

## **Reciprocal behaviour in partnership and fertility: new mechanisms for family formation in Europe**

*Mark Lyons-Amos, University of Southampton*

Across Europe and the United States, an increasing proportion of births are to unmarried women. That said, many cohabiting relationships are translated to marriage after birth- even in settings where cohabitation is common, such as Norway. Most existing analyses either assume a one-way transition (i.e. marriage to birth), or that these processes are correlated. This analysis argues that in settings where birth triggers marriage, such a causal association cannot be captured by existing approaches. I employ a cross-lagged bivariate regression to model the two processes of union formation and birth incidence, to establish whether such a causal relationship exists, and how it varies across national contexts. Data for this analysis come from the Harmonized Histories, a comparable dataset encompassing the United and 15 countries in Europe, which include retrospective data on both partnership and fertility. Preliminary results indicate that in Norway, birth is indeed a trigger for marriage. In Italy, however, there is no significant effect of birth on union status; consistent with a traditional union formation pattern. In Bulgaria, while there is an initial effect of birth inducing marriage, this effect diminishes- indicating that birth will not trigger a transition to marriage in established cohabiting unions.

An increasing proportion of births in Europe now occur within stable, cohabiting but non-marital unions. This is part of a wider trend toward more heterogeneous relationships between fertility and partnership (Perelli-Harris 2012, Heuverline and Timberlake 2004). That said, this trend is not universal, with some countries exhibiting a preference that fertility be restricted to a marital setting (Perelli-Harris 2012). While fertility has increasingly occurred within cohabiting unions, parents frequently marry after the birth, even in countries at the vanguard of the Second Demographic Transition such as Norway (Perelli-Harris 2012). Further, evidence from the United States indicates rather than marriage existing as a prerequisite for fertility, translating cohabitation to marriage and fertility now represent interrelated family building processes (Brien *et al.* 1999). Family formation is therefore characterised by a series of events – including marriage and fertility – where the event ordering is increasingly uncertain but fundamentally related (Wu and Musik 2008).

While there has been much research on the nature of fertility within different partnership forms, and also on the effect of fertility on subsequent partnership patterns, there has to this date been little work on the interaction between the two. Many analyses have examined either the effect of partnership status on subsequent fertility (Perelli-Harris *et al.* 2012), or have examined the effect of fertility on partnership either in terms of the effect of prior fertility on partnership dissolution (Lillard 1993). This ignores the interrelationship between fertility and partnership status. Further, in a European setting where the relationship between fertility and partnership is becoming increasingly varied between countries (Heuverline and Timberlake 2004), there is a dearth of comparative work into the different interaction between fertility and partnership. Where analyses have attempted to answer these questions, the scope has been limited to one setting (e.g Steele *et al.* 2005). Given that the relationship between partnership and fertility varies within the European context, the inferences that can be drawn from such research are limited.

This analysis aims to fill this research gap in two ways. Firstly, using data from a number of European settings and the United States, it aims to establish the nature of the relationship between fertility and partnership. Specifically it is posited that fertility and partnership, rather than being merely related, will have a reciprocal, causal relationship. While it is naturally expected that partnership status will influence subsequent fertility, it is also expected that fertility will act as a trigger for marriage under new family formation norms. Further, the nature of this relationship will vary depending on the national setting. It is expected that in countries more advanced in the Second Demographic Transition the relationship between fertility and partnership will be less strong, while in settings further behind in the transition, fertility and partnership type will be closely related.

## **Data**

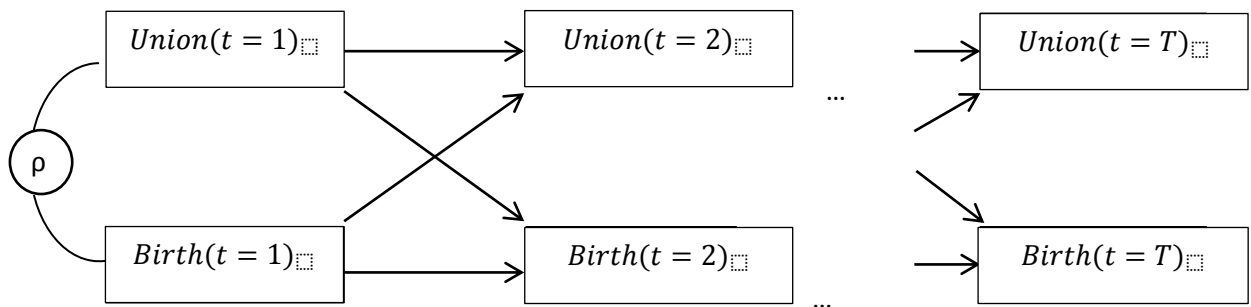
Data for this analysis are drawn from the Harmonised Histories database (Perelli-Harris, Kreyenfeld, and Kubisch 2009, and see [www.nonmarital.org](http://www.nonmarital.org)). The Harmonized Histories is a standardised set of 15 surveys from European countries and the United States, which include both partnership and fertility histories. I select three countries from the full Harmonized Histories dataset by way of illustration: Later work will extend the models to all European countries. A number of exclusions from the data are made: I consider only women in the age group 15-45: women have to be able to legally marry, and physically able to bear children. Additionally, I focus only on first unions: re-partnering behaviour is different from first union formation (Skew, Evans, Grey 2009), for example being far more likely to remain non-marital.

A number of deletions are made for reasons of data quality. Partnerships with inconsistent dates are omitted (where the end date precedes the start date for example). Only women are considered for the analysis: all male histories are therefore excluded. Only women in the cohorts 1945-54, 1955-64 and 1965-74 are included in the analysis. These cohorts are consistently available in the Harmonized Histories datasets (not all datasets include information for older cohorts). Additionally, women from more recent cohorts will have partnership and fertility histories which are so incomplete as to compromise data quality.

## Model

The cross lagged model is a bivariate regression applied in circumstances of mutual, reciprocal causality. Previous analyses (e.g. Steele *et al.* 2005) have modelled the transition to marriage and birth as two associated processes, where the errors of partnership and fertility are correlated ( $\rho$ ) to account for association (e.g. cohabiting unions tend have lower probabilities of birth). However, where one outcome has a direct and causal effect on the other, this model is not sufficient (Blossfeld and Mills 2001). Historically fertility was largely restricted to marital unions: therefore the previous marital status will have a direct effect on the probability of subsequent birth. However, under new family formation patterns, the incidence of birth in a cohabiting relationship may be a trigger to marry. This indicates reciprocal causality. The conceptual model is presented in Figure 1, which represents the first union. Two processes are presented in this figure. The upper process is Union status; the model presents estimates of the probability of either cohabiting or being married at time  $t$ . The lower process is Birth: the probability of whether a woman has a birth at time  $t$ .

Figure 1: Conceptual representation of crossed lag model of fertility and marriage.



I fit models for each country in the dataset: this facilitates different trajectories of marriage by both relationship duration and age (for example, in post-Socialist contexts marriage tends to be rapid and at an early age, while in Nordic settings there are extended periods of cohabitation at the start of relationships). I specify each time interval  $t$  in 9 months durations. This duration is chosen to avoid contamination of the beta coefficients for the lagged variables by shotgun marriages (where pregnancy, rather than birth, prompts marriage). The choice of 9 month intervals means that in the event of marriage due to pregnancy, the marriage and birth will occur in the same time interval rather than the previous lagged time interval. I include lags of the three previous time intervals: Perelli-Harris *et al.* (2012) suggest that in certain settings there may be a delay between birth and marriage. To capture this potential delay, the three lagged effects are estimated simultaneously.

I include a number of control variables available in the Harmonized Histories dataset. Specifically each model controls for educational attainment, religious affiliation, birth and whether the respondent was native born. All of these controls can affect the probability of marriage, birth or both. Models are estimated in MLwiN 2.20 (Rasbash *et al.* 2009) via the MCMC facilities using a burn in of 7000 samples and 30,000 samples, with Gibbs sampling used as the update algorithm.

## **Preliminary results**

Preliminary results pertain to three exemplar countries: Bulgaria, Italy and Norway. Figure 2 presents the predicted probabilities of having a birth, conditional on previous union status. The previous union statuses are denoted by the union type over three lags: for instance CMM represents a woman who was cohabiting 3 time periods ago, but has been married ever since. In all settings, women who are in long term marriages (MMM) tend to have a higher probability of having a birth than women who are in long term cohabiting relationships (CCC). This contrast is strongest in Italy, consistent with expectations (e.g. Perelli-Harris *et al.* 2012). There is a particularly high probability of birth for women who have recently made a transition from cohabitation to marriage (CCM or CMM) have considerably elevated probabilities of having a birth in all settings. This indicates that women still tend to have a birth relatively rapidly after marriage.

Figure 3 presents the predicted probability of remaining in a cohabitation given previous birth timing (i.e. the lagged partnership statuses are all cohabiting). Lower probabilities indicate a transition from cohabitation to marriage. In Norway, there is a distinct fall in the probability of remaining in cohabitation following a birth 1, 2 and 3 time intervals previously. This indicates the hypothesised new family formation pattern in Norway: birth acts as a trigger for marriage. In Italy, there is no consistent effect of having a birth on relationship status. In fact, none of the regression coefficients (not shown) or probabilities for women who have had a birth in the previous time intervals is significant. This is indicative that there is little impact of birth on partnership status in Italy- consistent with the traditional family formation pattern in that context.

In Bulgaria, there is an initial drop in the probability of remaining in cohabitation for women who had a birth in the previous time period. However, the probability of remaining in cohabitation is higher for women who had their birth 2 or 3 time intervals previously. This is indicative that although women who have had a recent birth are more likely to translate their cohabitation to marriage, this effect is reversed at later stages. The initial conclusion here is that although birth can act as a trigger for marriage early postpartum, Bulgarian women in intractable cohabitations (i.e. those in very long-term cohabiting union) are unlikely to translate these to marriage, regardless of birth.

Future work will expand the number of results to the entire Harmonized Histories dataset. This will facilitate identifying groups of countries with the inter-relationships identified, and potentially identify new family formation patterns across Europe and the United States.

Figure 2: Predicted probabilities of having a birth over Lagged partnership status in exemplar countries

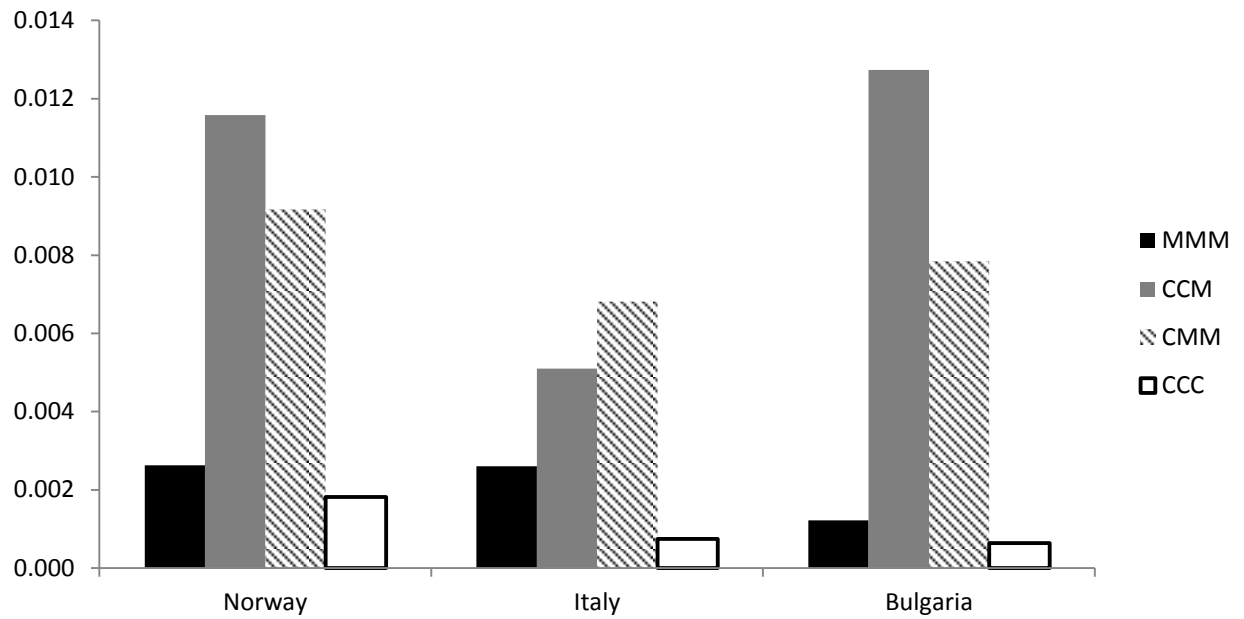
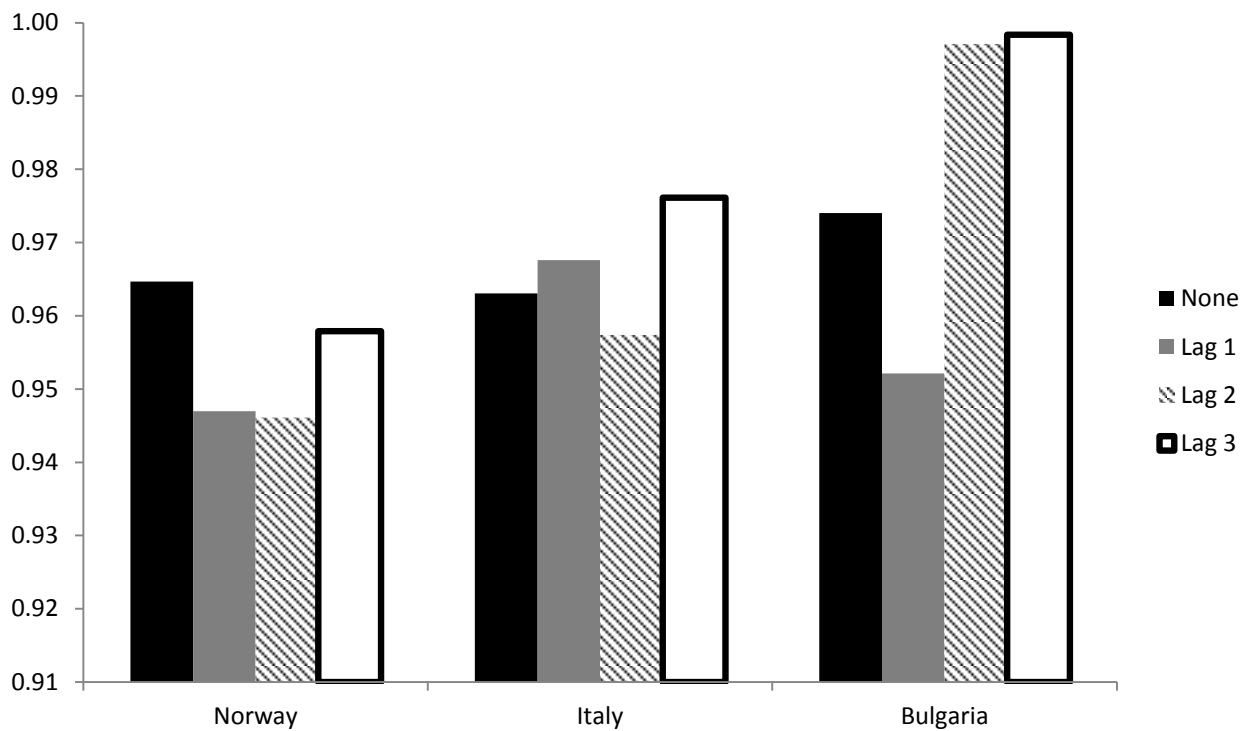


Figure 3: Predicted probability of remaining in cohabitation given previous birth status



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