

Summary:  
Social Insurance and the Marriage Market  
Journal of Political Economy, 2020, vol. 128, no. 1  
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<https://github.com/s-saisw/studyGroup>

October 27, 2020

## 1 Introduction

- Swedish government eliminates a survivor insurance.
  - Sweden used to provide survivors insurance to a female widow. The widow was granted a lifetime benefits upon her husband's death. Cohabiting partners or divorcees were not eligible.
  - More specifically, couples were eligible to survivors insurance if they
    1. had a joint child and married before December 31, 1989
    2. had no joint child before December 31, 1989 but married before December 31, 1984
  - The reform was discussed for the first time in the Parliament in June, 1988. This date was treated as reform announcement.
- (Broad) Research Question: How does the new institution setting affect the volume and nature of marriage contract?
  - Volume: Entry and exit from marriage
  - Nature: Who contracts with and then marries whom?
- Predictions
  - Long-run marriage market steady state
    1. Lower marriage rate – survivors insurance provides surplus from marriage relative to cohabitation.
    2. Quality of cohabiting union falls ????? – Suppose gain from marriage comes from both match quality and insurance benefits. Matched couples continue to cohabit until their expected gain from match quality and insurance benefits is high enough. After the regime change, people get married when match quality is high. Quality of cohabiting partner rises.
  - Impacts stemming from marriage market regime transition
    - \* Matched but unmarried couples
      1. Marriage boom – Price of waiting to learn more about match quality suddenly rises. Cohabiting couples enter marriage by the end of 1989.

- 2. Retimed and extra marriages – People who have already learned their match quality schedule their marriage before 1989 instead; people who have yet to learn about the match quality choose to marry (intertemporal substitution).
- 3. Heterogeneous responses and economic incentives – Some couples are more likely to enter marriage during the boom, depending on couple’s age structure, relative income shares, husband’s likelihood of death.
- 4. Higher long run divorce rate – People who hastily marry during marriage boom may not know the quality of the match, leading to lower quality of match, and higher long-run divorce rate.
- \* Matched and married couples
  - 1. Higher marital instability – Marital surplus falls after regime change.
- \* Unmatched and unmarried individuals
  - 1. More assortative matching – The insurance gives higher benefits to wives whose husband earn relatively more. The absence of it will induce a more assortative match, i.e. high-skilled men matched with high-skilled women.
- Contributions
  - 1. This study finds large response to marriage market.
  - 2. It analyzes behavioral responses across three stages of the mating process: matching, entry into marriage, and exit from marriage.
  - 3. Its institutional feature directly affects economic gains from assortative matching.
  - 4. It documents responses to benefits that pay out only in the far future. (Literature often focuses on immediate impact)
  - 5. It focuses on an insurance product provided by a government scheme instead of private insurance.

## 2 Data

- Individual-level administrative data
- Sample covers 1981–2000

## 3 Methodology

- Graphical illustrations → long-run steady state, marriage boom
- Decomposition method → retimed and extra marriage
- Hazard model → heterogeneous response
- OLS → long-run divorce rate in marriages during the boom
- Difference-in-differences + Regression discontinuity → marital instability (among matched and married couples)
- Regression discontinuity → assortative matching

## 4 Results

### 4.1 Long-run steady states

- Consider only cohabiting couples who enter cohabitation 9 years before the reform and stay together for 10 years after that.
- To gauge the long-run effect, this part of the analysis consider behavior in the marriage market well-before and well-after the reform.

#### 4.1.1 Steady-state marriage rate

- Consider only couples that marry within 3, 5, and 7 years after moving in together.
- Marriage rate declines in the long run.

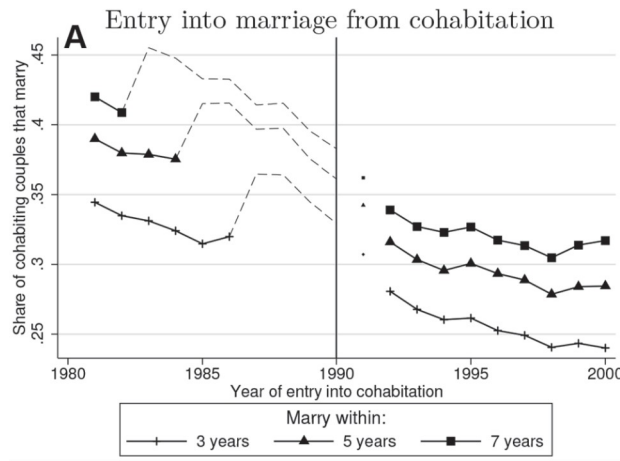


Figure 2A

#### 4.1.2 Steady-state quality of cohabiting unions

- Consider only couples that separate within 3, 5, and 7 years after moving in together.
- Separation rate rises in the long run.

## 4.2 Impact around transition period

### 4.2.1 Marriage boom

- Figure 3 compares the marriage rate of couples who faced incentive (those with at least one child born before or on December 31, 1989) to marry fast VS those who did not (those whose first joint child was conceived after the elimination of survivors insurance).
- There is bunching at the quarter right before the reform for those with incentives.

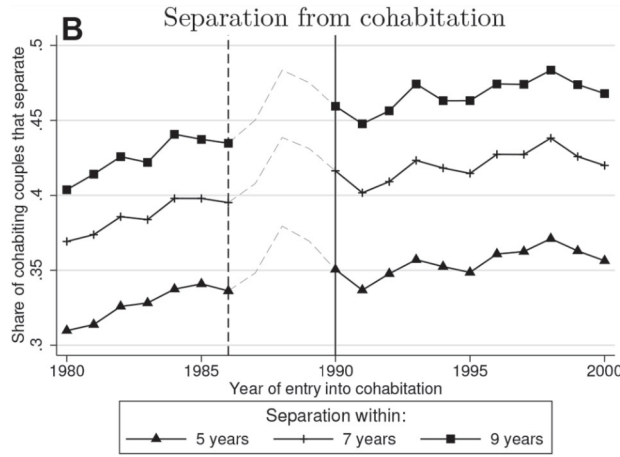


Figure 2B

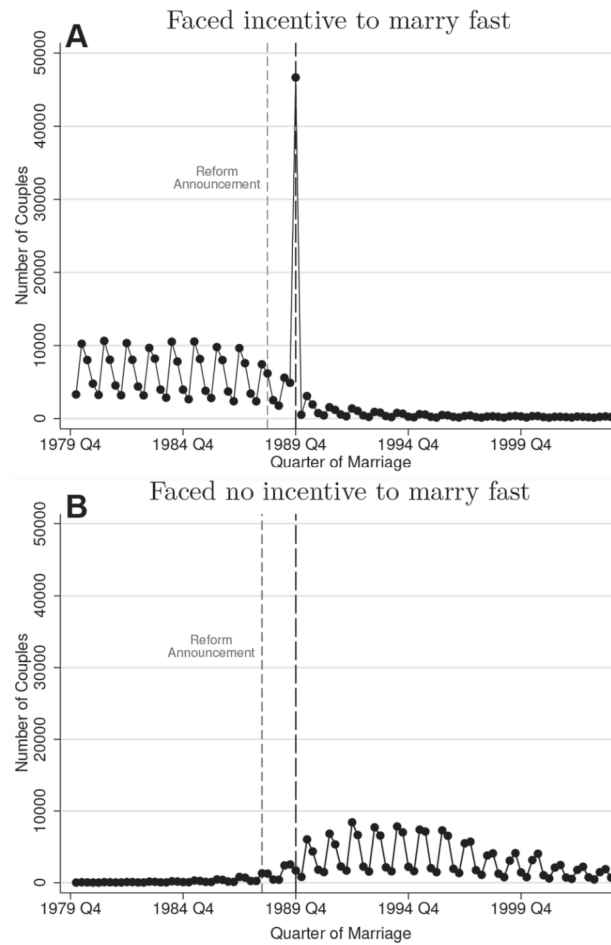


Figure 3

#### 4.2.2 Retimed and Extra marriages

- This paper then estimates the effect of the reform by decomposing the time-series plot of marriage over time.
- Decompose the time series plot into (Figure 4):
  1. Long-run steady state decline of marriage (A)
  2. Retimed marriage i.e. marriage that would have occurred after 1989q4 if there was

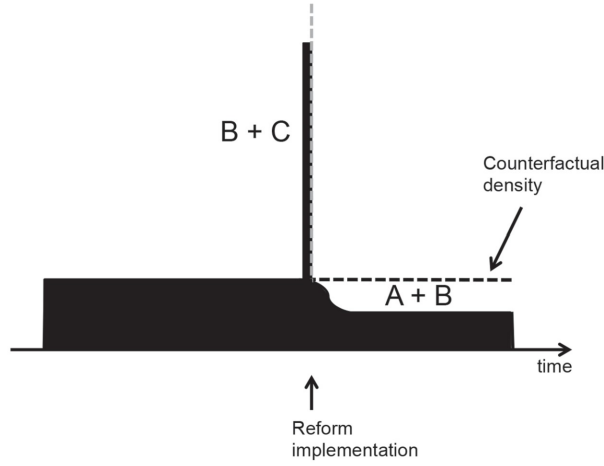


Figure 4

no reform (B)

3. Extra marriage i.e. marriage that would not happen if there was no reform

• A, B, and C were estimated as follows:

1. Use two samples:

- Treated sample: sample with couples with at least one child before the reform. Divide them into 72 cohorts by the time their first child was born (1971q1–1988q4).
- Untreated sample: sample with couples whose first child was born after the reform. Divide them into 32 cohorts by the time their first child was born (1991q1–1998q4).

2. Estimate the following equation

$$n_{cs} = \alpha + \mathbf{1}[s = s^*] \sum_{c=1}^{72} \beta_c + g(s) + \zeta_q + \eta_c + \mathbf{1}[s > s^*] \sum_{c=1}^{104} \gamma_c + h(t_{prebirth}) + j(t_{postbirth}) + \epsilon_{cs} \quad (1)$$

where

- $\mathbf{1}[s = s^*] = 1$  when period  $s$  is  $s^*(1988q4)$
  - $\beta_c$  captures bunching at the reform period and is specific to each cohort  $c$ .  $\rightarrow B+C$
  - $\gamma_c$  captures different things for different samples
    - \* Treated sample:  $\gamma_c$  captures retimed marriage and steady state marriage.  $\rightarrow B+A$
    - \* Untreated sample:  $\gamma_c$  captures steady-state reduction.  $\rightarrow A$
  - $g(s)$  is higher-order polynomial in time.
  - $\zeta_q$  and  $\eta_c$  are quarter and cohort fixed effects.
  - $h(t_{prebirth})$  and  $j(t_{postbirth})$  are higher-order polynomials in the number of quarters before and after the birth of the first child.
3. Calculate counterfactuals from treated and untreated samples. Set  $\mathbf{1}[s = s^*] = \mathbf{1}[s > s^*] = 0$  and use  $\hat{\alpha}, \hat{\beta}_c, \hat{\gamma}_c, \dots$  to get the predicted number of marriages when there is no reform.

- Untreated sample: We can get A from its counterfactual
  - Treated sample: We can get A+B and B+C from its counterfactual.
4. Calculate A, B, and C.

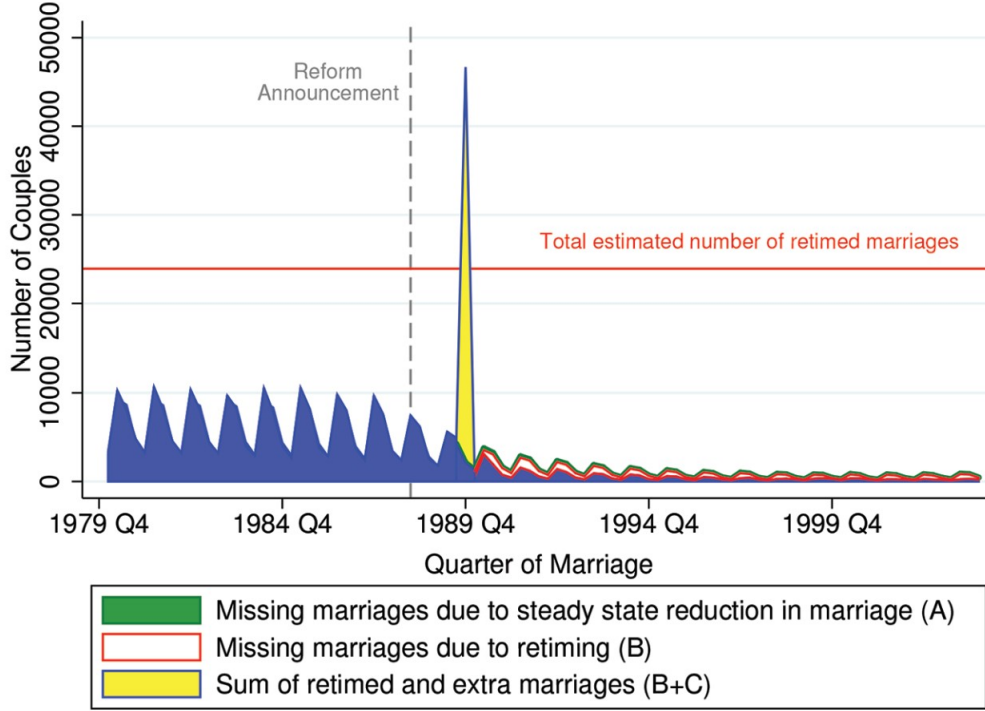


Figure 6

- Identifying assumption: Couples marrying before and after the reform behave the same way when time after childbirth is controlled for.

#### 4.2.3 Heterogeneous effects and economic incentives

- This section analyzes who is likely to marry.
- It specifies a hazard model that assumes that the risk to enter marriage depends on the first child birth, the reform, and other covariates such as time-varying financial characteristics and couple characteristics. Hazard for marriage at time  $t$  is specified as follows:

$$h(t; \mathbf{Z}_i(t)) = h_0(t) \exp(\beta s_i^*(t) + \gamma \text{post}_i(t) + \delta_1 \mathbf{F}_i(t) + \delta_2 \mathbf{D}_i(t)) \quad (2)$$

- $s_i^*(t) = 1$  if  $t = 1989Q4$
- $\text{post}_i(t) = 1$  if  $t > 1989Q4$
- $\mathbf{F}_i(t)$  captures financial characteristics
- $\mathbf{D}_i(t)$  captures couple characteristics

Only treated sample (couples who have at least one child before the reform) is used. It is assumed that a couple enters the risk pool for marriage 7 years before the birth of the first child.

- After that, the predicted probability for marriage in 1989Q4 is calculated:  $\hat{h}_{1989Q4} = \exp(\beta)$

TABLE 2  
IMPACT ON MARRIAGE: HAZARD RATIOS

	FINANCIAL CONTROLS		ALL OBSERVABLE CONTROLS	
	Coefficient $\hat{\beta}$ (1)	Exponential $e^{\hat{\beta}}$ (2)	Coefficient $\hat{\beta}$ (3)	Exponential $e^{\hat{\beta}}$ (4)
A. All				
Marriage in 1989Q4	2.65*** (.03)	14.14*** (.48)	2.71*** (.03)	14.96*** (.52)
Marriage in 1989Q4 (flexible controls)	2.70*** (.04)	14.81*** (.54)	2.74*** (.04)	15.45*** (.57)
No. of couples	960,414	960,414	764,332	764,332
B. Male Dies within 5 Years				
Marriage in 1989Q4	2.84*** (.09)	17.09*** (1.50)	2.97*** (.09)	19.46*** (1.73)
No. of couples	3,865	3,865	2,980	2,980
C. Male Alive after 5 Years				
Marriage in 1989Q4	2.65*** (.03)	14.14*** (.48)	2.70*** (.03)	14.95*** (.52)
No. of couples	956,031	956,031	760,966	760,966

Table 2

- A couple who is unmarried by 1989Q3 is on average 14.14 times more likely to marry in 1989Q4 than they would in the absence of the reform.
- Next, the author estimates the hazard ratio of each demographic group by adding interactions between male labor income group and age-difference group.

$$h(t; \mathbf{Z}_i(t)) = h_0(t) \exp(\beta s_i^*(t) + \gamma \text{post}_i(t) + \delta_1 \mathbf{F}_i(t) + \delta_2 \mathbf{D}_i(t)) \quad (3)$$

- Figure 8 shows couples are likely to enter marriage in 1989Q4 if the male income is high or age-difference is large.

#### 4.2.4 Long-run divorce rate in marriages during the boom

- Compare divorce rate within the treated sample of those who marry in 1989Q4 with couples who married earlier. (Table 3)

### 4.3 Impact on Preexisting Marriages

#### 4.3.1 Higher marital instability

- This section uses the sample of couples who married in 1984 or 1985 who did not have a joint child. Threshold to the old marriage contract is January 1, 1985. Reform announcement was June 1988.
- Since marriage date is easily manipulated, couples who marry before and after the New Year's eve may have characteristics that influence marital instability. To address this issue, the author uses DiD combined with RDD. This method captures the difference between two RD estimates: the one within 180 days around January 1, 1984 and the one around January 1, 1985.

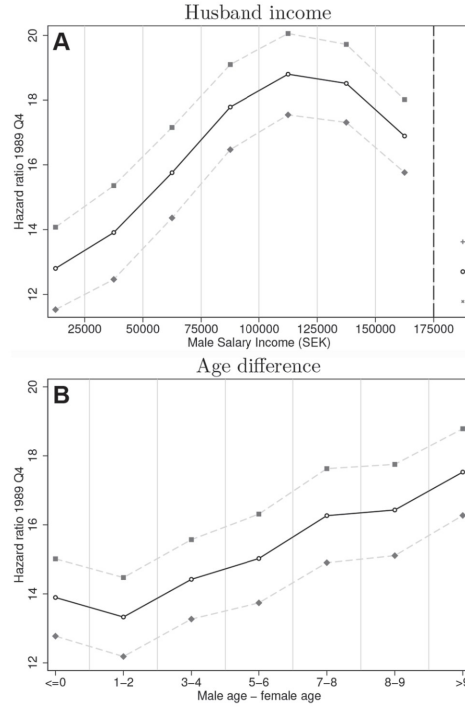


Figure 8

TABLE 3  
HEIGHTENED DIVORCE RISK IN BOOM MARRIAGES  
(Dependent Variable: Divorce within  $n$  Years)

	3 years	5 years	10 years	15 years
Married in 1989Q4	.01*** (.00)	.03*** (.00)	.05*** (.01)	.05*** (.01)
Mean, dependent variable	.03	.07	.17	.25
No. of couples	175,015	175,015	175,015	175,015

Table 3

- DiD specification:

$$Y_{it} = \tau_t \times I_{it} + \sigma_t \times NYE_i + g(dom) + U_{it} \quad (4)$$

RD specification:

$$I_{it} = \alpha + \gamma \mathbf{1}[\tilde{dom}_b > 0] \mathbf{1}[\text{Around85}] + \delta \mathbf{1}[\text{Around85}] + g(\tilde{dom}_b) + h(\tilde{dom}_b) \mathbf{1}[\text{Around85}] + \epsilon_{it} \quad (5)$$

- $Y_{it}$ : whether the couple  $i$  has already divorced in year  $t$ .
- $I_t$ : survivor insurance status at time  $t$
- $dom$  : date of marriage
- $NYE$  : New year's eve

- Result shows the removal of survivors insurance cause divorces after reform announcement in 1988. There is no difference among the placebo groups. (Figure 9)



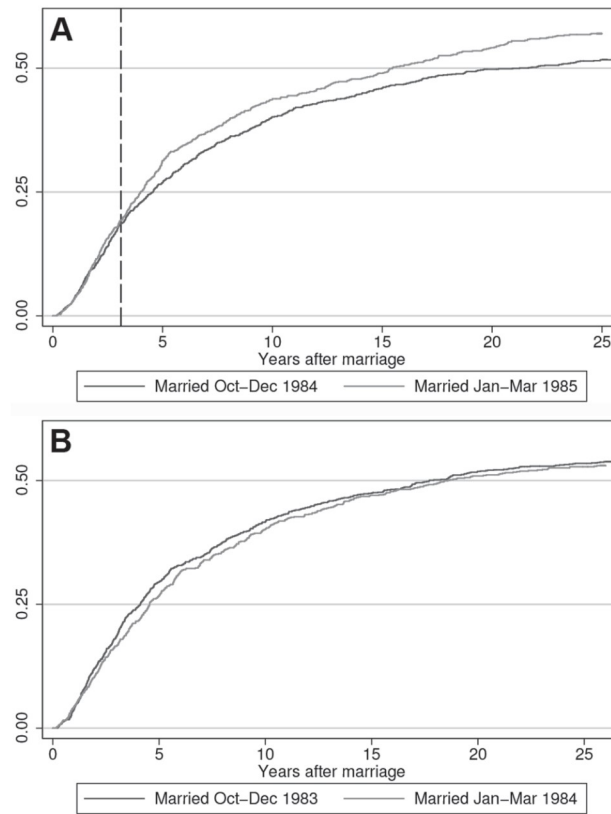


Figure 9: CDF of marriage duration

## 4.4 Impact on Unmatched and Unmarried Individuals

### 4.4.1 Assortativeness of Matching

- The old marriage contract favors women who marry men with much higher earnings.
- Compare the matching patterns of couples who chose to marry in the old VS new marriage contract.
- The sample includes all couples with children who married from 1983 through 1999. It uses RDD to compare the share of male who married women with less education attainment.

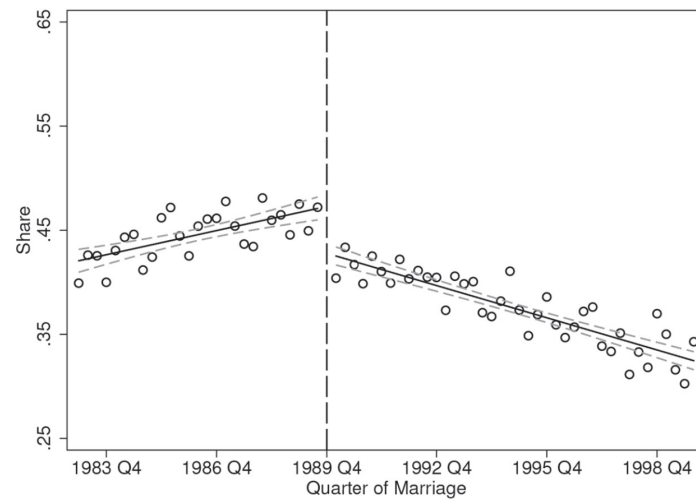


Figure 10: CDF of marriage duration