Unstable Careers, Postponed Families. Employment Instability and Fertility in France.

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Abstract

The emergence of new evidence suggesting a sign shift in the longstanding negative correlation between prosperity and fertility levels has sparked a renewed interest in understanding the relationship between economic conditions and fertility decisions. In this context, the notion of *uncertainty* has gained relevance in analyses of low fertility. So far, most studies have approached this notion using snapshot indicators like type of contract or employment situation. However, these types of measures seem to be falling short in capturing what is intrinsically a dynamic process. Using sequence analysis, I develop an indicator of employment instability that considers the entire employment trajectory. The measure has the additional advantage of taking into account the variation coming from both the amount of transitions between states in a sequence and from the time spent at each of these states. The result is then used as a time-varying covariate in a event history model of the risk of having a first child and, later, in a series of logistic regressions predicting the intensity of fertility at age 45+. Analyses are performed for French men and women using the three waves of the *Etude des relations familiales et intergenerationnelles (ERFI)*. Although France is characterized by strong family policies and high and stable fertility levels, we find that employment instability not only has a strong and persistent negative effect on the final number of children for both men and women, but also contributes to fertility postponement in the case of men.

Keywords: Employment Instability; Fertility; Economic Uncertainty; Sequence Analysis; France.

1. Introduction

The first decade of the 21st century witnessed the emergence of a new narrative regarding the relationship between living standards and fertility outcomes. It was **?** which made the strongest, most explicit case for this regime-change hypothesis, showing how the historically negative correlation between development and fertility becomes positive after countries exceed a certain threshold of human development. This conclusion was supported by a series of papers published in the early and mid 2000s that showed how the correlation between women's labor force participation and fertility rates across countries had also reversed, and how countries with a higher share of women in the labor force also presented relatively higher fertility rates (**???**).

Although evidence of the above-mentioned trends at the micro-level is more ambiguous than at the aggregate level (**?**), the new narrative surrounding economic conditions and family formation seems to have gained a foothold in fertility analyzes, which has translated into an increased interest in the constraints and limitations driving fertility decisions in industrialized countries. In this context, the notion of *uncertainty* has become one of the most relevant factors to understand contemporary family dynamics in the region (**?**).

In this paper I try to capture the notion of economic uncertainty by looking at employment instability at the micro level. The novelty of the approach lies in the use of the entire sequence information instead of a single event (or characteristic) and in the consideration of both the number of transitions in and out of full-time employment and of the *time* spent in these two states.

1.1. Labor Market Reform and the De-standardization of the Life Course

Life course research has shown how the sequence of events that comprise individual biographies in contemporary societies has become less stable, more complex and less collectively determined. Behind this notion is the idea that 'traditional' biographies used to be significantly more stable, both in relation to work and family dynamics; a stability guaranteed by the action of strong collective institutions.

However, in the long run, this ideal type against which contemporary trajectories are measured was only dominant for a relatively short period of time (**?**). In fact, **?** has shown how in the case of the United States the life course became *more* standardized during the first half of the 20th century, thanks to the expansion of primary and secondary education and the regulation of the labor market. After a couple decades (from the fifties to the seventies) of high institutionalization and standardization, individual biographies started to resemble less and less one another. This increased heterogeneity and complexity was generally interpreted

as a result of four major processes originating in the second half of the 20th century: the expansion of tertiary education, the changes in women's roles, the emergence of post-material values and the deregulation/flexibilization of labor markets.

In the 1980's flexibilization became the keyword for governments and companies looking for a response to the increased external competition in the context of a rapid internationalization of markets (**?**). Since then, OECD countries have converged to less strict Employment Protection Legislation (EPL), the set of rules governing the hiring and firing process.

In this context the European Commission has favored the implementation of the so-called *flexicurity* approach: a combination of low EPL (to allow for market dynamism) with strong employment security (by means of active employment policies and high unemployment benefits). Although the theoretical advantages of this approach are still subject of debate[1], empirical analyses have shown that in practice most European countries have introduced labor market flexibility at the margin, easing the limitations on temporary forms of employment for labor market entrants, while leaving intact the regulation of permanent contracts. The average share of temporary employment on total dependent work for all workers in Europe (EU21) went from 5% in 1980 to 12% in 2012, with a similar increase but from significantly higher levels in the case of young workers (15-24), from 21% to 42% (OECD Employment Database 2013).

The result of this *partial and targeted* deregulation (**?**) has been a deepening of the segmentation of labor markets between the so-called *insiders*, unionized workers, who held permanent (protected) jobs with higher benefits, and the *outsiders*, who spend a large fraction of their working life in precarious, unprotected positions. Young workers are over represented among those with precarious contracts and the unemployed, and have experienced the greater income losses as inequality increased in OECD countries in the last decades (**?**).

1.2. Are Employment Trajectories Really More Unstable?

Since the beginning of the deregulation process, the employment dimension of individual trajectories has received considerable attention in the public debate. A widespread belief exists that our relation with the labor market has changed dramatically, making stable jobs a memory of a distant past.

In this context it comes as a surprise to find the existing lack of consensus among labor market researchers regarding these trends and the scarcity of empirical evidence that supports them.

[1] for a critique see: **?**

? presents an interesting review mostly of the US case, finding consistent evidence of a decline in long-term tenure rates (one of the most commonly used measures) for men in the private sector from the 1980s, but an increase in employment stability for women in the same period. Therefore, in spite of significant change, empirical trends in the US are far from matching public perceptions regarding employment instability. In Europe the situation is similar, with no *irrefutable stylized facts* brought to light after the publication of several studies since the mid-nineties (**?**). However, using a 30 years long employer-employee matched dataset, **?** find that in the case of France, the employment survival rates have decreased since the 1990's.

In a similar line, **?** found that the career of men in some European countries have remained more stable than expected. However they also document the increasing economic uncertainty that young workers face in the labor market, reinforcing the idea of a strong insider/outsider divide (**?**).

In sum, although no clear trend towards generalized instability has been empirically observed in Europe or the US, the picture that comes out from the literature, suggests that the negative consequences of deregulation on individual careers are particularly visible in certain segments of the population that remain in the periphery of the labor market.

In the next section we review the literature on how this increased economic uncertainty has affected the family formation process before we describe briefly the specificities of the French case.

1.3. Economic Uncertainty and Fertility

As mentioned before, both the shifts on historical demographic changes and the rapid transformations of the labor markets gave strength to the uncertainty hypothesis, which resulted in a series of papers analyzing the effects of economic uncertainty on fertility both at the macro and the micro-level. Until now, the most consistent evidence of a depressing effect has been found using aggregate unemployment rates (**??**), although analyses using individual-level data have also found significant effects in the same direction. **?** argue, for example, that the labor market reform that introduced flexible employment contracts in 1984 is one of the main reasons why ages at first birth in Spain are among the highest in Europe.

Significant effects of economic uncertainty on fertility timing have also been found combining 'objective' measures (employment status, type of contract, income) with 'subjective' measures (self assessment of personal economic situation) (**??**). **?** provides extensive macro and micro-level evidence on how economic uncertainty negatively affects the family formation process, specially in the case of men in male breadwinner societies with weaker welfare systems.

? have demonstrated that taking into account both members of the couple is key to understand the effect of uncertainty on fertility decisions. Analyzing data from Italy they show how stable work contracts are associated with higher fertility, but only when both partners work. This result is in line with the idea that the effects on the timing of motherhood differs not only by gender (**?**) but also according to whether women are expected to be caregivers or household providers (**?**). In fact, for women in male-breadwinner type of arrangements uncertainty regarding employment prospects may not be decisive, on the contrary, in most cases unstable employment trajectories might express the priority given to unpaid work.

1.4. The Uncertainty-Fertility Link in France

France is probably one of the most challenging countries in Europe for an analysis of the effects of uncertainty on fertility given its relatively strong family policies, its relatively smaller obstacles to reconcile family and work and its relatively high and stable fertility rates. According to Toulemont et al. (2008) family policies implemented in the second half of the 20th century are the main reason why fertility rates have remained around the 2 births per woman figure in France while most European countries have seen their fertility fall below replacement level.

However, and although not as strong as in other contexts, delaying effects of economic uncertainty on family formation have been found in France. **?** report delayed first births for women experiencing unemployment, a result that is consistent with **?**, which also finds *timing* effects, but no effects on complete cohort fertility levels.

These results suggest that the strength of family policies and programs in France is enough to alleviate but not to completely suppress the effects of economic uncertainty on the family formation process, at least in some segments of its population, which is not surprising taking into account the extent of the changes in the French labor market.

At the beginning of the 80's the share of temporary employment on total dependent employment for young workers in France was about 13%, in 2012 was 55.5%, with very small differences between men and women (OECD Employment Database 2013). It could be argued that this might not necessarily translate into an increase in the experience of unemployment spells if workers can jump from temporary contract to temporary contract and from job to job, but our first descriptive results suggest otherwise. Figures **??** to **??** show the proportion of individuals in each labor market/education status at each age for three different cohorts: Those entering the labor market between 1942 and 1961 (born 1926-45). Those that entered in 1962 to 1979 (born 1946-63) and 1980 to 1998 (born 1964-82).

As expected the *inactive* state gets a large proportion of women's trajectories (Figure **??**)

while it is marginal in the case of men (Figure **??**). Another interesting element to notice is the clear delimitation of the *military service* period, which indicates a relatively high degree of accuracy in the data.

Figure 1: Education-Employment trajectories Men 1942-1961 (born 1926-45) | France

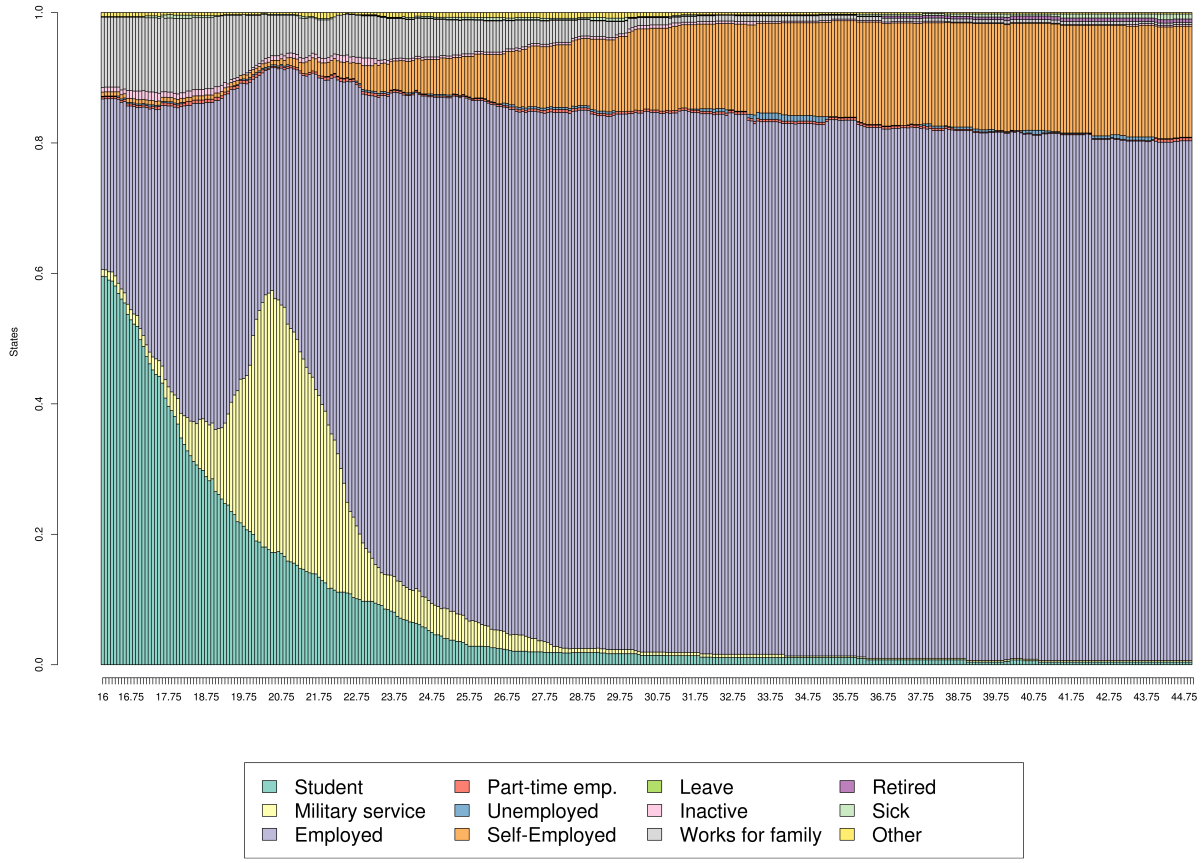
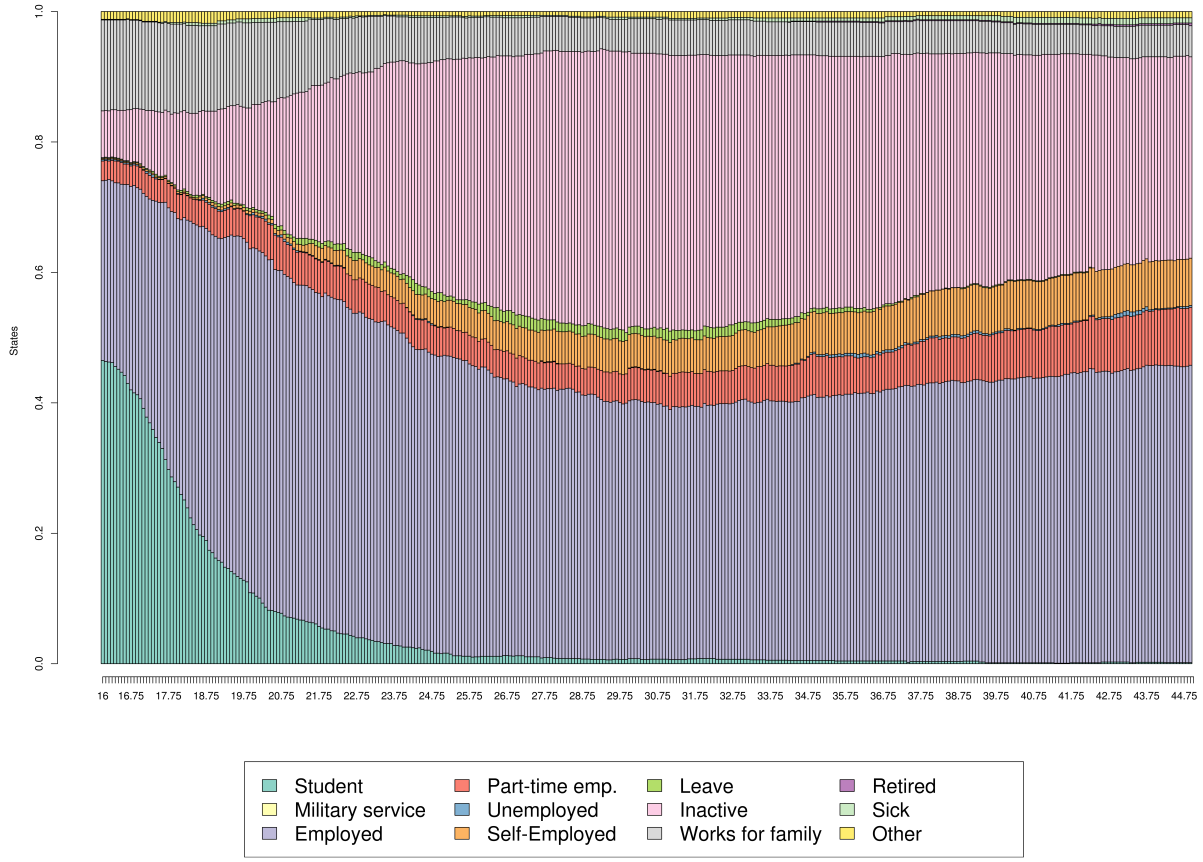


Figure 2: Education-Employment trajectories Women 1942-1961 (born 1926-45) | France



The most prominent feature of the trajectories of the second cohort is the high degree of stability of men's trajectories. States other than *employed* or *self-employed* are infrequent. At the same time we see a convergence of the trajectories of men and women, although women's careers still present a higher proportion of *part-time employment* and *inactivity*.

Figure 3: Education-Employment trajectories Men 1962-1979 (born 1946-63) | France

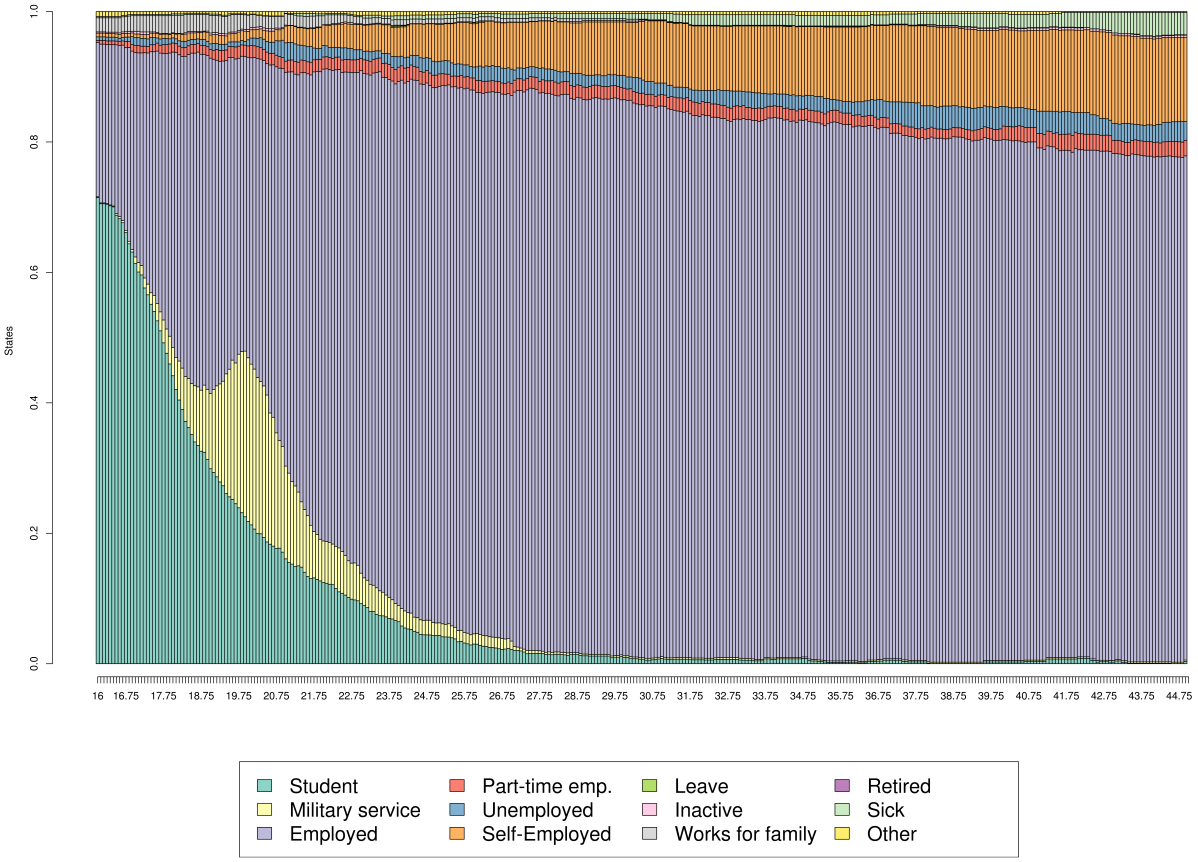
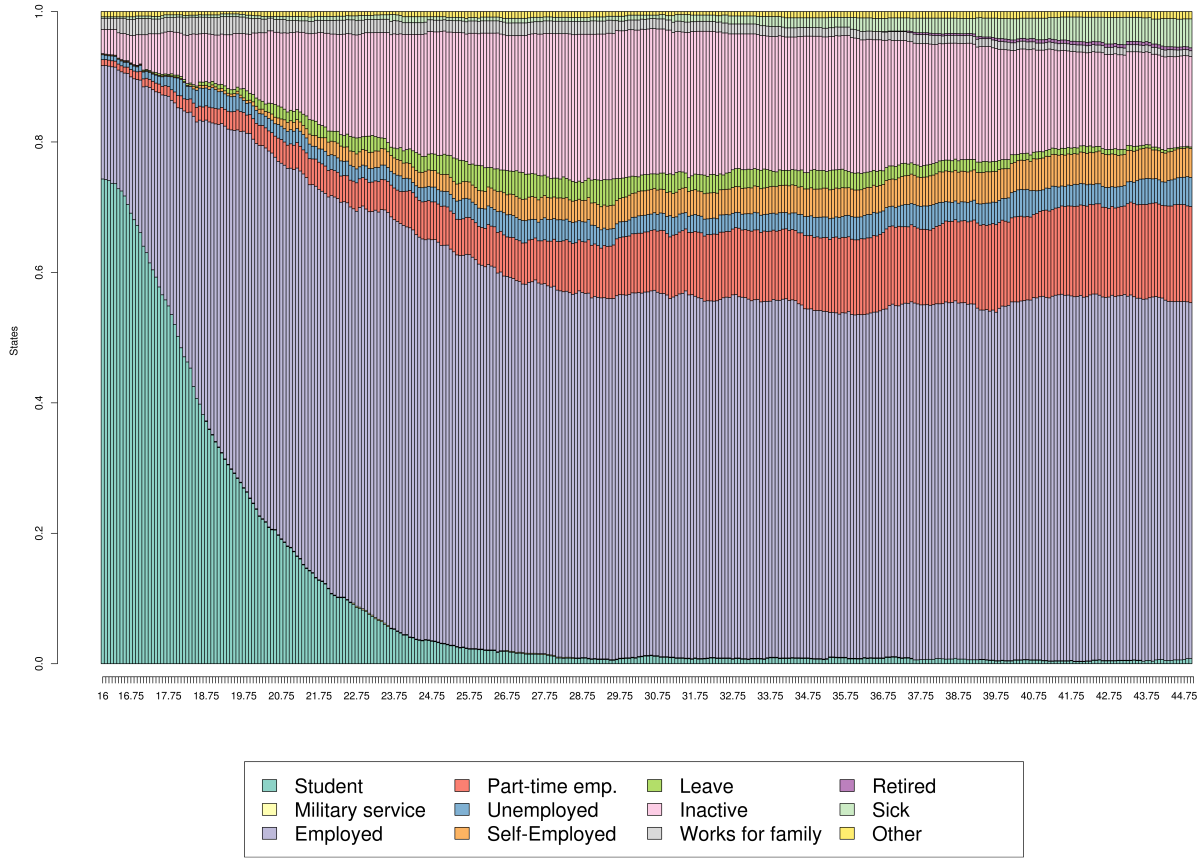


Figure 4: Education-Employment trajectories Women 1962-1979 (born 1946-63) | France



The trajectories of most recent cohorts (Figures **??** & **??**) show that at least part of the de-regulation process has translated into a higher frequency of *unemployment* and *part-time employment* spells for both men and women. It is also interesting to notice, that most of the increase in the mentioned states is concentrated at the beginning of the employment trajectory, supporting previous findings which have shown particularly strong effects for labor market entrants (**?**).

Figure 5: Education-Employment trajectories Men 1980-1998 (born 1964-82) | France

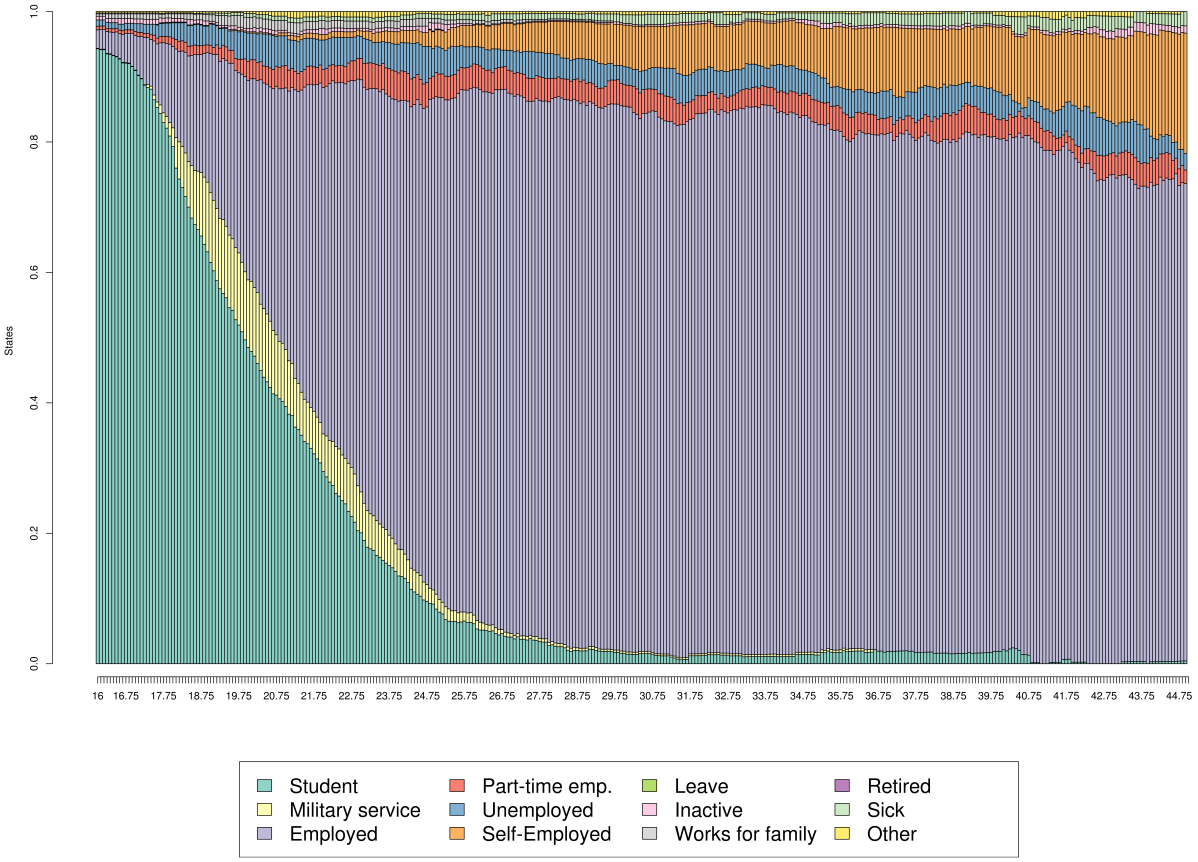
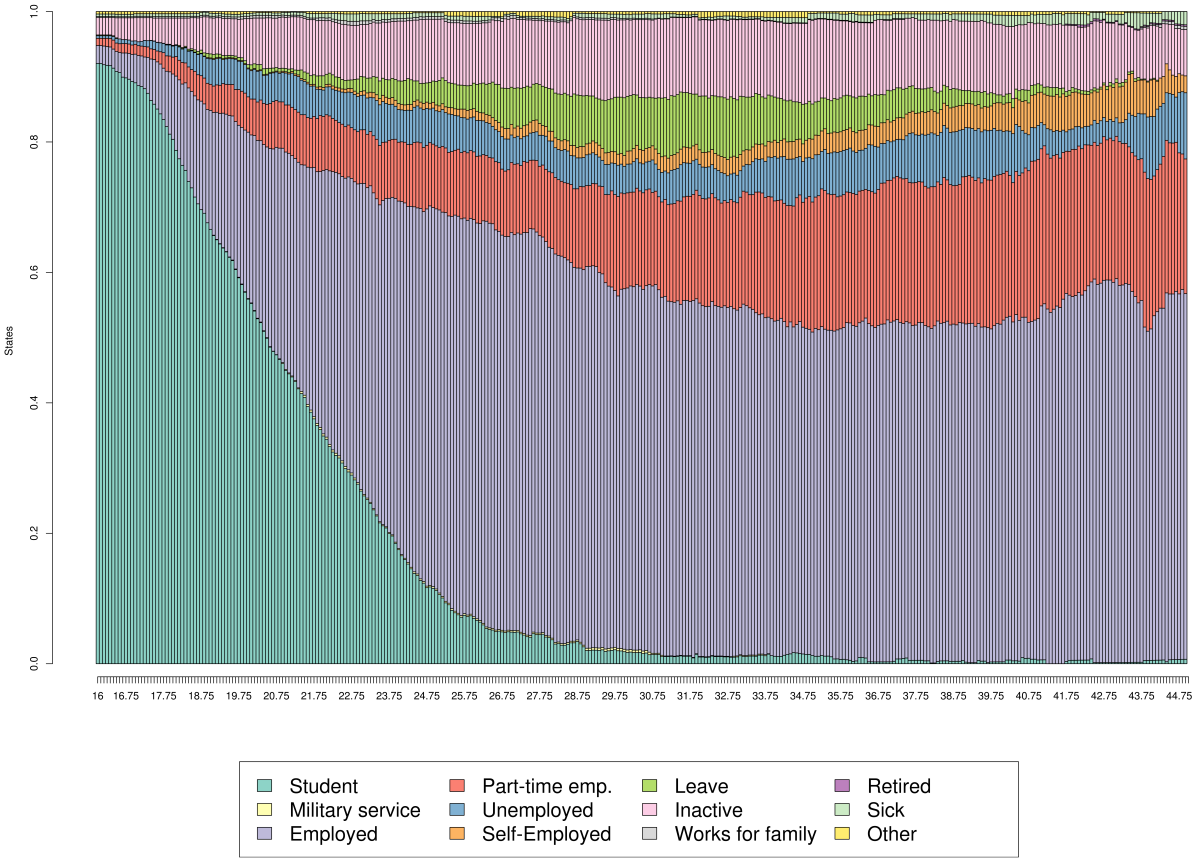


Figure 6: Education-Employment trajectories Women 1980-1998 (born 1964-82) | France



2. Questions and hypotheses

In the previous section we showed that men's and women's employment trajectories have become increasingly volatile over time. The main question that we will try to answer now is whether this increased instability has an effect on the timing and the intensity of fertility.

In spite of renewed interest in the effects of uncertainty on individual decisions, formalizations of the mechanisms involved are still limited. Most studies have adapted Becker's New Home Economics ideas about the effects of income on family dynamics to derive hypothesis on the links between uncertainty and fertility. According to Becker, an increase in household income can produce to opposite effects on the demand for children: an income effect or a substitution effect. An income increase will consequently increase the demand for children, but it also increases children's indirect costs in the form of income and careers opportunities parents have to give up in order to spend time with their children. An income effect is thus observed when the demand for children is positively affected by an increase in income and a substitution effect when the effect is negative.

Therefore, gender differences regarding the predominance of one effect over the other will largely depend on who pays the costs (direct and indirect) of children. In a male-breadwinner context an increase on men's economic uncertainty will likely produce an income effect, reducing the demand for children. For women, on the other hand, it is likely that the substitution effect will dominate as indirect costs decrease. In a context where the indirect costs of children are equally (or more equally) distributed, however, the differences between men and women should be smaller.

Taking into account that women labor force participation is relatively high in France and that a part of the costs of childrearing are absorbed by the state via family policies, then our hypotheses are:

H1: In the case of men, unstable employment trajectories will be associated with a higher age at first birth, higher probability of remaining childless and a lower probability of achieving higher-order parities.

H2: In the case of women, since we cannot distinguish between career-oriented and family-oriented individuals, unstable employment will be less disruptive to fertility than men.

3. Data and Methods

3.1. Data

Our study combines exploratory (Sequence Analysis) with confirmatory (Event History, Logistic Regression) methods to understand the relationship between early life course uncertainty and the timing and intensity of fertility in France. It takes advantage of the recent availability of complete employment histories in the *Etude des relations familiales et intergenerationnelles (ERFI)* a panel survey carried out by INED and INSEE which constitutes the base of the Generations and Gender Survey (GGS) in France. The panel includes a sample of 18 to 79 year old metropolitan France residents. The survey contains not only detailed information on the reproductive history and fertility intentions of the interviewees, but also complete retrospective and prospective education.

The first wave was carried out in 2005 including 10.079 men and women and it is representative of the French population. The second wave consists of 6.534 interviews and the third one of 5.781, 5.433 of whom participated also in the second wave and could then be integrated in our sample, given that the employment histories started to be collected from wave 2.

Our final sample consist then of *6.492* individuals aged 20 to 85, 5.402 of whom participated in the three waves and 1.090 in the first two.

3.2. Outline of the study

In the first section we use sequence analysis techniques to quantify the degree of instability of employment trajectories. Sequence Analysis consists of a set of techniques originally developed by molecular biologists to find similar DNA patterns, introduced in the social sciences in the 1980s. These techniques are particularly useful for the study of life-courses because they provide a holistic understanding of individual trajectories, allowing for the combination of multiple dimensions of a biography in one sequence, which becomes the main unit of analysis.

For our analysis, the education - employment histories are combined to obtain a unique binary sequence for each observation in the sample. In ERFI respondents are asked to provide information about the duration of each spell (of at least three months) in which they were: employed, in school, inactive, unemployed, etc. When respondents where simultaneously in two or more states (employed and studying for example), they were asked to choose the activity in which they spent most time. The possible states in the employment/education dimension are:

Student; Military Service; Employed; Self Employed; Part-Time Employed; Leave; Help at home; Unemployed; Retired; Inactive; Sick; Other.

These sequence-states were re-classified in order to obtain the above-mentioned binary trajectories that represent the transitions from a state of *stability* to one of *instability* and vice versa. In the case of men the states included in the stable state are: *Student; Military Service; Employed; Self Employed; Leave; Help at home; Retired; Inactive; Sick; Other.* While *Part-Time Employed and Unemployed* comprise the unstable state. For women, however, we include only unemployment spells as instability given the fact that in a large number of cases part-time work is related to a decision of the individual or the household and not to an imposition of the labor market. In fact, the data used here shows that men working part time are approximately one fifth of the women with that type of work. Besides, 70% of these men are doing it involuntarily, while in the case of women these figure is about 50%.

3.3. Software

Analysis were performed using R (**?**). The Traminer package (**?**) was used for Sequence Analysis and packages Survival (**?**) and EHA (**?**) for Survival Analysis. All of them available at: `<http://cran.r-project.org/>`

3.4. Definition of Instability

The measure of instability developed here is inspired in the *Complexity* indicator presented in **?**, previously called *turbulence* (**?**), which was developed to measure the uncertainty of sequences of equal length composed of multiple states. In our case we have binary sequences (two possible states) and sequences of different length (different ages at first birth, censored observations). Therefore, the definition of instability we use is:

$$I(x) = log_2\left(\Phi(x)\frac{(s_t^2, max(x)^2 + 1)}{(s_t^2(x)^2 + 1)}\right)$$

One important advantage of this indicator over similar measures (e.g. entropy) is that it considers not only the variation coming from state-changes in the trajectory but also the differences in the durations of each state. The former is captured through Φ which represents the number of subsequences[2] in each sequence. The second part of the formula captures variation coming from the duration of each spell dividing the maximum potential variance given the number of states in the sequence (s_t^2, max) over the observed variance of the times spent at each state in the sequence (s_t^2) [3]. The logic here is that the smaller the variance of the time spent at each state (s_t^2) the more difficult is to predict in which state the individual is going to be at any particular time, hence the higher the Instability. The maximum variance is given by $(1-d)(1-\bar{t})^2$, where d is the number of different states in the sequence[4] and $\bar{t}$ the mean consecutive time spent in each state.

The binary logarithm is taken instead of the original measure given the large increase in Φ produce by each additional transition between states.

In order to deal with the different lengths of the sequences in our sample, state-durations[5] were standardized by sequence length, expressing the length of each duration in x as a percentage of the total length of x.

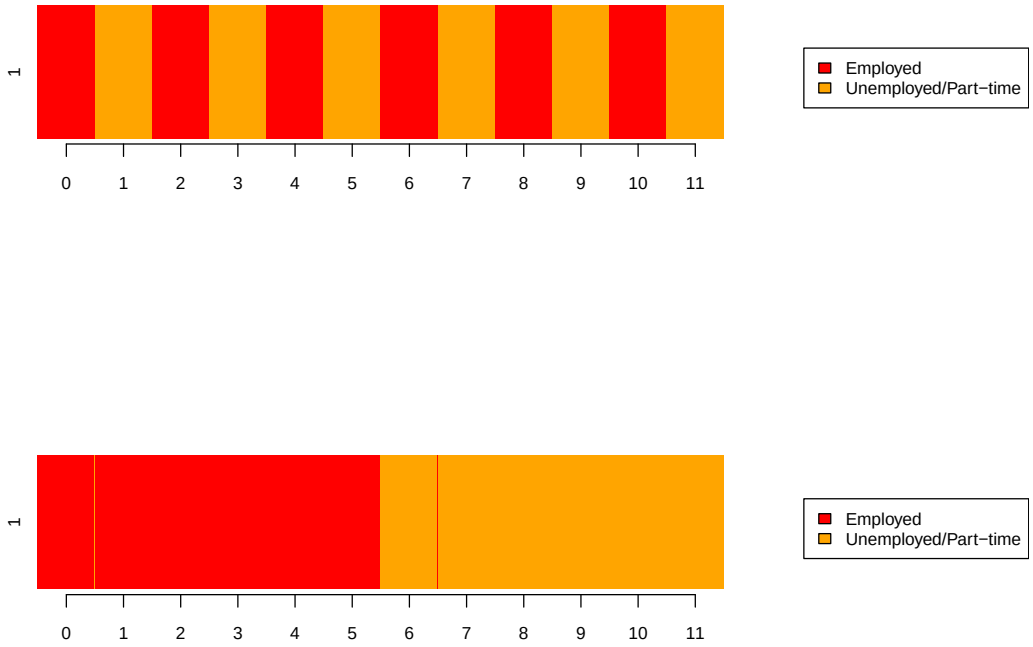
[2]A sequence z is a sub-sequence of a another sequence x if all the states of z appear in x and in the same order. The empty sequence is counted as a subsequence, hence the sequence *a-b-a* has 7 subsequences: a,b, ab, ba, aba, aa, + the empty sequence.

[3]Here one of the main differences with the Complexity measure, which considers the variance of *state-durations*

[4]Unlike in the case of Complexity (Turbulence in TraMineR) which defines d as the number of non-consecutive states/the number of state-durations

[5]State-durations represent the amount of time spent in each non-consecutive state. The sequence: a-a-a-b-b-b-b has 2 state-durations, one of length 3 and one of length 4.

According to this definition, an individual that experiences a relatively small number of transitions between states, but who spend a similar amount of time in the two states will be classified as having unstable trajectories, which in our case is a very desirable property given the "involuntary" nature of the *Unemployed* and *part-time employed* (for males) states. Let us consider the two following sequences:



The first hypothetical sequence a is highly unstable, it has 11 transitions (609 subsequences) and no variance in the time spent at each state. The second b, has only 1 transition (4 subsequences), which means this sequence will be considered as being fairly stable if we were only counting spells. Our measure, however, gives $I(a) = 19.5$ and $I(b) = 12.2$, a is still more unstable than b, but b will still be considered highly unstable given that half of the total length in this trajectory was spent in unemployment.

Although the measure has a series of advantages, it could lead to incorrect classification in the case of a sequence which is predominantly (or entirely) spent in unemployment or part-time employment. Such cases, however, are very unlikely to be observed, specially a sequence uniquely composed of unemployment. Appendix A presents a series of tables of the proportions of cases by time spent at different states.

3.5. Classification of Trajectories

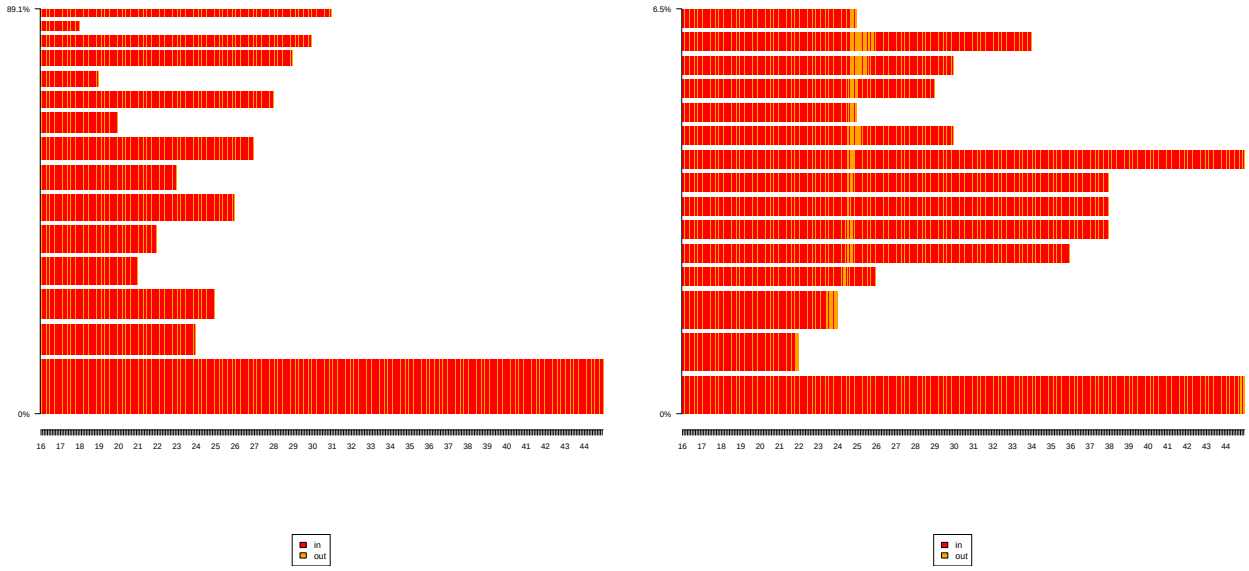
In this section we asses the performance of our measure in classifying individual trajectories according to their Instability level. Although the measure obtained is continuous we decided to re-categorize it in three levels: Low, medium and High Instability. Figure **??** presents the fifteen most representative sequences for each of the groups, for females. The height of each bar indicates the number of sequences in the group each of these sequences represents. The percentage in the x axis is the total proportion of sequences within each group that these fifteen trajectories represent.

The group of *Low Instability* is composed of sequences with scores between 0 and 1, the most representative sequences here present no unemployment/part-time employment spells and they only differ by their length. Together, they represent 89% of the trajectories in the group, which is the larger part of the female sample since this is the category with more cases by far (n=3099).

The sequences in the *Med Instability* category (n=277) have a score between 1 and 2.2. Most trajectories here present one relatively brief period of unemployment/part-time employment, which in general starts around age 23-25, probably coinciding with the end of formal education. These periods are labeled *out*, as in a transition out of a state of stability and depicted in orange in graphs. The total proportion of sequences in the group represented by these fifteen trajectories is significantly smaller than in the previous case, which is not surprising considering these group is composed by more complex trajectories. Substantively, we do not consider this careers to be significantly different than those with low Instability, it is unlikely that a brief unemployment period will have a dramatic impact on other life course transitions so for the reminder of the paper we decide to collapse these two categories and have it as a reference for analysis.

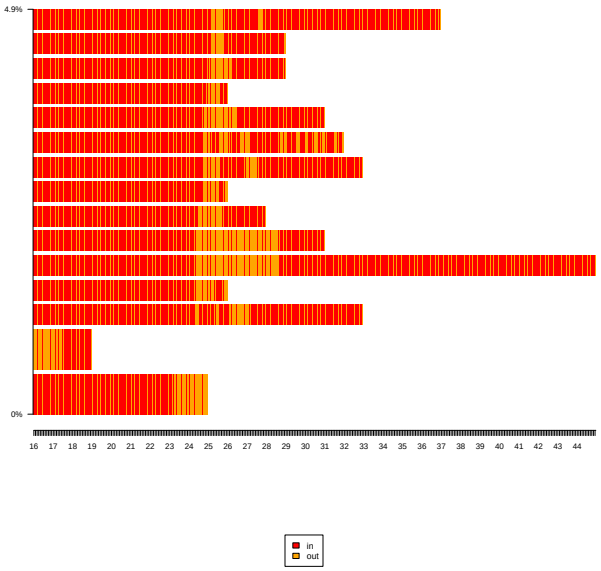
The group of *High Instability* (n=348) corresponds to sequences with a score between 2.2 and the maximum Instability observed in the group (21.9). These trajectories are characterized by multiple transitions and/or long spells of unemployment and, in contrast, to the two previous groups they represent a real departure from a "normal" (or normative) career, therefore we will focus on these individuals in the following analyses.

Figure 7: Initial 15 sequences by Instability level |Females



(a) Low Instability

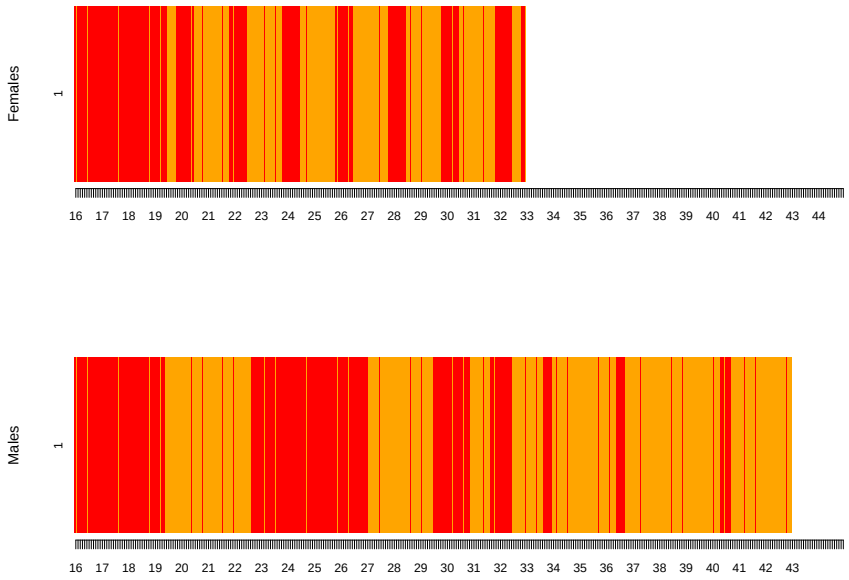
(b) Medium Instability



(c) High Instability

In figure **??** we present the most unstable sequences for men and women to give the read an idea of how highly turbulent trajectories look like. The most unstable trajectory among females presents 8 unemployment spells in 17 years (from age 16 to age 33) while the most turbulent trajectory among men has 7 unemployment/part time spells. In the second case the out spells are longer as well as the trajectory, which goes from age 16 to age 43.

Figure 8: Most Unstable Sequences for Males and Females



In general, and in spite of limitation, we believe the scheme proposed seem to be doing a good job separating the most stable trajectories from the less stable.

3.6. Event History Models

After trajectories are classified according to their level of instability, the new variable obtained is introduced as a time-varying covariate in a Cox Regression model predicting the timing of first births. Instability is computed for each trajectory up to the last complete year of age before the first birth and up to age 45 / age censored for those that have not experienced the event. The measure is taken cumulatively (computed over the entire trajectory to that point) at each age, since age 16, and introduced as a binary variable identifying those with *high* vs. those with *med* and *low* Instability (see Appendix A for a description of sequences in each category).

Separate models for males and females are presented, both including individuals from age 20+. In the models we control for the timing of first union formation, introduced as a time varying covariate with values 0 before and 1 after first cohabitation experience. We also control for the age at which respondents finished/dropped out school. We introduced this as a binary variable: up to age 18 / after age 18. The effect of education is modeled in this way assuming that the stronger differences in terms of the risk of a first birth are given by the pursuit of tertiary education.

The models are defined as follows:

$$h^m(t,x) = h_0(t) * exp(x\beta_{Inst} + x\beta_{funion} + x\beta_{edu}) \quad (1)$$

$$h^f(t,x) = h_0(t) * exp(x\beta_{Ins} + x\beta_{funion} + x\beta_{edu}) \quad (2)$$

3.7. Completed Fertility

To analyze the effects of employment instability on the intensity of fertility at the end of the reproductive period we run a series of logistic regressions for which the outcome is the parity achieved by respondents at age 45: 0 vs 1+ children, 1- vs 2+, 2- vs 3+ and 3- vs 4+ children. In this case we consider the instability until the age of first birth or until age 45 for those with no children.

We run models for each binary outcome and sex for a sample of age 45+, and we include the following controls:

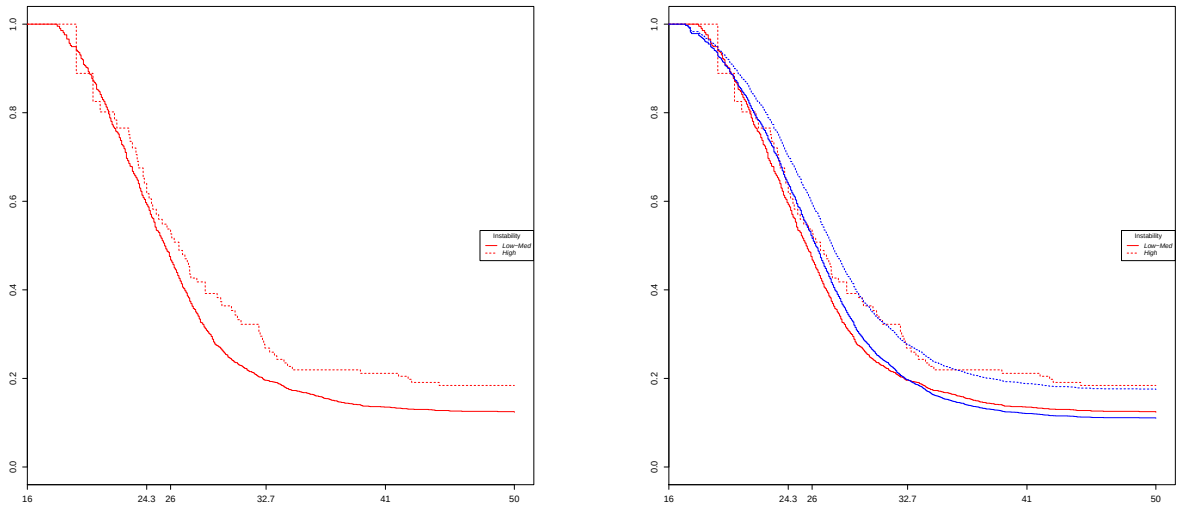
* Age at finish/complete education (defined in the same way as in the Cox models). * Ever had partner < Binary. * Nationality < European vs. Other.

4. Results

4.1. Effects of Employment Instability on Fertility Timing

Figure **??** shows observed and fitted survival curves by Instability level for men with age of leaving education <18 that had experience a union in the past. Among this group those with highly unstable trajectories have lower risks of having a first birth at each age. The model estimates this risk to be 21% lower in relation to the reference category (Low-Medium Instability), although as it can be appreciated in the observed survival curves this difference is only visible before around age 26. This results has been consistent through the different specifications of the model and categorization of its variables.

Figure 9: Observed and Fitted Survival Curves by Instability Level and Partnership Status - Males, Age at End Edu <18, Who Have Been in a Union.

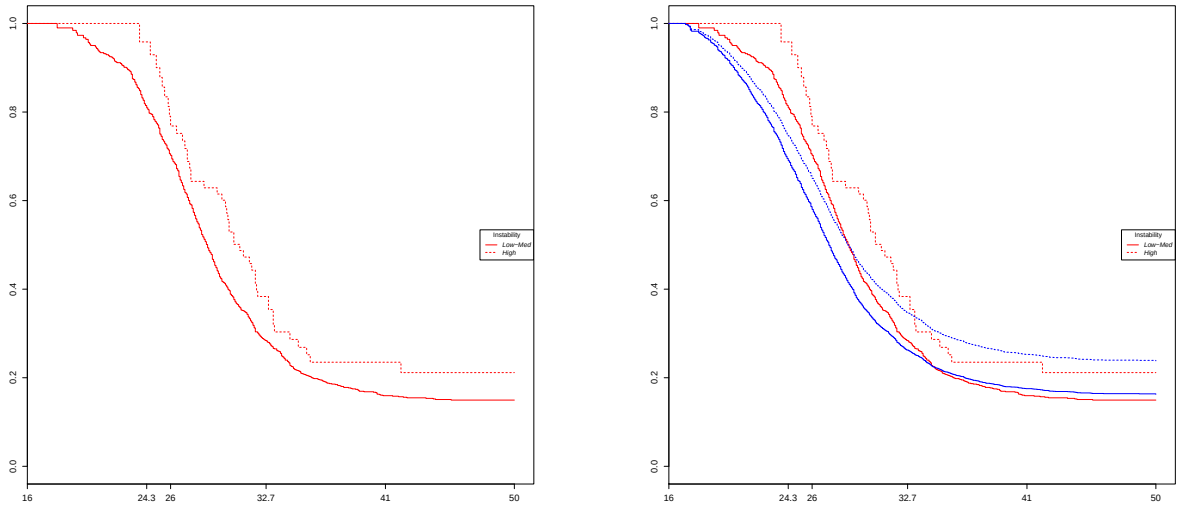


(a) Observed

(b) Observed + Fitted

In the case of those that did at least one year of formal education after high-school (Figure **??**), we observe a similar effect, although the fit of the model is weaker for this category, which has significantly less cases than the previous one.

Figure 10: Observed and Fitted Survival Curves by Instability Level and Partnership Status - Males, Age End Edu >18, Who Have Been in a Union.

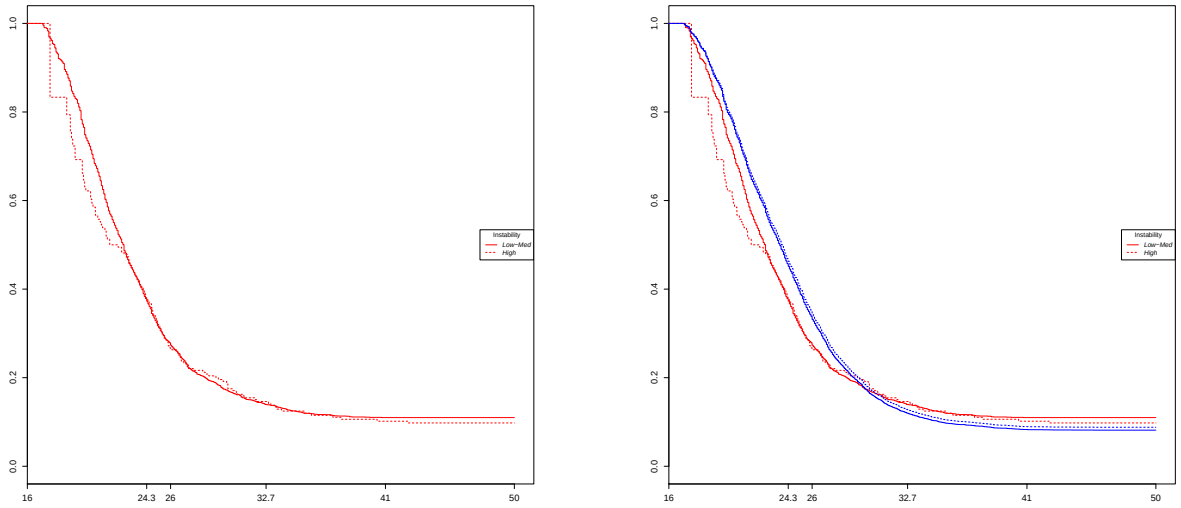


(a) Observed

(b) Observed + Fitted

Figures **??** and **??** show the results for women. In this case we do not find significant differences for any of the groups. The fact that we are not able to properly identify career-oriented women due to the small size of the highly unstable group might be driving this result. Further efforts should be directed to reveal potential opposing effects among women.

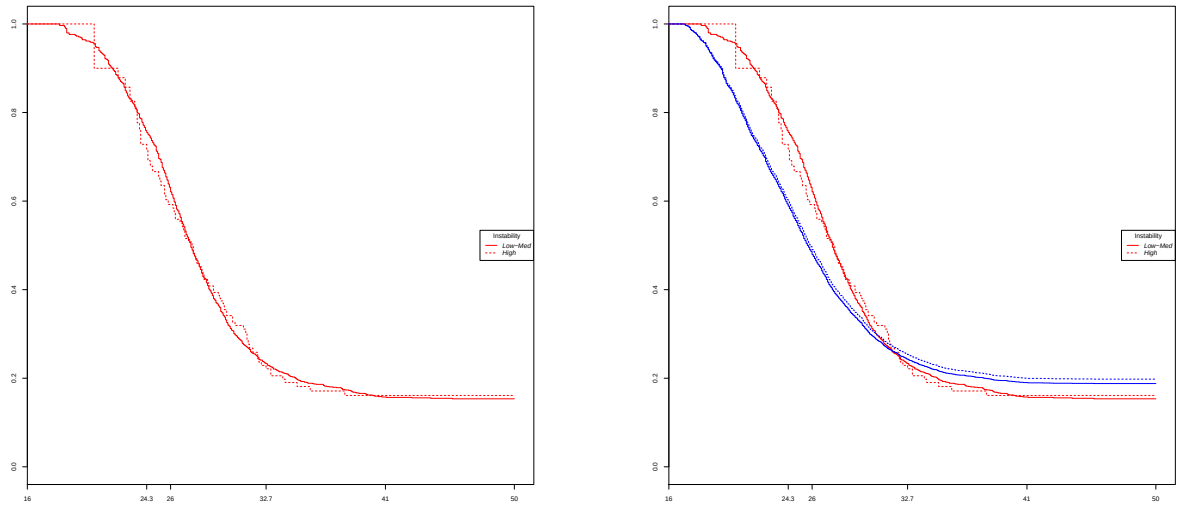
Figure 11: Observed and Fitted Survival Curves by Instability Level and Partnership Status - Females, Age at End Edu <18, Who Have Been in a Union.



(a) Observed

(b) Observed + Fitted

Figure 12: Observed and Fitted Survival Curves by Instability Level and Partnership Status - Females, Age at End Edu >18, Who Have Been in a Union.



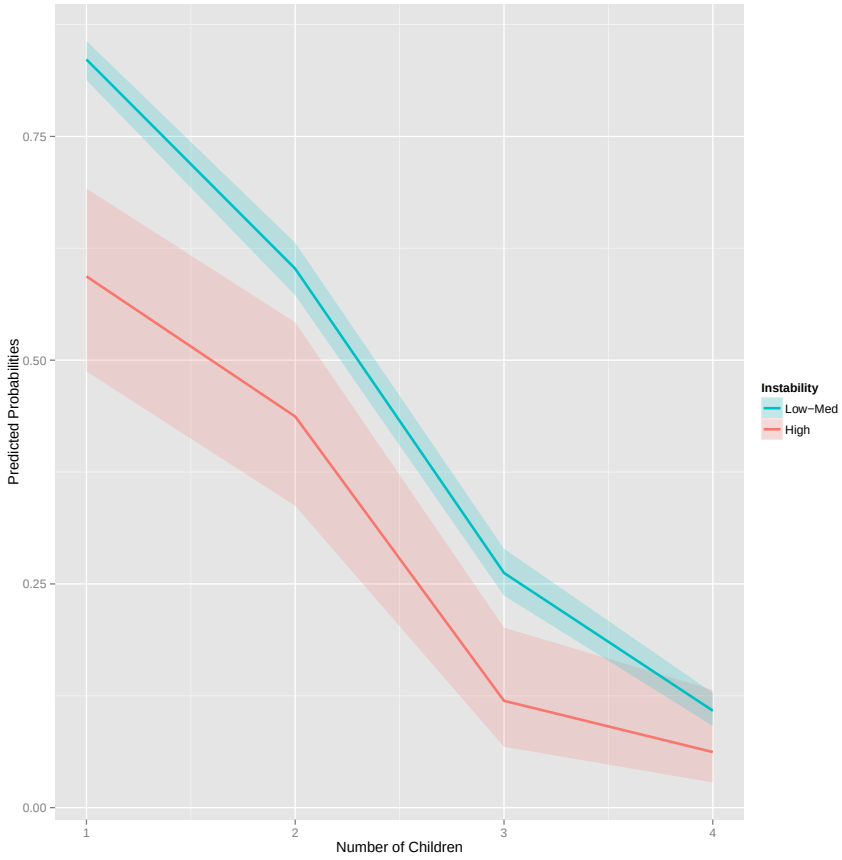
(a) Observed

(b) Observed + Fitted

4.2. Effects of employment instability on Completed Fertility

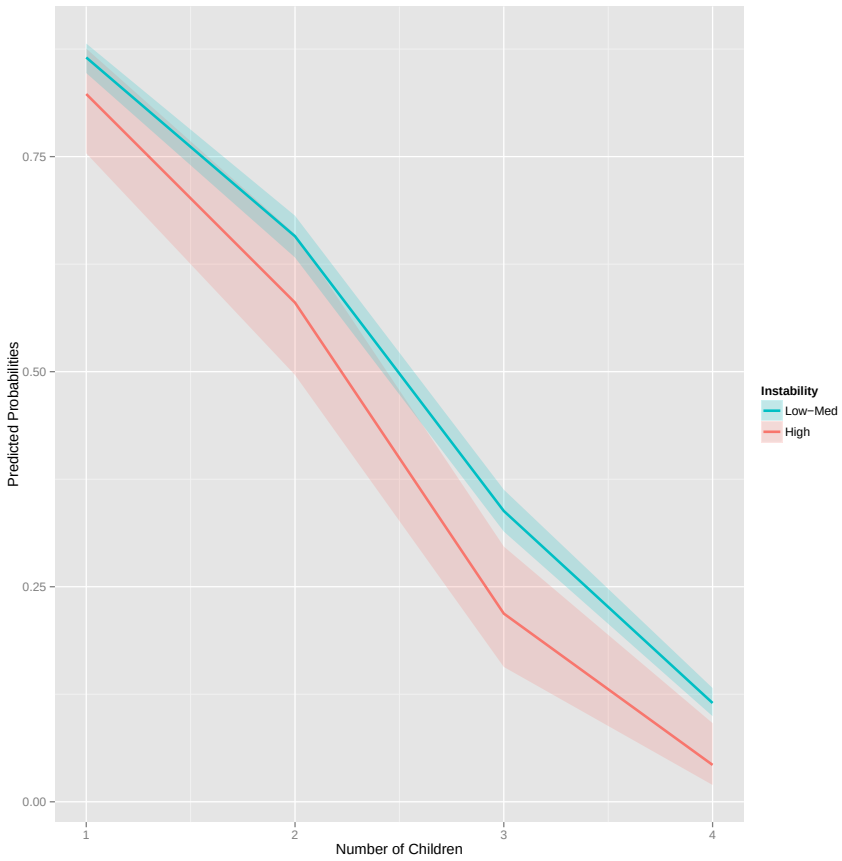
The analyzes of the effects of employment instability on the intensity were performed through a series of logistic regressions described above. In Figure **??** and Figure **??** we present the predicted probabilities of having at least 1, at least 2, at least 3 and at least 4 children for men and women aged 45. The results displayed are obtained for different hypothetical cases with a particular values on the control variables (see graph titles).

Figure 13: Predicted Probabilities and Confidence Intervals from Logistic Regression Models, Number of Children - Males, Age>= 45, Nationality=European, Age End Education <18.



The results for men in the low educational category are in line with those find in our previous analysis: All four probabilities are higher for those with more stable sequences, specially for the first outcome, having at least one child. This is the same as saying that the probability of remaining childless is higher for those with the more unstable trajectories. Although differences are less marked, results are also significant for having at least 2 and 3 children.

Figure 14: Predicted Probabilities and Confidence Intervals from Logistic Regression Models, Number of Children- Females, Age>= 45, Nationality=European, Age End Education <18



For females, in contrast to what we observed for males, the most visible differences are at higher order parities, although not significant in the first two cases, in all four models the probabilities are higher for those with more stable careers.

5. Discussion

In the context of a remarkable shift in the longstanding negative correlation between economic prosperity and fertility levels, our study was set to analyze the effects of employment instability on the timing of first births and on completed fertility in France.

First, we showed how unemployment and part-time job episodes in individuals' biographies have increased over time, resulting in more complex and unstable trajectories for both men and women. We interpret this, at least partially, as the result of the process of flexibilization/de-regulation of the French labor market, a process observed in most European countries in the last decades.

Our main objective was to assess the effects of this increased instability on the timing of first

births and on the final number of children. According to our first hypothesis we expected employment instability to be particularly disruptive in the case of men, affecting both the timing and the intensity of fertility. Our results partially confirmed this hypothesis, showing that for men unstable trajectories lead both to postponement of first births and to a higher probability of remaining childless.

According to our second hypotheses, we expected employment instability to have a less disruptive effects in the case of women. This was confirmed when looking at fertility timing, although in the case of intensity the effects where more pronounced as in the case men. The difficulties making the effects on timing visible are explained by the fact that women that are earlier exposed to employment instability are most likely also experiencing earlier transitions to adulthood and earlier family formation.

Finally, these results gain even more relevance when we consider that the cohorts included in the analysis of intensities have not fully experience the effects of labor-market deregulation. Incoming labor-market cohorts should show, *ceteris paribus,* , increasingly unstable trajectories and stronger depressing effects on fertility levels.

Beyond our substantive conclusion, one of our primary goal was to develop an innovative and robust measure of employment instability over the life course, taking advantage of the potentialities of sequence analysis. The proposed measure has the advantage of incorporating the information contained in the entire education-employment trajectory of individuals, including the time spent in each state, if at the price of a less clear cut interpretation than more frequently used indicators.

AppendixA.

Table **??** presents the proportions of individuals at four intervals of time by state and sex. In the case of part-time employment a 98% (of males) and 89% (of females) spend less than 101 months in this state. Although the cases spending more than this time in part-time employment are a minority, in the case of women the figure is large enough to justify the adoption of a different definition of instability (including unemployment spells only). For *unemployment* the figures do not suggest any major issues, the vast majority of individuals (both males and females) spend less than 20 months of their trajectories unemployed.

Table A.1: Proportion of Cases (Sequences) by Time Spent in Selected States

	Part Time		Unemployed	
	Males	Females	Males	Females
[0,20]	0.92	0.68	0.90	0.84
(20,100]	0.06	0.21	0.08	0.14
(100,247]	0.01	0.09	0.01	0.02
(247,347]	0.01	0.01	0.00	0.00

The states in which individuals spend more time are *employed* and *student* as can be seen in Tables **??** and **??**. As expected there are few or no retirees in our sample (including up to age 50) and the proportion of time spent *sick* is also marginal in our sample.

Table A.2: Proportion of Cases (Sequences) by Time Spent in Selected States

	Student		Employed		Self Employed		Sick	
	Males	Females	Males	Females	Males	Females	Males	Females
[0,20]	0.20	0.15	0.08	0.14	0.90	0.96	0.98	0.98
(20,100]	0.71	0.73	0.17	0.31	0.05	0.03	0.02	0.01
(100,247]	0.09	0.12	0.47	0.41	0.04	0.01	0.01	0.01
(247,347]	0.00	0.00	0.28	0.14	0.01	0.00	0.00	0.00

Table A.3: Proportion of Cases (Sequences) by Time Spent in Selected States

	Leave		Retired		Help at Home		Inactive	
	Males	Females	Males	Females	Males	Females	Males	Females
[0,20]	1.00	0.85	1.00	1.00	0.98	0.99	0.99	0.82
(20,100]	0.00	0.14	0.00	0.00	0.01	0.00	0.01	0.09
(100,247]	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.07
(247,347]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01

AppendixB.

Table B.4: Cox Proportional Hazards Model Estimates | Males.

	Model 1
High Instability	-0.23 $(0.10)^{*}$
First Union - Yes	2.63 $(0.11)^{***}$
Age Ends Education >18	-0.19 $(0.05)^{***}$
Num. events	1925
Num. obs.	41177
Missings	0

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Table B.5: Cox Proportional Hazards Model Estimates | Females.

	Model 1
High Instability	-0.03 (0.07)
First Union - Yes	2.11 $(0.08)^{***}$
Age Ends Education >18	-0.40 $(0.04)^{***}$
Num. events	2713
Num. obs.	46986
Missings	0

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Table B.6: Logistic Regression Models- Final Parity Achieved | Males 45+

	At least 1 Children	At least 2 Children	At least 3 Children	At least 4 Children
Intercept	-0.34 $(0.16)^{*}$	-0.78 $(0.17)^{***}$	-1.70 $(0.22)^{***}$	-2.33 $(0.28)^{***}$
High Instability	-1.25 $(0.23)^{***}$	-0.67 $(0.22)^{**}$	-0.96 $(0.32)^{**}$	-0.61 (0.43)
First Union - Yes	1.97 $(0.18)^{***}$	1.19 $(0.18)^{***}$	0.67 $(0.22)^{**}$	0.22 (0.28)
Nationality - Other	0.46 $(0.24)^{\cdot}$	0.77 $(0.19)^{***}$	0.98 $(0.17)^{***}$	1.06 $(0.20)^{***}$
Age Ends Edu >18	-0.17 (0.13)	0.14 (0.11)	0.10 (0.12)	-0.14 (0.17)
Deviance	1876.95	2566.15	2230.95	1362.51
Num. obs.	1795	1795	1795	1795

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Table B.7: Logistic Regression Models- Final Parity Achieved | Females 45+

	At least 1 Children	At least 2 Children	At least 3 Children	At least 4 Children
Intercept	0.34 (0.14)*	−0.28 (0.14)*	−1.03 (0.16)***	−2.02 (0.22)***
High Instability	−0.32 (0.22)	−0.33 (0.18)·	−0.60 (0.21)**	−1.06 (0.42)*
First Union - Yes	1.52 (0.15)***	0.93 (0.14)***	0.35 (0.16)*	−0.02 (0.23)
Nationality - Other	−0.07 (0.22)	0.32 (0.18)·	0.78 (0.17)***	1.03 (0.20)***
Age Ends Edu >18	−0.43 (0.12)***	−0.16 (0.10)	−0.41 (0.11)***	−0.47 (0.17)**
Deviance	1924.70	2781.93	2623.62	1449.53
Num. obs.	2307	2307	2307	2307

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

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