proportions of ever married and the number of children by sex, age and

education is very likely to be an endogenous variable in marriage and childbearing decisions. In order to deal with this problem instrumental variable or simultaneous equation estimation techniques have been applied. Nevertheless the problem persists in most cases due to the difficulties in finding adequate instruments or due to tenuous identification. In our study we estimate the models separately for each educational category. We take this approach because education is not one of our central variables of interest and we want to allow different effects of covariates by education. We break the sample into three groups with primary education, secondary education, and college education. We further restricted the sample to include only individuals who completed schooling by a given age: age 14 for the primary education group (60% of this group), ages between 17 and 19 for the secondary education group (59% of this group), and ages 20 through 25 for the college education group (62% of this group). Although the empirical results cannot be generalized to the whole population due to our sample selection, our goal is to establish more precisely the effects of male employment status on the (conditional) hazards of family formation for each level of education.

The duration variable of our analyses is waiting time (in years) until marriage, until the first birth, and the intervals between the first and second births and between the second and the third births. The covariates included are employment status, the duration of the (unemployment) spell in the transition from school to work, father's and mother's education and father’s labor market situation when the respondents were 16, age at the survey date (as a control of cohort and trend effects), and regional dummies. In the analyses of higher order births we also include variables related to previous births, such as survival status of previous children, duration of previous birth intervals, and the gender of existing children.

Unlike age at marriage or age at first birth the interval to the second (third) birth is of course conditional on having had a first (second) birth and the beginning of the interval is the date of the first (second) birth. This selection implies significant changes in interpreting the results. Many explanatory variables may become less important if their main effect is exerted through the duration to marriage or to first birth; or, on the contrary, other variables may gain importance in higher order birth intervals. Furthermore, reduced sample sizes in the analyses of higher birth intervals is likely to lead to less accurately estimated coefficients. Also, it is demonstrated in

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cohort.

Heckman and Walker (1990) that estimation of each birth interval separately (the so called "piece-meal" approach) could yield biased results. However, their empirical study using Swedish data found that unobservables correlated over spells were empirically unimportant. One should be aware of these problems in interpreting our results.

Before we turn to the estimation results, a more descriptive analysis of the relationship between family formation and employment status will be useful. In Table 1 we compare Kaplan-Meier hazard rates by employment status.

(Table 1)

The conditional probability of marrying or having the first child is clearly higher for those employed than for those without a job, and higher for the full-time workers than for the part-time or temporal workers. The differences are more pronounced after age 20 and persist well beyond age 30. The Kaplan-Meier hazard rates for the second and third birth intervals are not so clearly distinguishable between different employment states. In particular, the sample size of those who do not work is substantially reduced for the higher birth orders making the comparison less precise. This suggests that few non-employed males progress to marriage or to first birth leaving few non-employed males in the analyses of higher order birth intervals.

5. Empirical Results

In this section we discuss separately the effects of each of the covariates on the age at marriage (Table 2), age at first birth (Table 3) and the duration of subsequent birth intervals (Tables 4 and 5). Although we have also estimated the intervals from marriage to a first birth, we do not discuss the results due to some problems. The main empirical problem with this interval arises from the fact that we have only yearly information. A vast majority of first births (over 70%) are concentrated in the 2^{nd} , 3^{rd}, or 4^{th} year of marriage, and most coefficients are not significant.

5.1 Employment Status

Every year, an individual's employment status is described by a categorical variable with five possible values: full-time continuous work, part-time or temporal work, no work, military duty and "in school" (for college graduates only). This variable refers to the situation the previous

year to allow for the gap between decision to have a child and the occurrence of a birth. It is time-varying covariate. In general, the estimation results confirm what we learnt from the Kaplan-Meier hazard rates shown in Table 1.

Age at Marriage: For all education samples, individuals with a full-time work (the omitted or 'reference' category in estimation) are substantially more likely to marry than those without one. Part-time or temporal work reduces the conditional probability of marriage in a given year by about 20 percent relative to a full-time work, except for the college educated. However, the largest reduction occurs during no-work periods. Those without work are less than half as likely to become married as those with a full-time work. This result suggests that the lack of stable employment among the young has contributed significantly to the substantial delay in the age at marriage and the increased incidence of singlehood in Spain during the last two decades. As expected, the marriage hazard is substantially lower while one is doing military service or in school.

Age at First Birth: The results are similar to those for age at marriage. For all education samples, full-time continuous employment increases the hazard of having the first child substantially relative to other situations. Part-time or temporal work reduces the conditional probability of having a first birth relative to full-time work by between 20 and 40 percent (depending on education). For those without work, the hazard of having the first child is less than half the hazard for those with a full-time job. Among the college educated it is only one fourth as large. Again, this result suggests that lack of stable employment has contributed substantially to the increase in the age at first birth, to an increase in childlessness and ultimately to fertility decline.

Interval to Second Birth: As discussed earlier, the sample is very different from the samples for age at marriage or first birth. In this sample the number of periods without work, in military duty or at school is much smaller, less than two percent compared to more than 10 percent in previous samples. This suggests indirectly that employment status is indeed important for marriage and first birth. Many of those without work do not marry or have a first child, and therefore will never be eligible for the second birth sample. Regardless of sample selection, we would still expect negative effects of part-time jobs or no job on the hazard of a second births, and our results conform to that prior. The second birth hazard falls by 40-50 percent during

periods of joblessness; however, this effect is not significant at the 95% level for the secondary or college education categories. Part-time or temporal jobs also reduce the hazard by about 30 percent for those with secondary education, but the effect is not significant. These results suggest that the lack of stable jobs contributed to the fertility decline in Spain during the last two decades not only through the delay of marriage and first birth but also through the delay or reduction of subsequent births.

Interval to Third Birth: Labor market status does not seem important for the pace of third births. None of the estimated coefficients are significant, probably due to reduced sample sizes.

5.2 Initial Unemployment Duration

We have also included the duration of the unemployment spell that individuals experienced prior to their first job usually during the transition from school to work. This variable is not time-varying and the coefficient should not be interpreted as a direct contemporaneous effect of unemployment. Having included time-varying employment status, we interpret this variable as representing some permanent unobserved individual differences, such as abilities in the labor market and preferences for work, which influence their family formation behavior throughout their lives.

Age at Marriage: The results are as expected. Initial unemployment duration has a negative effect on marriage hazards: the longer the transition from school to work the later one marries. Somewhat surprising is its large magnitude. Those whose initial unemployment spell was longer than 6 months are 20 percent less likely to get married each year than those with shorter unemployment duration prior to their first job.

Age at First Birth: As in the case of the age at marriage the negative effect is present. Unemployment duration longer than 6 months reduces first birth hazards by about 20 percent for the primary and secondary education groups, while its effect is reduced and only marginally significant for the college education group.

Interval to Second Birth: Unobserved individual differences as measured by the initial unemployment duration seem much less important for the primary education group. However, this variable still yields significant and negative effects on the second birth hazard for the groups with secondary or college education.

Interval to Third Birth: The duration of the first unemployment spell has a very strong negative impact on the third birth hazard for individuals with college education. The effects on the other groups are in general not significant.

5.3 Parents' Education Level and Father's Employment Status

As shown in many previous studies (see Ahn and Ugidos, 1996 for the Spanish case), parents' education influences children's labor market and demographic behavior mostly through children's educational achievement. Given that our samples are homogenized with respect to the education level and the age at completion of schooling, parents' education level is likely to affect children's age at marriage through family income and other relevant factors that are correlated with parents' educational level. One plausible hypothesis would be that higher education of parents makes their children more attractive in the marriage market therefore leading to earlier marriage other things equal. Given the parents' education level, father's occupation may be a proxy for the economic situation of the family. We distinguish three employment categories: employer, paid worker (reference category in our estimation models) and self-employed without employees. According to previous studies, the average income is highest among employers and lowest among the self-employed.

Age at Marriage: Our results are not clear-cut. In general, the coefficients are not significant for father's education in spite of large sample sizes. However, for mother's education we observe a tendency to negative effects on children's marriage probability. This might reflect the existence of reverse selection. That is, given that all individuals have the same completed education level in our samples, the mother's education might be negatively correlated with the child's unobserved ability. Children with more educated mothers are supposed to have higher education, either for genetic reasons or because they receive more human capital at home.

With respect to father's employment status our results indicate that while 'employer' fathers increase (but not significantly) children's marriage probabilities, self-employed fathers decrease it significantly relative to paid-worker fathers. This seems to be in agreement with our 'family income' hypothesis - that the higher the family income the higher the marriage probability.

Age at First Birth: In contrast with results for the age at marriage, father's education tends to show a negative effect while the mother's education shows no significant effects.

Interval to Second Birth: Parental education and occupation level are likely to have smaller effects for higher birth orders. Surprisingly, father's education shows negative effects and it is almost as significant as in the case of age at first birth. Fathers' occupation does not show any effects on the second birth hazards.

Interval to Third Birth: No significant effects.

5.4 Birth Cohort

Age at Marriage: There are some differences between cohorts. Among the primary education sample, the 1956-1960 cohort has a higher marriage rate than earlier cohort, while the marriage rate is higher for the latest cohort (1961-1965) than for earlier cohorts among the secondary and college education samples. The decrease for the latest cohort is greater for the college graduates, which may reflect the rapid increase in college enrollment rate among spouses.

Age at First Birth: There are some differences across samples in cohorts effects. Among the primary education sample, there are no cohort effects while among the higher education samples more recent cohorts are having their first birth later, with the largest effects observed among the college educated.

Interval to Second Birth: The more recent cohorts have lower second birth hazards for all education groups. These differences across cohorts are larger among the secondary and college education groups than among the other group. This may be due to the effect through their wives' education and labor market behavior. On average, higher educated men marry higher educated women and the cohort effect might reflect the fact that female labor market participation has been increasing faster among the women with higher education.[8]

Interval to Third Birth: Those in the birth cohort 1956-1960 are about 20% smaller hazard of a third birth than those of birth cohort 1951-1955. The youngest cohort shows similar smaller hazards but the coefficients are not significant, most probably due to a small sample size of this young cohort (age at the time of survey between 26 and 30).

5.5 Previous Children

[8] In fact, between 1976 and 1986 the female participation rate among women with primary education decreased from 30 to 24 percent while that among those with secondary and university education increased from 42 and 68 percent to 47 and 80 percent, respectively.

Interval to Second Birth: We have included some variables regarding the first child. First, the variable indicating the death of the first child is included as a time-varying dummy equal to one for all periods after the death of the child. Of course, the low infant and child mortality rate is reflected in a very few person-years (less than 0.3 percent) in which the first child is dead. It is well known that subsequent births will occur sooner due to both biological and behavioral reasons if a child dies. The same result is observed in our estimates. The death of the first child increases the second birth hazard by a factor of more than two for all samples.

We have also included the interval from marriage to the first birth. This variable is likely to play as a proxy for the couples' fecundity and preferences for children, which we do not observe. Under this hypothesis, shorter previous intervals would lead to shorter subsequent intervals, which is confirmed in our results. Every year added to the previous interval reduces the second birth hazard by about 10 percent. However, this should not be interpreted as a causal effect since both are likely to be determined by some common unobserved factors.

To control for gender preferences we included the gender of the first child. The result suggests that there are no gender preferences among the Spanish parents, at least in the decision to have a second child.

Interval to Third Birth: Again the death of the first or second child is very rare as reflected in a very few person-years (less than 1 percent) in which the first or second child is dead. A similar effect as in the progression to a second birth is observed in our results. The death of the first or second child increases the third birth hazard by more than four times for all samples.

We also included the interval from the first to the second birth. As in the analysis of the second birth interval, shorter previous intervals lead to also shorter subsequent intervals. The third birth hazard falls by about 20 percent for every year that is added to the second interval

With respect to gender preferences the results suggest that there are preferences for a balanced gender composition with a special preference for at least one girl. Parents with two boys are likely to have a third child about 20 (among primary education males) to 80 percent (among secondary education males) faster than those with a boy and a girl.

6. Conclusions

In this study we have looked for evidence of a link between the ‘unemployment crisis’ and the ‘fertility crisis’ in Spain. We have examined the factors that affect individuals’ ages at marriage and childbirth, focusing on the effects of male employment status. Our results suggest that spells of non-employment have a very strong negative effect on the probability of marriage and childbearing. Part-time or temporal employment also shows negative (but smaller) effects relative to full-time continuous employment. These effects are strongest on the age at marriage and the age at first birth, while the effects on subsequent births are considerably reduced. Our results suggest that lack of stable jobs among young men is one important factor that has forced many young people to delay their marriage and childbearing, lowering the period fertility rate in Spain to the lowest level in the world. The key to the recuperation of fertility seems to lie in the recovery of the labor market not only through the creation of new jobs but also by increasing the level of confidence among young workers about their future employment prospects.

REFERENCES

Ahn, N. (1997) "Labor market crisis and demographic crisis in Spain" Paper presented in the 11th annual conference of the European Society for Population Economics in Essex.

Ahn, N. and P. Mira (1998) "Changing relationship between fertility and female employment in developed countries" mimeo.

Ahn, N. And A. Ugidos (1996) "The effects of the labor market situation of parents on children: inheritance of unemployment" *Investigaciones Económicas*, XX: 23-41.

Allison, P.D. (1982) "Discrete-time methods for the analysis of event histories" in *Sociological Methodology*, ed. S. Leinhardt: 61-97.

Anderson, K.H., Hill, M.A. and J.S. Butler (1987) "Age at marriage in Malaysia: a hazard model of marriage timing" *Journal of Development Economics* 26(2): 223-234.

Arroyo, C.R. and J. Zhang (1997) "Dynamic microeconomic models of fertility choice: A survey", *Journal of Population Economics* 10: 23-65.

Angrist, J.D. and W.N. Evans (1998) "Children and their parents' labor supply: evidence from exogenous variation in family size" *American Economic Review* 88(3): 450-477.

Becker. G.S. (1960) "An economic analysis of fertility" in *Demographic and economic change in developed countries*, Universities-National Bureau Research Conference Series 11 (NBER, Princeton, NJ): 209-231.

Becker. G.S. (1974) "A theory of marriage" in *Economics of the Family: Marriage, Children, and Human Capital*, ed. T.W. Schultz, 299-344. University of Chicago Press.

Bergstrom, T. And R.F. Schoeni (1996) "Income prospects and age-at-marriage" *Journal of Population Economics* 9:115-130.

Bover, O. and M. Arellano (1995) "Female labor force participation in the 1980s: the case of Spain" *Investigaciones Económicas*, Mayo: 171-194.

Easterlin, R.A. (1980) *Birth and Fortune*, 2nd ed. University of Chicago Press.

Eberstadt, N. (1994) "Demographic shocks after communisom: Eastern Germany, 1989-1993" *Population and Development Review* 20(1): 137-152.

Gauthier, A.H. and J. Hatzius (1997) "Family benefits and fertility: an econometric analysis" *Population Studies* 51: 295-306.

Heckman, J.J. and J.R. Walker (1990) “The relationship between wages and income and the timing and spacing of births: evidence from Swedish longitudinal data” *Econometrica* 58(6): 1411-1441.

Hotz, V.J. and R. Miller (1988) “An empirical analysis of life cycle fertility and female labor supply” *Econometrica* 56: 91-118.

Hotz, V.J., Klerman J. and R. Willis (1997) “The economics of fertility in developed countries” *Handbook of Population and Family Economics*: 275-347.

Jenkins, S.P. (1995) “Easy estimation methods for discrete-time duration models” *Oxford Bulletin of Economics and Statistics* 57(1): 129-138.

Keeley, M. (1977) "The economics of family formation" *Economic Inquiry* 15: 238-250.

Macunovich, D.J. (1996) "Relative income and price of time: exploring their effects on US fertility and female labor force participation" *Population and Development Review* 22(supplement): 223-257.

Mincer, J. (1963) “Market prices, opportunity costs and income effects” in C. Christ et al., eds., *Measurement in economics: studies in mathematical economics in honor of Yehuda Grunfeld.*

Montgomery, M.R. and J. Trussell (1986) "Models of marital status and childbearing", in *Handbook of Labor Economics, Vol. I*, eds. O. Ashenfelter and R. Layard.

Oppenheimer, V.K. M. Kalmijn and N. Lim (1997) “Men’s career development and marriage timing during a period of rising inequality” *Demography* 34(3): 311-330.

Schultz, T.P. (1997) “Demand for children in low income countries”, *Handbook of Population and Family Economics*: .

Southall, H. And D. Gilbert (1996) "A good time to wed?: marriage and economic distress in England and Wales, 1983-1914", *Economic History Review,* XLIX(1): 35-57.

Willis, R. (1973) “A new approach to the economic theory of fertility behavior”, *Journal of Political Economics* 81: S14-S64.

Witte, J.C. and G.G. Wagner (1995) "Declining fertility in East Germany after unification: A demographic response to socioeconomic change" *Population and Development Review,* 21(2) 38-397.

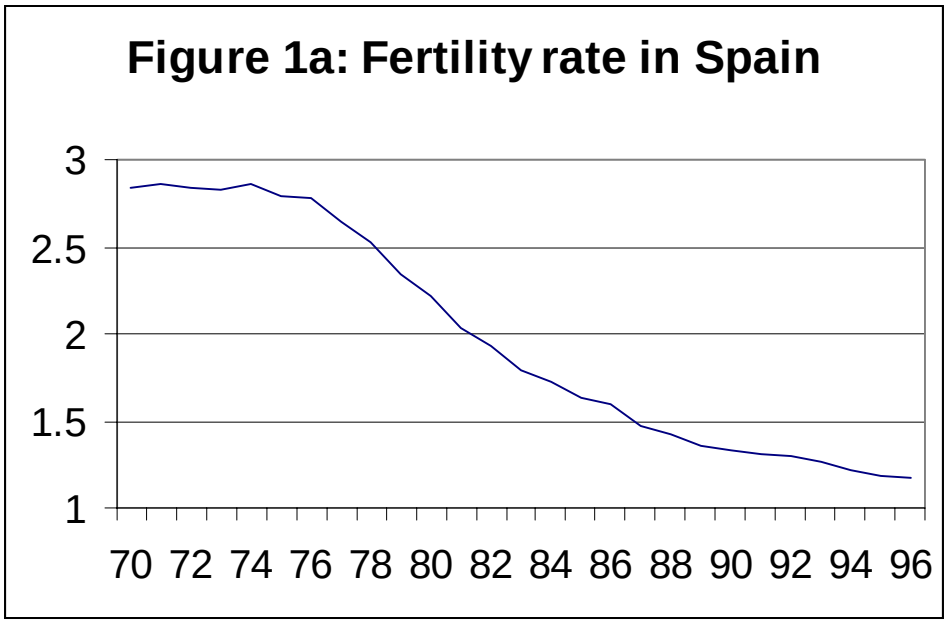
Figure 1a: Fertility rate in Spain
3
2.5
2
1.5
1
70 72 74 76 78 80 82 84 86 88 90 92 94 96

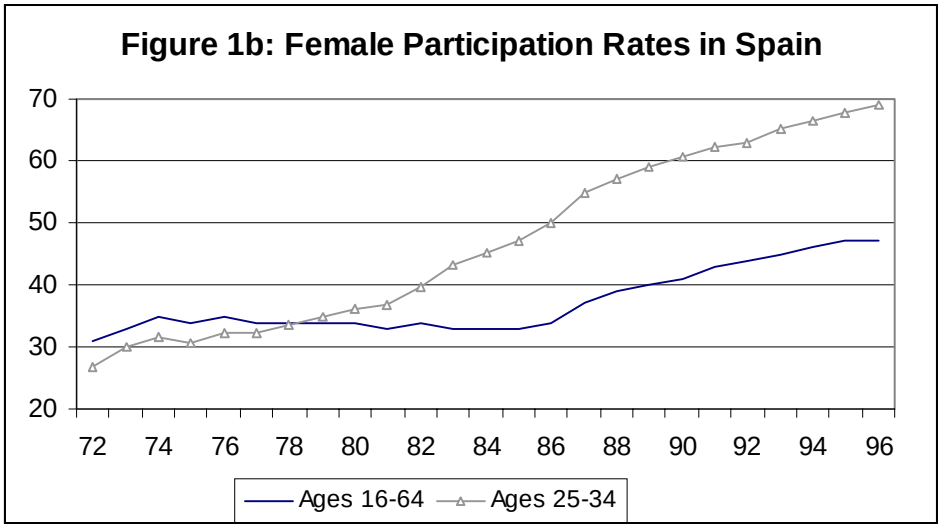
Figure 1b: Female Participation Rates in Spain
70
60
50
40
30
20
72 74 76 78 80 82 84 86 88 90 92 94 96
Ages 16-64
Ages 25-34

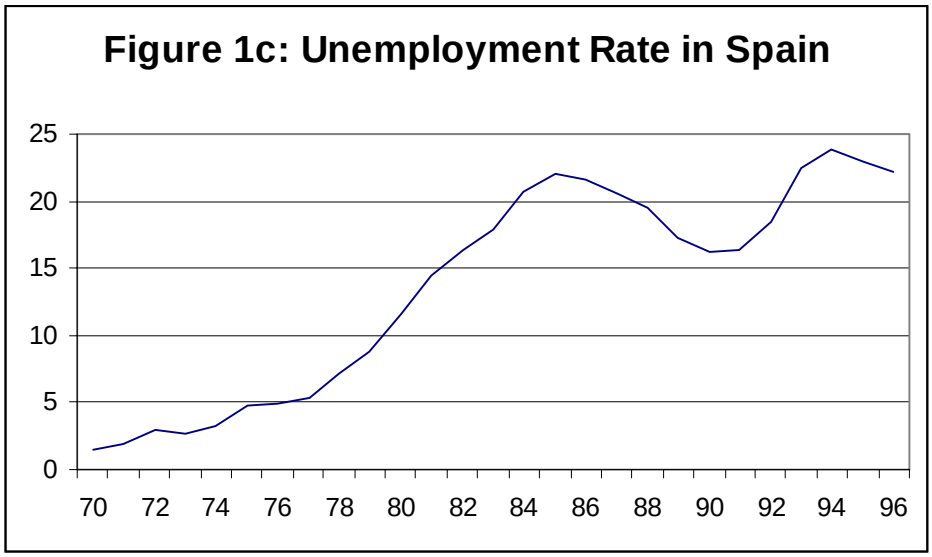
Figure 1c: Unemployment Rate in Spain
25
20
15
10
5
0
70
72
74
76
78
80
82
84
86
88
90
92
94
96

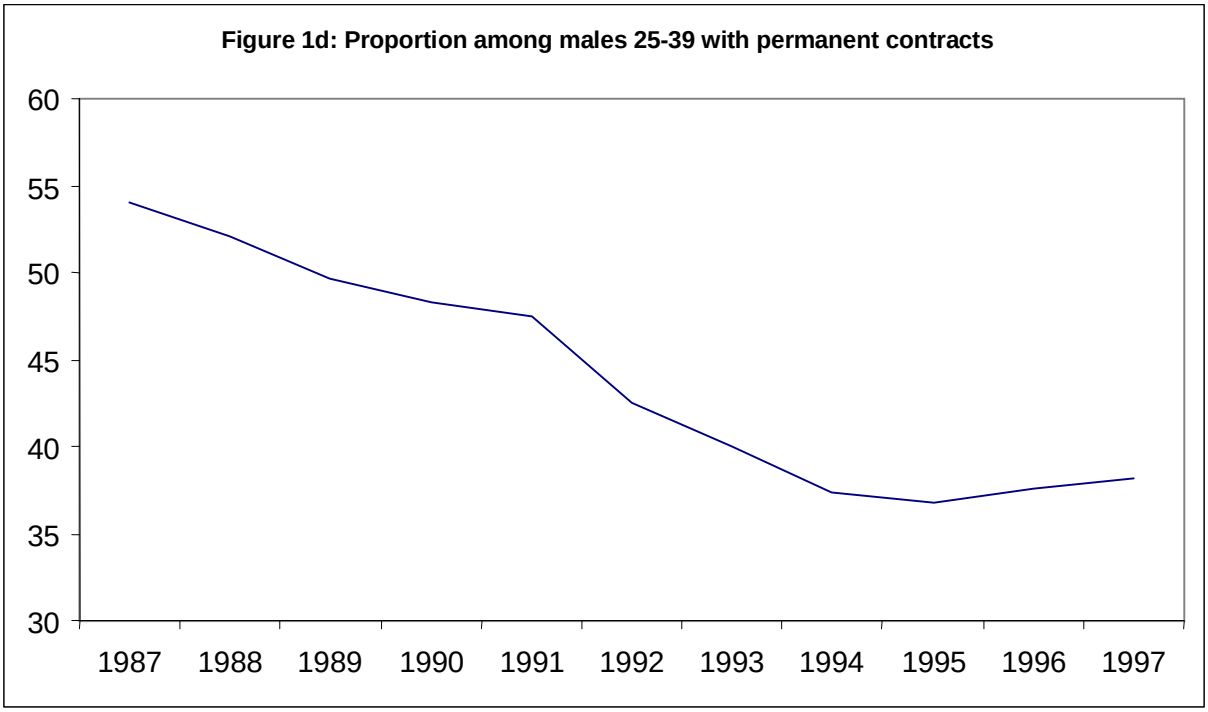
Figure 1d: Proportion among males 25-39 with permanent contracts
60
55
50
45
40
35
30
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997

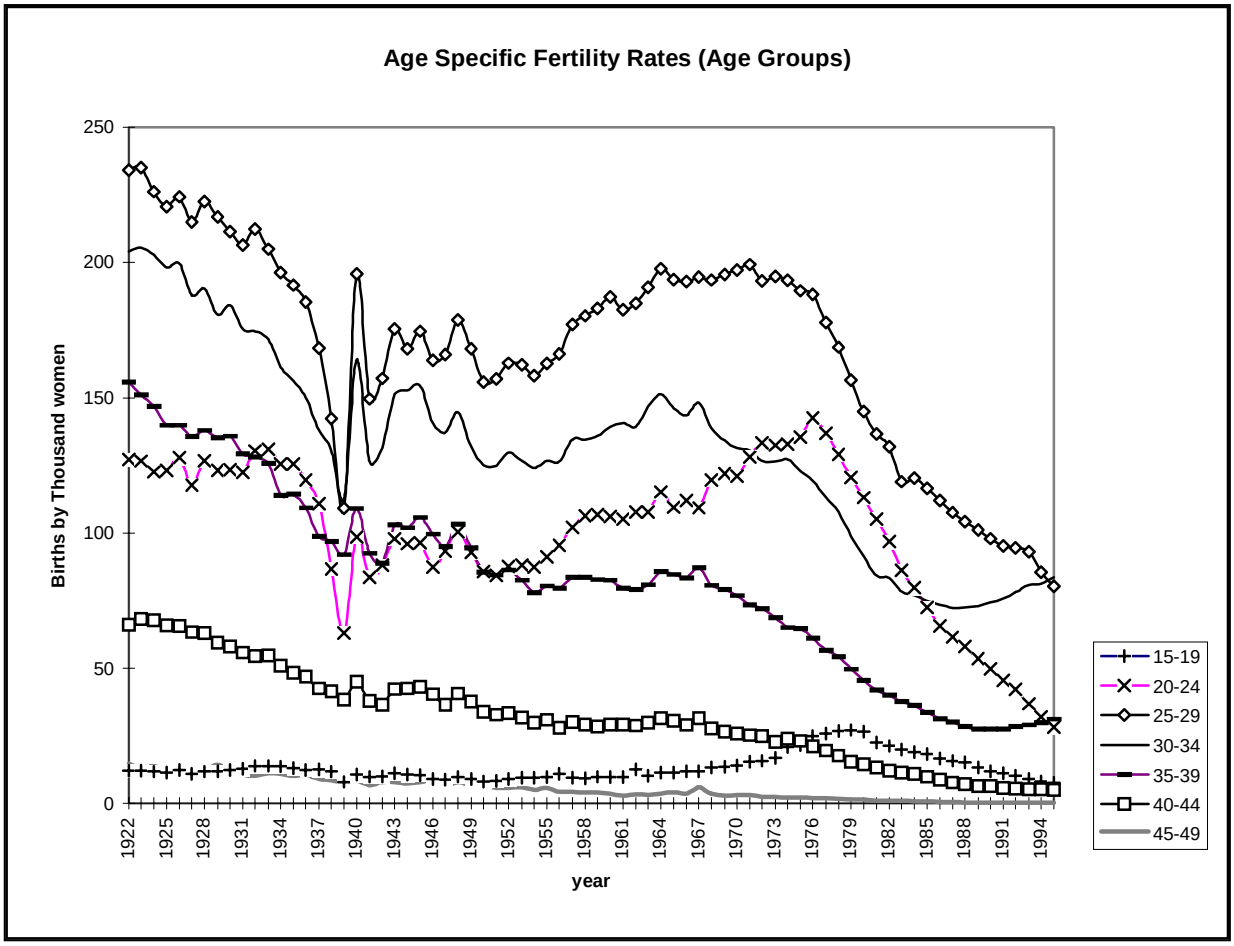

Figure 2: Age-specific Fertility Rates

Table 1: Kaplan-Meier Hazard Rate by Employment Status

	Age at Marriage			Age at 1st Birth		
Age	Full-time	Part-time	No work	Full-time	Part-time	No work
14	0.04	0.00	0.04	0.04	0.00	0.02
15	0.03	0.00	0.05	0.09	0.00	0.05
16	0.15	0.11	0.03	0.05	0.22	0.12
17	0.29	0.20	0.07	0.13	0.51	0.15
18	0.93	1.28	0.67	0.34	0.83	0.29
19	1.66	2.43	0.97	1.19	1.30	0.47
20	3.51	3.02	2.20	2.56	2.47	1.07
21	5.31	4.49	2.73	3.03	2.09	2.00
22	8.22	7.03	4.77	3.00	2.58	1.84
23	12.85	10.86	8.06	4.68	5.18	2.20
24	15.60	14.56	8.24	7.54	7.33	2.76
25	19.26	13.99	4.95	9.89	10.47	2.60
26	17.48	13.03	7.94	12.10	7.95	4.45
27	19.35	14.81	9.46	12.14	10.06	7.81
28	17.02	12.46	4.31	14.10	12.13	8.39
29	14.39	8.75	8.1*	14.14	16.54	4.27
30	11.67	8.57	1.3*	14.29	7.25	8.1*
31	11.11	7.55	3.2*	14.05	7.58	4.0*
32	11.03	7.08	3.8*	12.20	6.58	3.2*
33	7.76	4.3*	2.1*	9.44	5.83	0.0*
34	7.28	4.5*	0.0*	10.0	4.7*	4.0*
35	4.79	0.0*	2.9*	6.85	1.5*	0.0*
36	4.48	2.6*	0.0*	5.51	4.1*	0.0*
37	7.21	3.7*	0.0*	4.14	8.6*	0.0*
38	4.08	0.0*	5.9*	7.62	0.0*	0.0*
39	0.0*	0.0*	0.0*	2.44	0.0*	0.0*
40	0.0*	0.0*	0.0*	2.0*	0.0*	0.0*

Note: * denotes the estimates based on a number of observation fewer than 100.

Table 1 (continued): Kaplan-Meier Hazard Rate by Employment Status

	Interval to Second Birth			Interval to Third Birth		
Years	Full-time	Part-time	No work	Full-time	Part-time	No work
1	0.86	0.49	1.22	1.02	1.24	2.78*
2	6.97	6.54	8.06	2.47	3.46	2.17*
3	12.40	15.42	15.17	5.24	6.90	9.30*
4	15.59	15.14	6.25*	5.04	6.49	0.00*
5	18.31	18.55	9.23*	5.82	4.67	0.00*
6	21.61	19.80	20.83*	4.55	5.79	0.00*
7	19.97	14.93	10.00*	5.22	1.00*	0.00*
8	14.42	22.73*	0.00*	3.70	8.20*	0.00*
9	13.58	6.90*	20.00*	3.93	2.17*	0.00*
10	10.14	11.36*	8.30*	3.79	6.90*	0.00*
11	11.54	7.14*	0.00*	3.27	5.56*	0.00*
12	5.21	12.50*	0.00*	4.32	0.00*	0.00*
13	0.82	9.09*	0.00*	0.00*	0.00*	0.00*
14	0.00*	14.02*	0.00*	6.38*	0.00*	0.00*
15	6.00*	60.00*	0.00*	0.00*	0.00*	0.00*

Note: * denotes the estimates based on a number of observation fewer than 100.

Table 2: Discrete Time Hazard Estimation of Age at Marriage

	Males with Primary Education (N=72009)		Males with Secondary Education (N=22510)		Males with College Education (N=19010)	
	Risk Ratio (t statistics)	Sample Mean	Risk Ratio (t-statistics)	Sample Mean	Risk Ratio (t statistics)	Sample Mean
Labor Market Situation One Year Ago (re: full-time work)						
Part-time	0.84 (3.81)	0.14	0.80 (2.94)	0.10	0.98 (0.26)	0.08
No Work	0.58 (6.04)	0.18	0.41 (7.44)	0.21	0.45 (9.07)	0.42
In School	---	---	---	---	0.70 (3.73)	0.51
Military	0.82 (3.84)	0.13	0.84 (2.21)	0.19	0.84 (2.19)	0.15
Search Duration of First Job (re: 0-6 months)						
7+	0.75 (4.95)	0.10	0.83 (2.96)	0.19	0.81 (3.29)	0.28
Mother (re: no education)						
< Prim.	0.88 (2.20)	0.37	1.11 (1.07)	0.38	0.90 (0.73)	0.29
Prim. Low	0.93 (0.82)	0.18	0.93 (0.71)	0.30	0.95 (0.35)	0.33
Prim. High	0.64 (2.82)	0.02	0.80 (1.51)	0.08	0.84 (1.08)	0.12
Second. +	0.91 (0.33)	0.004	1.00 (0.03)	0.03	0.85 (1.07)	0.14
Father (re: no education)						
< Prim.	1.11 (1.87)	0.38	0.89 (1.07)	0.35	1.07 (0.43)	0.23
Prim. Low	1.02 (0.24)	0.20	0.93 (0.70)	0.29	0.90 (0.65)	0.25
Prim. High	1.05 (0.39)	0.03	0.97 (0.19)	0.08	0.87 (0.79)	0.11
Second. +	1.02 (0.13)	0.01	0.85 (1.29)	0.10	1.00 (0.06)	0.32
Father (re: employee)						
Employer	1.15 (1.37)	0.02	1.09 (0.97)	0.07	1.20 (2.24)	0.12
Self-emp.	0.81 (5.89)	0.31	0.91 (1.67)	0.25	0.98 (0.24)	0.22
Cohort (re.: 1951-55)						
1956-60	1.09 (2.37)	0.39	1.00 (0.09)	0.39	0.97 (0.43)	0.41
1961-65	1.10 (2.21)	0.31	0.84 (2.77)	0.37	0.70 (4.51)	0.28

Note: Coefficients are ratios of hazards to the baseline hazard. Baseline hazard rates are estimated non-parametrically by including a dummy variable for each year of age. We have also included regional dummy variables which are not presented in the table.

Table 3: Discrete Time Hazard Estimation of Age at First Birth

	Males with Primary Education (N=81936)		Males with Secondary Education (N=30111)		Males with College Education (N=23025)	
	Risk Ratio (t statistics)	Sample Mean	Risk Ratio (t-statistics)	Sample Mean	Risk Ratio (t statistics)	Sample Mean
Labor Market Situation One Year Ago (re: full-time work)						
Part-time	0.66 (8.63)	0.14	0.79 (2.62)	0.10	0.77 (2.57)	0.09
No Work	0.40 (8.34)	0.16	0.38 (5.88)	0.18	0.28 (8.58)	0.35
In School	---	---	---	---	0.64 (2.61)	0.35
Military	0.77 (3.49)	0.14	0.62 (3.92)	0.21	0.51 (4.95)	0.13
Search Duration of First Job (re: 0-6 months)						
7+	0.78 (3.92)	0.09	0.77 (3.56)	0.18	0.89 (1.62)	0.26
Mother (re: no education)						
< Prim.	0.91 (1.62)	0.37	1.06 (0.58)	0.39	0.91 (0.64)	0.29
Prim. Low	1.05 (0.61)	0.19	0.98 (0.17)	0.29	0.91 (0.62)	0.33
Prim. High	0.76 (1.67)	0.02	0.76 (1.66)	0.07	0.83 (1.07)	0.12
Second. +	1.06 (0.18)	0.004	0.99 (0.03)	0.03	0.85 (0.98)	0.14
Father (re: no education)						
< Prim.	0.94 (0.98)	0.38	0.86 (1.32)	0.35	0.89 (0.69)	0.23
Prim. Low	0.77 (3.10)	0.20	0.78 (2.00)	0.29	0.76 (1.60)	0.25
Prim. High	0.83 (1.40)	0.03	0.85 (1.09)	0.08	0.64 (2.47)	0.11
Second. +	0.68 (2.02)	0.01	0.70 (2.53)	0.10	0.73 (1.97)	0.32
Father (re: employee)						
Employer	0.96 (0.35)	0.02	1.20 (1.89)	0.07	1.06 (0.58)	0.12
Self-emp.	0.73 (8.45)	0.30	0.97 (0.54)	0.24	0.84 (2.29)	0.22
Cohort (re.: 1951-55)						
1956-60	1.00 (0.14)	0.39	0.91 (1.47)	0.40	0.84 (2.63)	0.42
1961-65	0.97 (0.76)	0.30	0.77 (3.57)	0.35	0.60 (4.59)	0.25

Note: Baseline hazard rates are estimated non-parametrically by including a dummy variable for each year of age. We have also included region dummy variables which are not presented in the table.

Table 4: Discrete Time Hazard Estimation of Second Birth Interval

	Males with Primary Education (N=18784)		Males with Secondary Education (N=7428)		Males with College Education (N=4881)	
	Risk Ratio (t statistics)	Sample Mean	Risk Ratio (t-statistics)	Sample Mean	Risk Ratio (t statistics)	Sample Mean
Labor Market Situation One Year Ago (re: full-time work)						
Part-time	0.98 (0.31)	0.13	0.85 (1.79)	0.08	1.03 (0.25)	0.10
No Work	0.54 (2.86)	0.02	0.57 (1.35)	0.02	0.63 (1.34)	0.02
In School	---	---	--	---	1.11 (0.29)	0.02
Military	1.43 (2.34)	0.02	1.57 (1.62)	0.02	0.92 (0.24)	0.02
Search Duration of First Job (re: 0-6 months)						
7+	1.08 (0.92)	0.07	0.79 (1.96)	0.14	0.76 (2.51)	0.11
Mother (re: no education)						
< Prim.	0.88 (1.62)	0.38	1.31 (1.69)	0.42	0.93 (0.35)	0.34
Prim. Low	1.17 (1.29)	0.18	1.04 (0.21)	0.27	0.90 (0.46)	0.32
Prim. High	1.32 (1.16)	0.02	1.40 (1.33)	0.05	1.18 (0.69)	0.10
Second. +	0.51 (1.12)	0.003	2.18 (2.91)	0.03	1.27 (1.00)	0.11
Father (re: no education)						
< Prim.	0.92 (1.04)	0.39	0.71 (2.10)	0.38	0.85 (0.66)	0.27
Prim. Low	0.74 (2.48)	0.20	0.83 (1.01)	0.26	1.02 (0.07)	0.24
Prim. High	0.60 (2.60)	0.03	0.77 (1.16)	0.07	0.97 (0.11)	0.09
Second. +	0.80 (0.85)	0.01	0.55 (2.82)	0.08	1.00 (0.01)	0.29
Father (re: employee)						
Employer	0.98 (0.16)	0.02	0.89 (0.88)	0.08	1.15 (1.00)	0.12
Self-emp.	1.04 (0.74)	0.27	1.06 (0.71)	0.23	1.02 (0.21)	0.20
Cohort (re.: 1951-55)						
1956-60	0.83 (3.91)	0.43	0.75 (3.61)	0.45	0.83 (2.11)	0.43
1961-65	0.71 (5.07)	0.19	0.58 (4.41)	0.19	0.52 (3.07)	0.08
1st ch. dead	4.46 (4.58)	0.002	2.35 (1.98)	0.003	12.0 (2.77)	0.00
Prior interval	0.89 (7.61)	1.78	0.92 (3.25)	2.05	0.92 (3.64)	2.34
1st ch. boy	0.95 (1.08)	0.52	1.00 (0.00)	0.50	1.04 (0.48)	0.52

Note: Baseline hazard rates are estimated non-parametrically by including a dummy variable for each year of age. We have also included region dummy variables which are not presented in the table.

Table 5: Discrete Time Hazard Estimation of Third Birth Interval

	Males with Primary Education (N=18784)		Males with Secondary Education (N=7428)		Males with College Education (N=4881)	
	Risk Ratio (t statistics)	Sample Mean	Risk Ratio (t-statistics)	Sample Mean	Risk Ratio (t statistics)	Sample Mean
Labor Market Situation One Year Ago (re: full-time work)						
Part-time	1.15 (1.10)	0.13	0.42 (1.78)	0.07	1.31 (0.89)	0.10
No Work	0.54 (1.06)	0.01	1.09 (0.08)	0.01	0.62 (0.45)	0.01
In School	---	---	---	---	---	---
Military	0.93 (1.19)	0.01	0.94 (0.06)	0.01	0.67 (0.54)	0.01
Search Duration of First Job (re: 0-6 months)						
7+	1.00 (0.00)	0.07	1.00 (0.01)	0.10	0.32 (3.63)	0.20
Mother (re: no education)						
< Prim.	0.82 (1.12)	0.35	0.48 (1.93)	0.43	0.58 (1.20)	0.29
Prim. Low	0.95 (0.19)	0.19	0.40 (2.06)	0.23	0.42 (1.86)	0.31
Prim. High	0.73 (0.61)	0.02	0.48 (1.16)	0.06	0.35 (1.90)	0.11
Second. +	0.00 (0.01)	0.001	1.75 (0.92)	0.03	0.63 (1.03)	0.13
Father (re: no education)						
< Prim.	1.05 (0.29)	0.37	1.98 (1.65)	0.38	0.75 (0.56)	0.24
Prim. Low	0.79 (0.83)	0.20	3.24 (2.56)	0.23	0.95 (0.11)	0.24
Prim. High	1.57 (1.11)	0.02	1.62 (0.82)	0.09	1.09 (0.15)	0.09
Second. +	0.51 (0.90)	0.01	2.47 (1.62)	0.07	1.08 (0.18)	0.30
Father (re: employee						
Employer	1.25 (0.77)	0.02	0.87 (0.41)	0.09	1.00 (0.00)	0.14
Self-emp.	1.17 (1.46)	0.28	1.13 (0.57)	0.25	0.82 (0.75)	0.20
Cohort (re.: 1951-55)						
1956-60	0.83 (3.91)	0.43	0.75 (3.61)	0.45	0.83 (2.11)	0.43
1961-65	0.98 (0.12)	0.11	0.87 (0.37)	0.08	0.65 (0.51)	0.02
Child dead	4.18 (4.93)	0.008	7.87 (4.23)	0.01	17.5 (4.79)	0.00
Prior interval	0.80 (7.64)	3.48	0.82 (3.63)	3.37	0.70 (4.68)	3.06
Two boys	1.24 (1.95)	0.28	1.86 (2.88)	0.29	1.20 (0.78)	0.29
Two girls	1.19 (1.45)	0.23	1.31 (1.11)	0.21	1.23 (0.87)	0.21

Note: Baseline hazard rates are estimated non-parametrically by including a dummy variable for each year of age. We have also included region dummy variables which are not presented in the table.

Appendix 1: Cumulative Proportion Ever Married and Number of Children

Birth Cohort	*by age 25*	*by age 30*	*by age 35*	*by age 40*	*by age 45*	*Sample size*
Men: Proportion Ever Married						
1941-1945	34	72	81	84	85	4161
1946-1950	39	73	81	84		4837
1951-1955	45	76	85			5678
1956-1960	46	77				7497
1961-1965	41					6928
Women: Proportion Ever Married						
1941-1945	64	82	87	88	88	4044
1946-1950	65	83	87	88		4427
1951-1955	67	84	88			5231
1956-1960	67	85				7267
1961-1965	64					7749
Men: Number of Children						
1941-1945	0.23	1.05	1.65	1.92	2.05	4161
1946-1950	0.26	1.04	1.54	1.79		4837
1951-1955	0.30	0.97	1.47			5678
1956-1960	0.30	0.90				7497
1961-1965	0.28					6928
Women: Number of Children						
1941-1945	0.74	1.58	2.03	2.20	2.25	4044
1946-1950	0.74	1.49	1.87	2.02		4427
1951-1955	0.68	1.33	1.70			5231
1956-1960	0.64	1.24				7267
1961-1965	0.58					6928