# Untying the knot: divorce legalization and the decline of marriage

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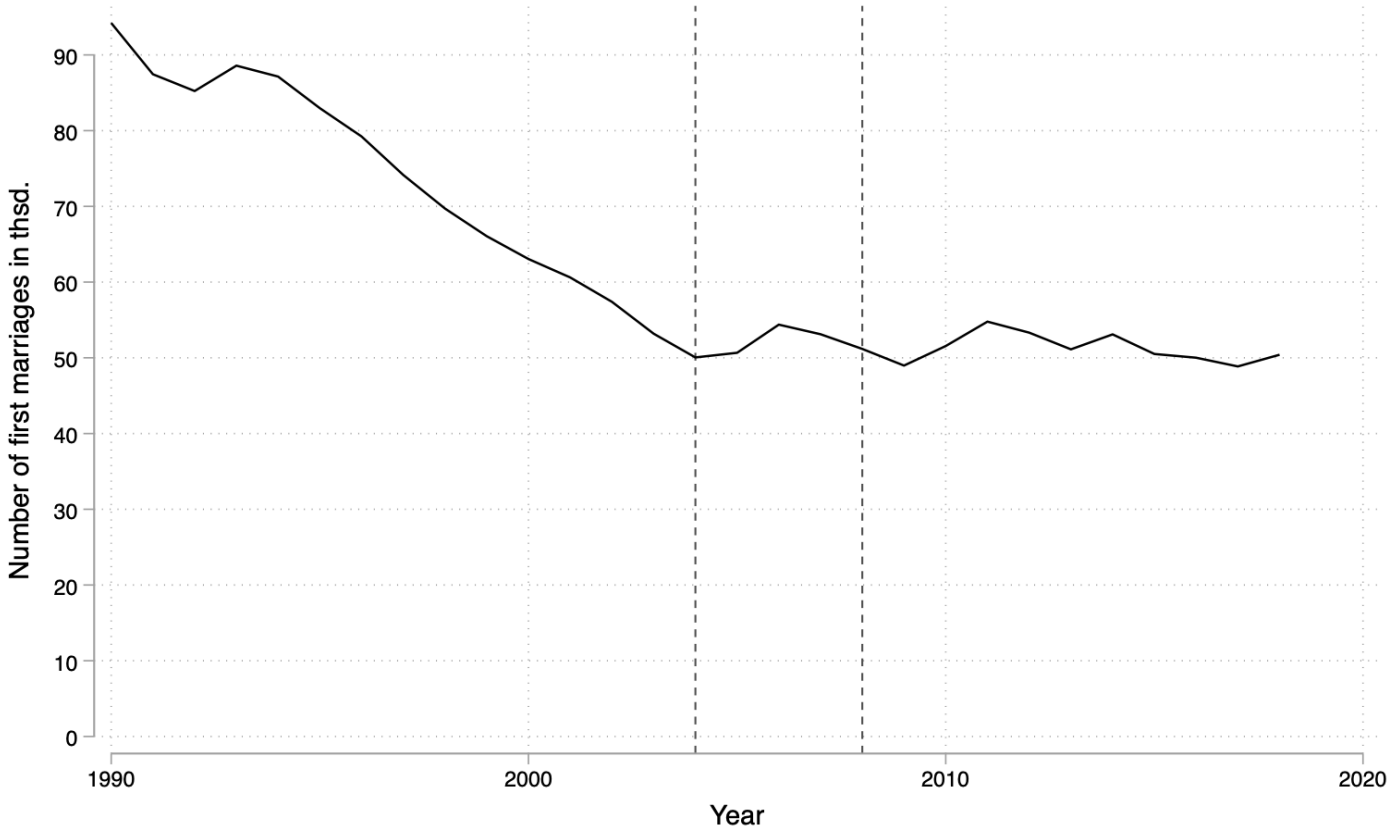
# Motivation

# Number of marriages, Chile 1990-2018

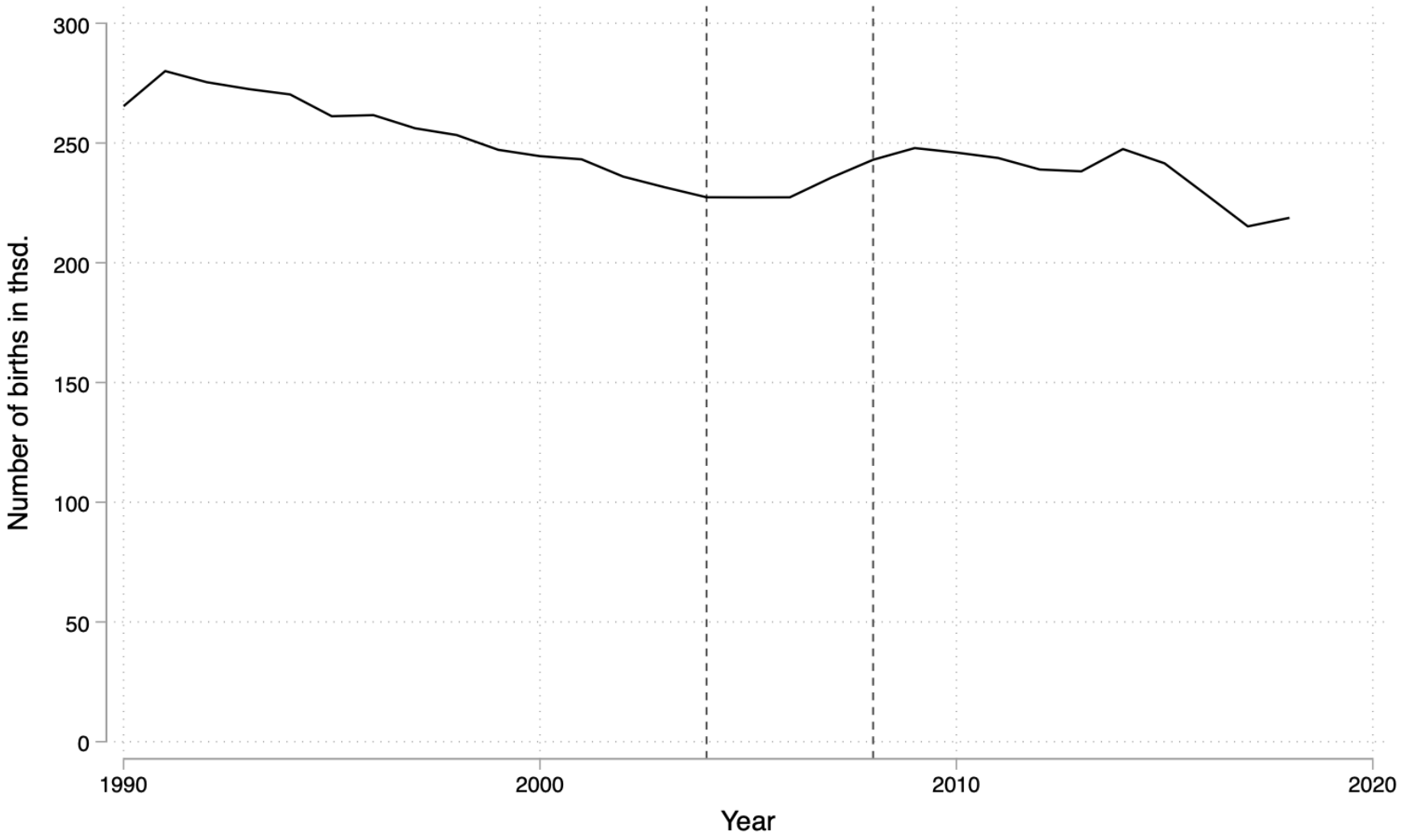



Note: Restricted to females aged 16-44.
Data source: Civil registry

2004 - Divorce is legalized

2008 - Divorces actually pronounced in significant numbers

# What about fertility?

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# Pre-law arguments against legalizing divorce

- Fear that it would reduce the appeal of marriage, by weakening its commitment value (Cox 2013)
- Economic theory: Easier divorce decreases marital commitment and gains from marriage by discouraging marriage-specific investments (Rasul 2006)
- Evidence of negative impact of easier divorce on marital investment in the literature:
  - lower fertility: Stevenson (2008), Bellido and Marcen (2014)
  - lower marital specialization: Johnson and Skinner (1986), Parkman (1992), Gray(1998), Genadek et al (2007), Stevenson(2008)
  - lower educational investment, homeownership: Stevenson (2008)

## Research Questions

How did divorce legalization shape marital decisions, marital investment and the gains from marriage?

- $\rightarrow$ Did divorce legalization make marriage less appealing?
- $\rightarrow$ Did divorce legalization discourage marital investment?
- $\rightarrow$ Who gained/lost from divorce legalization?
- $\rightarrow$ What can we learn about the determinants of marriage and fertility?

# Background

# Background: Chile and divorce

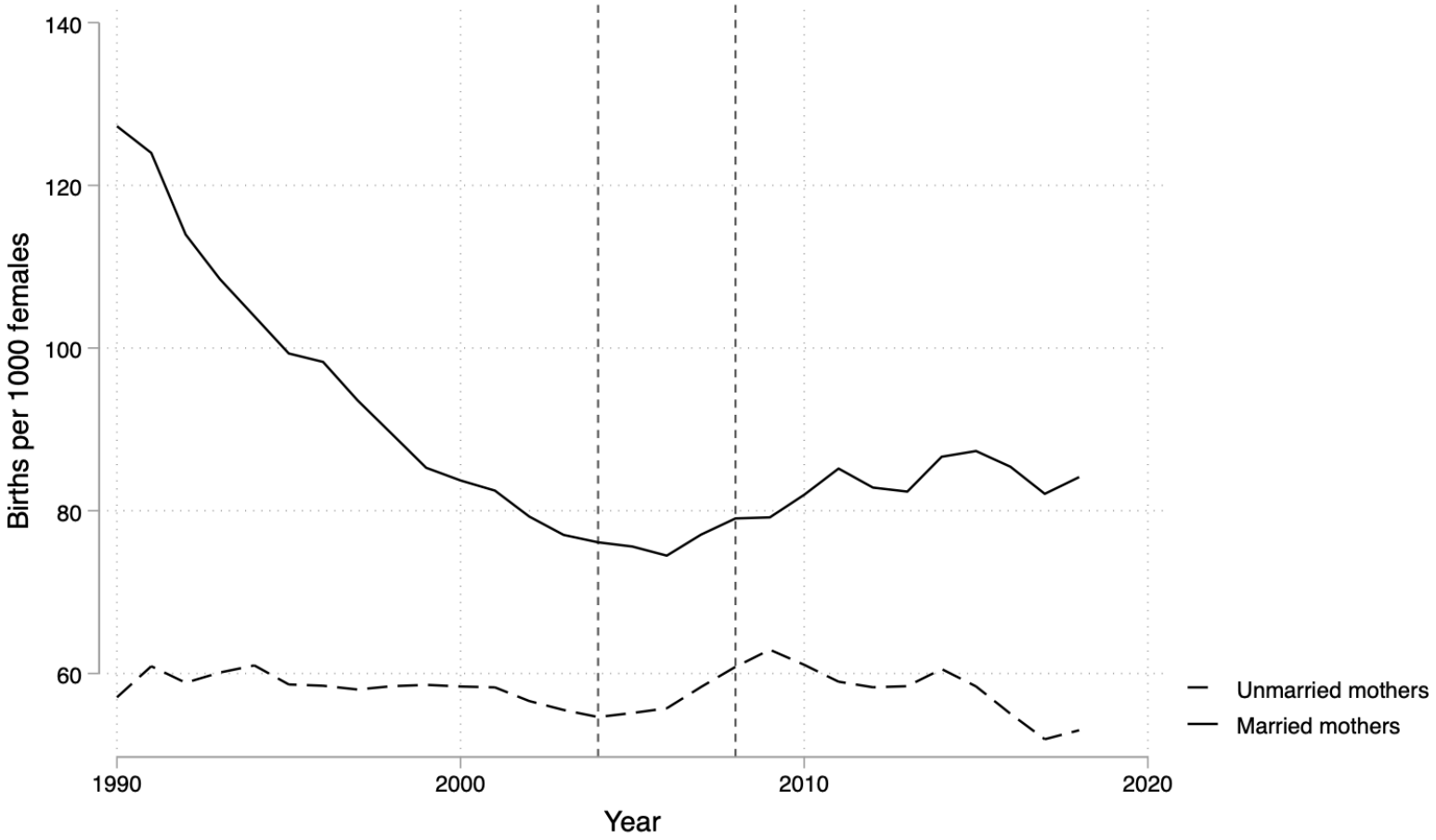
- One of the last countries to legalize divorce in 2004 (Malta 2011, still left: Vatican and Philippines)
- Before 2004: 1884 family law
  - “divorcio” = separation: no remarriage
- Annulment:
  - possible but expensive (about 5 month of minimum salary)
  - required mutual consent and a couple of witnesses willing to lie
  - marriage never existed: no alimony, asset division etc.

# Background: Divorce legalization

- introduced in Parliament in 1995, 1997, 1999, 2002,
- ... debated until March 2004,
- ... approved and made effective November 2004.
- After 2004:
  - Divorce dissolves marriage, allows remarriage.
  - Compensation to vulnerable spouse = f(marriage duration, assets, age, health, pension savings, earning power).
  - Community property is split between the spouses.
  - Mutual consent divorce : proof of 1 year separated.
  - Unilateral divorce : proof of 3 years separated.

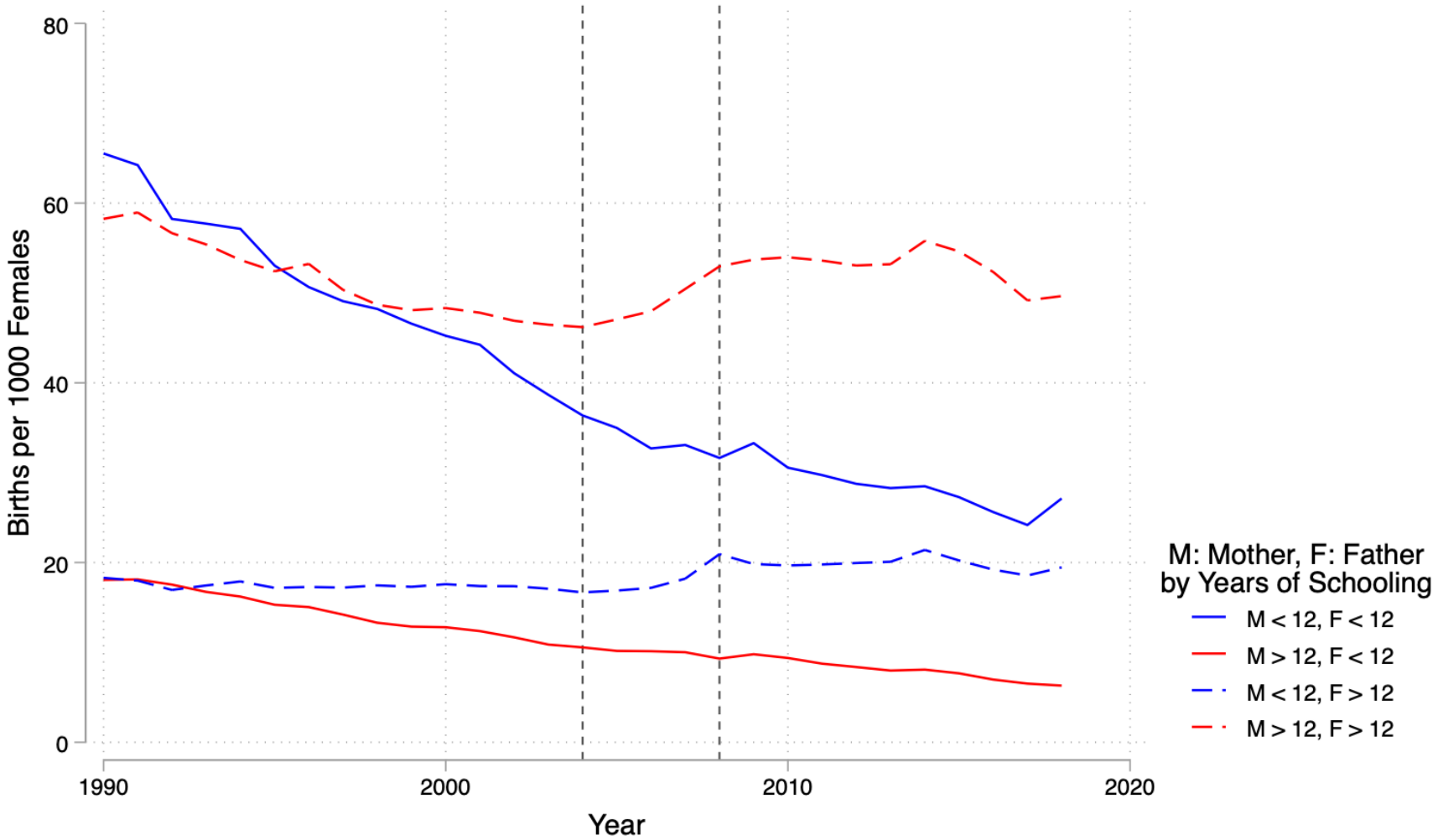
# Descriptive Evidence

# Fertility rebound mostly among married women



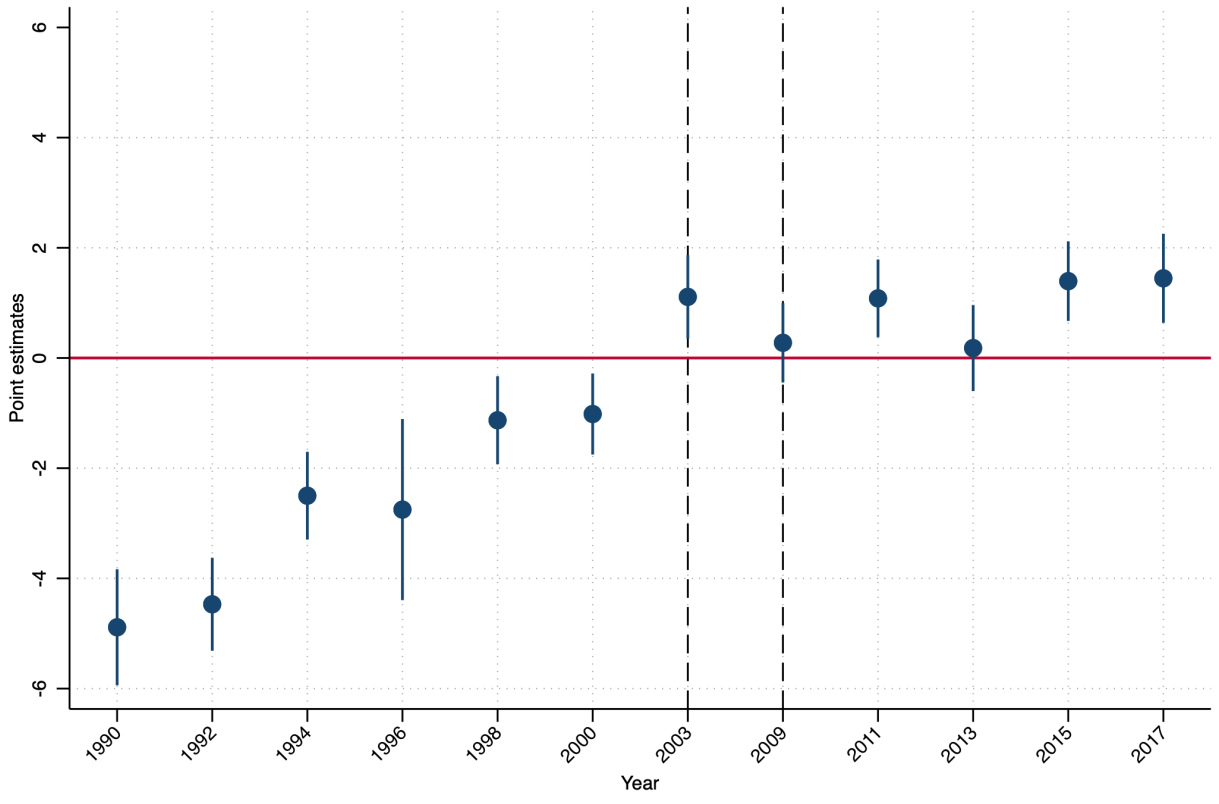

Note: Birth rates computed as number of births over number of females by marital status.
Restricted to females aged 16-44.
Data sources: Civil registry and CASEN.

# Fertility rebound mostly among highly educated women with highly educated partners




Note: Birth rates computed as number of births over number of females by schooling level.
Restricted to females aged 16-44.
Data sources: Civil registry and CASEN.

# Relative hours worked by more educated women stop increasing




Estimated effect of having high education (>12 years) on work hours, controlling for year and high education dummies for employed women aged 25 - 44.
Data source: CASEN

**Evidence so far:**

$\rightarrow$ Big trend breaks in marriage rates and marital specialization (fertility, labor supply) at the time of the reform

$\rightarrow$ Affects married women with higher levels of schooling

$\rightarrow$ [Not shown] Marital sorting patterns, interpreted through a Choo-siow model, imply improvements in the gains from marriage benefiting higher education women.

$\rightarrow$ Contrasts with pre-law arguments and results from literature

# Theoretical Framework

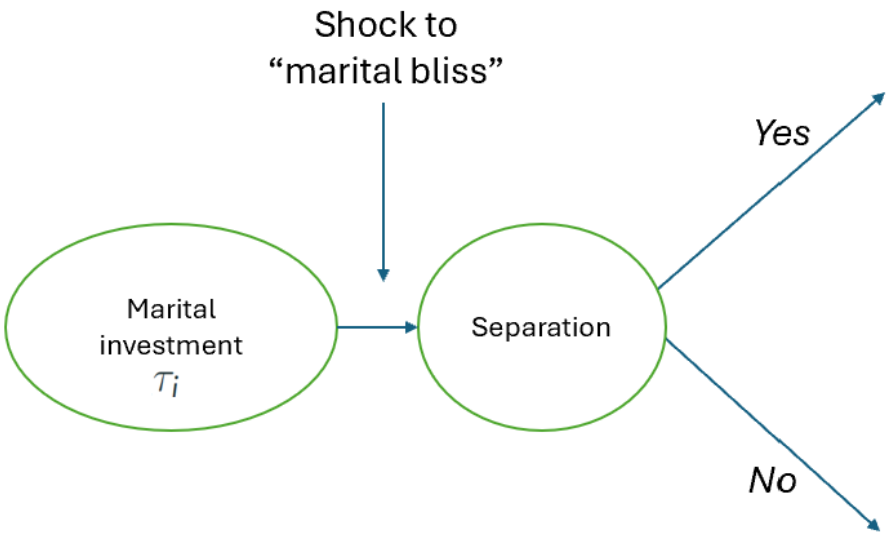
# Hypothesized mechanism

Marital savings and asset division enable specialization by insuring homemakers against the consequences of divorce (Lafortune and Low (2023))

Main model ingredients:

- Marital investment time $\tau_i$ produces public good $Q(\tau_i, \tau_j)$ at cost of career prospects:
  - reduces future labor income: $\Omega_i(1 - \tau_i)$
- Unilateral separation and limited commitment
  - Resources upon divorce are not optimally shared

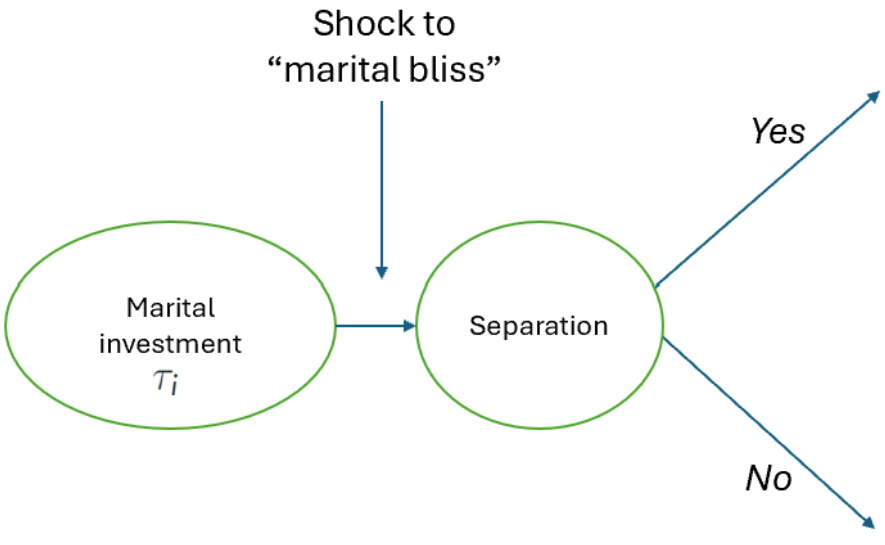
# Simplified model: no legal divorce




$$c_{2i}^{d} = \Omega_i(1-\tau_i)$$
$$c_{2j}^{d} = \Omega_j + A$$

$$c_{2i}^{m} = c_{2j}^{m} = 0.5 * (\Omega_i(1-\tau_i) + \Omega_j + A)$$

# Simplified model: legal divorce




$$c_{2i}^{d} = \Omega_i(1-\tau_i) + 0.5A$$

$$c_{2j}^{d} = \Omega_j + 0.5A$$

$$c_{2i}^{m} = c_{2j}^{m} = 0.5 * (\Omega_i(1-\tau_i) + \Omega_j + A)$$

# Marital investment decision

Consider wife's marital investment decision

- Marginal benefit: $\frac{\delta Q}{\delta \tau_i}$
- Marginal cost of investment: $\frac{\delta \Omega_i E[U'(C_2)]}{\delta \tau_i}$
  - $\Omega_i$: Marginal reduction in second period household labor income
  - $E[U'(C_2)]$: Marginal utility of consumption integrated over states of the world and household members
  - This term contains the marginal utility of consumption of wife after divorce $u'(c_{2i}^d)$

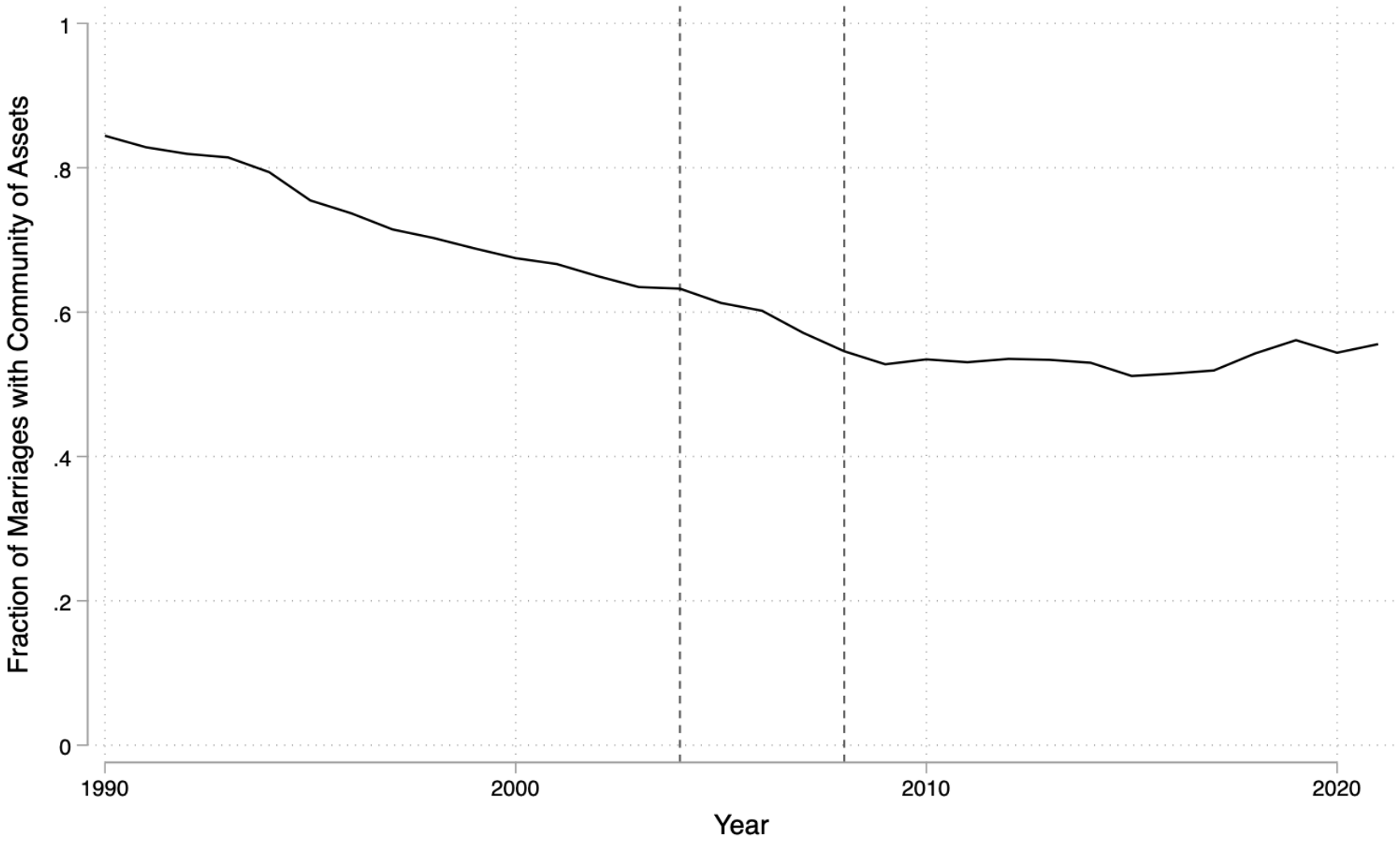
$\Rightarrow$ Divorce legalization transfers assets to the divorced wife which reduces the marginal cost of specializing.

# Empirical strategy

# Marital Regimes in Chile

- Default regime = “Sociedad conyugal” (community property)
  - Husband administers the assets, including wife’s inheritances
  - Wife’s signature only needed for real estate transactions
  - Wife can save part of her labor income outside of the community of assets
- Alternative = “Separación de bienes” (Separate property regime)

# Fraction of Community Property Marriages



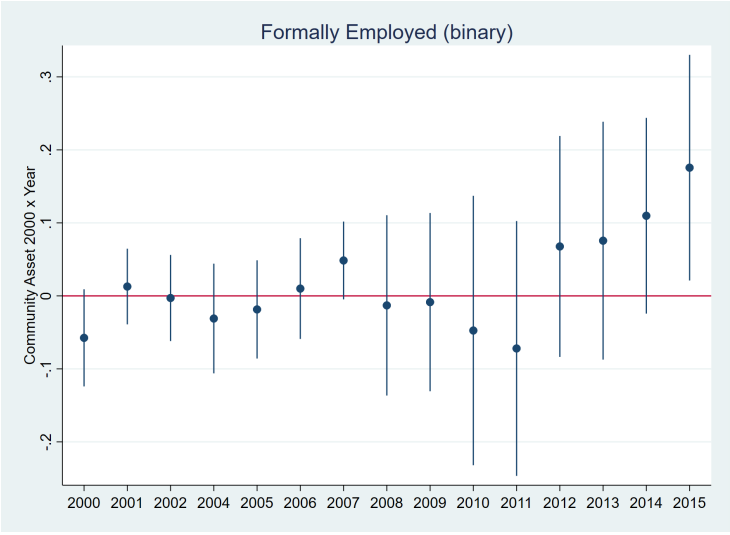

Note: Restricted to females aged 16-44.
Data sources: Civil registry

# Impact of divorce legalization on female labor supply

- **Hypothesis:** divorce legalization encourages marital investment in common property marriages
- **Identification threats:** Selection into marriage and asset regime changes with the law
- **Strategy:** Compare women already married before the law with the community property regime vs. the separate property regime.
- **Interpretation:** DiD measures the impact of asset division upon divorce, net of other changes introduced by the law.

# Relative drop in labor supply for high schooling women

## Edu $<$ 12, 20-29 y.o.

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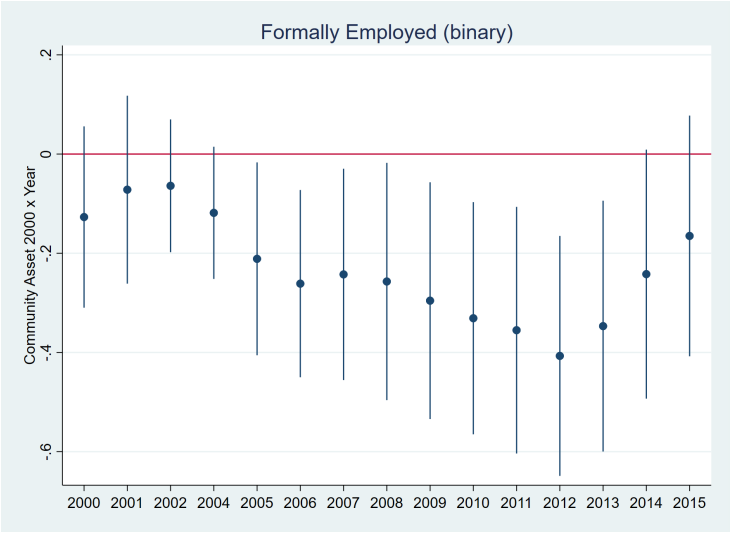


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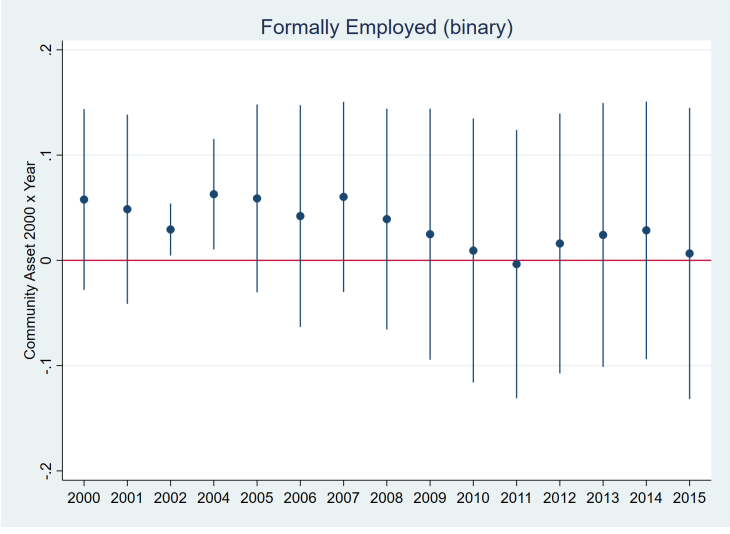


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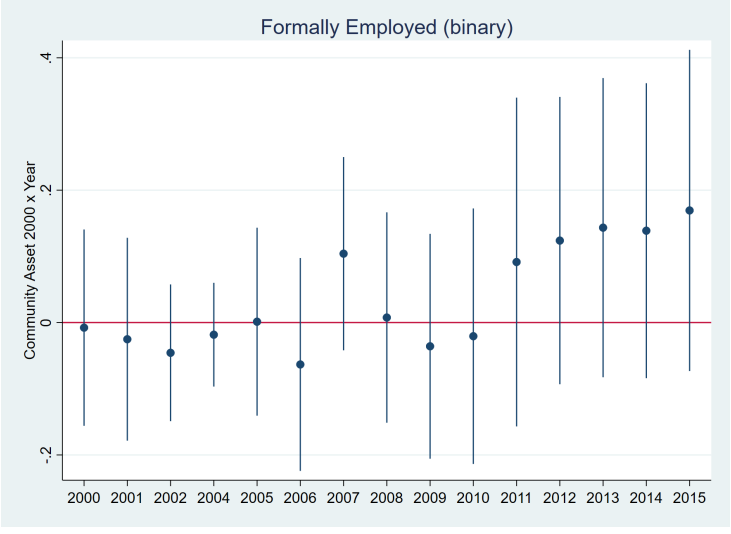


# Relative drop in labor supply for high schooling women

Edu $>$ 12, 20-29 y.o.

# Heterogeneity by pre-law household asset levels

Split households according to their pre-law asset levels:

- $A_i \leq 0$
- $A_i \leq p50$
- $A_i > p50$

| | Between 20–29 | | | | | | Between 30–39 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Below college | | | College | | | Below college | | College | | |
| | Asset g1 | Asset g2 | Asset g3 | Asset g1 | Asset g2 | Asset g3 | Asset g2 | Asset g3 | Asset g1 | Asset g2 | Asset g3 |
| Treatment effect interactions | 0.278* | 0.084 | 0.163 | 0.049 | -0.343** | -0.094 | -0.038 | 0.144 | 0.079 | 0.124 | 0.019 |
| | (0.161) | (0.094) | (0.124) | (0.224) | (0.135) | (0.139) | (0.140) | (0.129) | (0.194) | (0.123) | (0.106) |

$\rightarrow$ Only women in households with assets reduce their labor force participation

# Conclusion

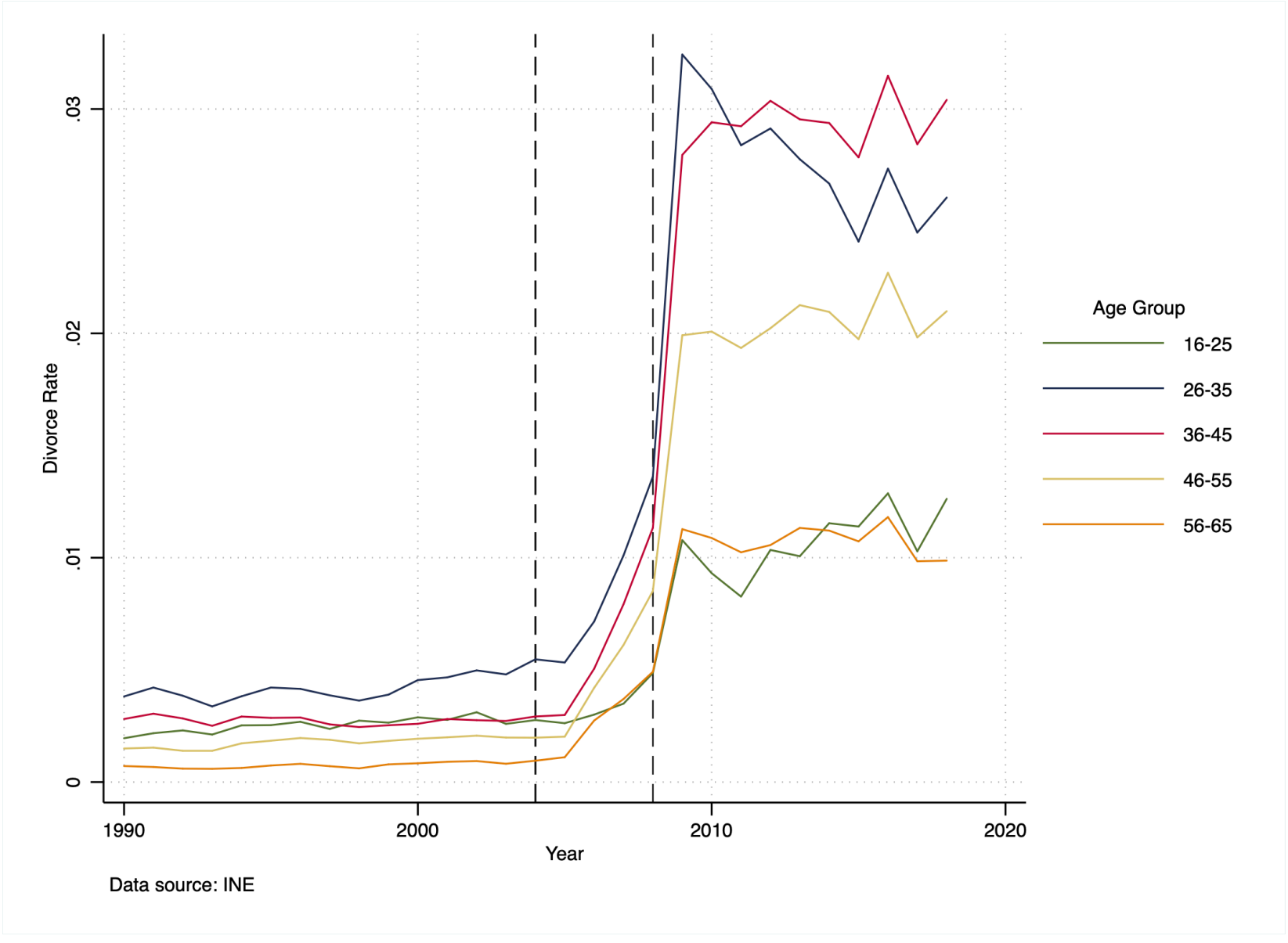
# Conclusion

- Large economic risks associated with marital separation can shape female fertility and labor supply decisions
- Importance of legal provisions after divorce and separation and their implementation in a context of rapidly declining fertility worldwide
- Policy implications:
  - Better enforcement of alimony and child support
  - Reducing the labor market costs of childbearing (childcare, paternal leave)
  - Alternative mechanisms besides survivorship pensions to support women's pension benefits

# Thank you!

# Appendix

# Divorce and Annulments by Age of the Wife



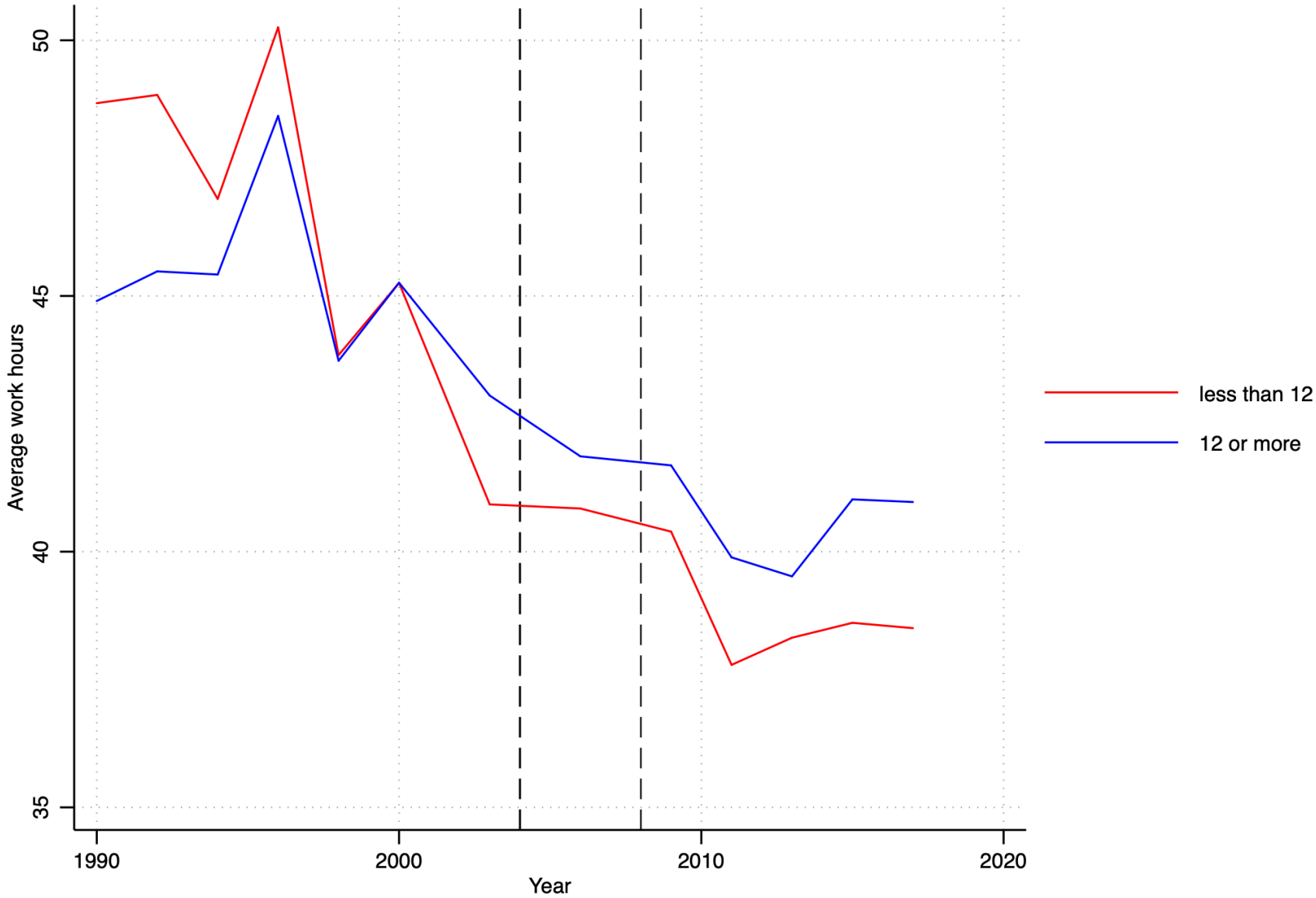
# Relative Labor Supply of Women by Schooling

- Fertility rebound is stronger for more educated women: is this reflected in labor supply?
- Estimate:

$$Y_{iet} = \alpha + \sum_k \beta_k I_k + \gamma_t + \phi_e + \epsilon_{iet} \tag{1}$$

- $\gamma_t$, $\phi_e$ are time and high education dummy (less than 12 years or 12 years and more)
- $I_t$ is the interaction between year $t$ and higher education level
- base level is 2006

# Female Hours Worked By Schooling




Average work hours by employed women aged 25 - 44 by years of education
Data source: CASEN

# Marriage Rates By Female Schooling

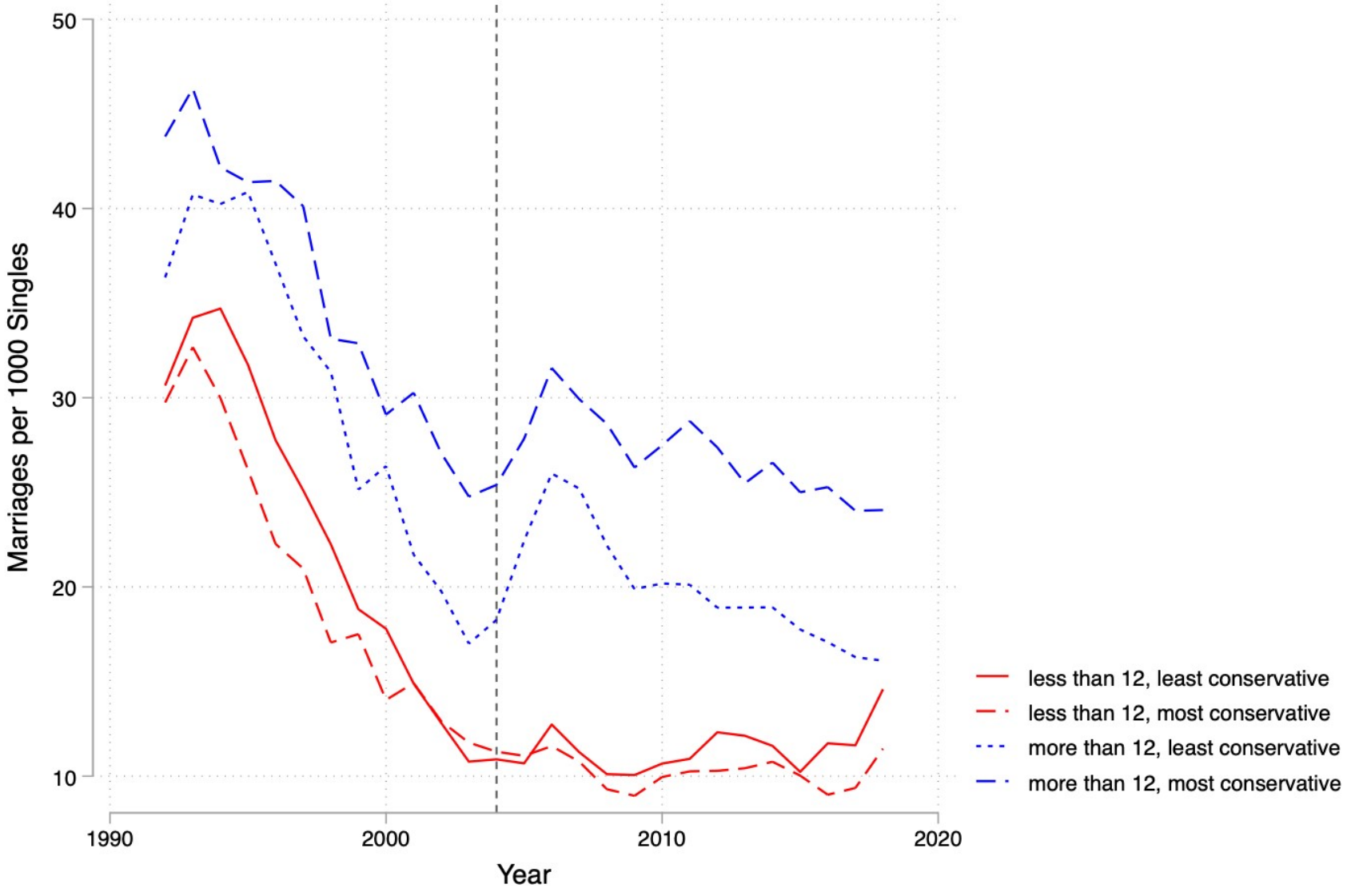


Table 1: Pre-law treatment vs. control group characteristics

| | Full sample | | | Between 20-29 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Below college | | | College | | | Bel | |
| Variable | CP | SP | Diff | CP | SP | Diff | CP | SP | Diff | CP | |
| Observations: Individuals | 986 | 176 | – | 251 | 25 | – | 76 | 37 | – | 524 | |
| Age in 2004 (mean) | 35.90 | 35.45 | 0.45 | 30.14 | 29.32 | 0.82 | 29.55 | 30.51 | -0.96** | 38.85 | 3 |
| Number of children (mean) | 2.03 | 1.27 | 0.76*** | 1.58 | 1.33 | 0.25 | 1.14 | 1.23 | -0.09 | 2.62 | |
| Tax. earnings (AD), employed (mean) | 204.69 | 343.72 | -139.03*** | 156.84 | 175.90 | -19.06 | 247.91 | 345.82 | -97.91** | 148.73 | 2 |
| Tax. earnings (AD), employed (median) | 162.00 | 258.25 | -96.25*** | 145.00 | 175.00 | -30.00 | 204.00 | 278.50 | -74.50 | 145.00 | 2 |
| Hours worked (EPS), employed (mean) | 43.66 | 42.82 | 0.84 | 44.67 | 45.00 | -0.33 | 42.40 | 43.73 | -1.33 | 44.06 | 4 |
| Own education: college (%) | 21.40 | 56.82 | -35.42*** | - | - | - | - | - | - | - | |
| Partner education: college (%) | 24.77 | 68.27 | -43.50*** | 22.80 | 40.00 | -17.20 | 55.74 | 77.27 | -21.54* | 14.94 | 5 |
| Non-positive assets (%) | 17.18 | 19.53 | -2.35 | 22.50 | 29.41 | -6.91 | 13.73 | 24.00 | -10.27 | 15.93 | 1 |
| Positive assets $<$ median (%) | 43.46 | 27.34 | 16.12*** | 45.00 | 17.65 | 27.35** | 45.10 | 32.00 | 13.10 | 46.37 | 3 |
| Positive assets $\geq$ median (%) | 39.36 | 53.13 | -13.77*** | 32.50 | 52.94 | -20.44* | 41.18 | 44.00 | -2.82 | 37.70 | 5 |
| Formally employed (AD) (%) | 27.99 | 45.45 | -17.46*** | 25.10 | 20.00 | 5.10 | 40.79 | 45.95 | -5.16 | 21.56 | 3 |
| Employed (EPS) (%) | 43.64 | 61.36 | -17.72*** | 37.35 | 28.00 | 9.35 | 52.63 | 59.46 | -6.83 | 41.49 | 6 |
| Attends church (%) | 13.03 | 12.58 | 0.45 | 12.17 | 10.00 | 2.17 | 4.35 | 12.12 | -7.77 | 14.34 | 1 |

*Notes*: Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data: Encuesta de Protección Social (EPS) and Chilean administrative records of formal employment from the Instituto Nacional de Estadísticas (INE). The sample consists of married women aged 20–39 years who were married in 2000.

# Empirical model: dynamic DiD

$$Y_{it} = \alpha + \phi_{CP} + \gamma_t + \beta_t CP_i + \varepsilon_{it} \tag{2}$$

where:

- Sample is women in EPS survey married by 2000, stratified by education and age groups
- $CP_i$ identifies women married under community property
- $Y_{it}$ is a formal employment dummy, in month $t \in [01/2000, 12/2015]$
- $\phi_{CP}$ and $\gamma_t$ are group and month fixed effects
- standard errors are clustered at the individual and month level.

# Evidence from marriage matches

# Winners and Losers in the Marriage Market

- Use Choo and Siow (2006)'s framework to interpret marital sorting patterns in terms of changes in marital surplus.
- Apply static framework to three points in time (1993, 2003, 2013) to analyze the pre-2004 marriage decline and post-2004 trend break
    - pre-trend: 2003-1993
    - trend break: (2013-2003)-(2003-1993)

# Choo and Siow (2006) framework:

- Static, frictionless, transferable utility model of the marriage market
- Produces nonparametric marriage matching function and estimates of the gains from marriage
- Spillover effects:
    - Number of matches between two types affected by supply of partners of all types
- Only data needed is population vectors and realized matches.

# Model

- Extreme-value random utility model. Let utility of male $g$ of type $i$ who marries female of type $j$ be

$$V_{ijg} = \tilde{\alpha}_{ij} - \tau_{ij} + \epsilon_{ijg}$$

- where $\tilde{\alpha}_{ij}$ is the systematic gross return to marriage of type $ij$, $\tau_{ij}$ is equilibrium transfer from type-$i$ male to type-$j$ female and $\epsilon_{ijg}$ is iid random shock specific to $g$

# Model

- Payoff to $g$ from remaining unmarried is

$$V_{iog} = \tilde{\alpha_{io}} + \epsilon_{iog}$$

- Male $g$ will choose to marry one of $J$ types or stay single according to:

$$V_{ig} = \max_{j}\{V_{iog}, V_{i1g}, ..., V_{iJg}\}$$

- Dynamic extension (Choo, 2015) accounts for option value of remaining single one more period (but marriage is an absorbing state)

# Model

- When all $I \times J$ sub-marriage markets clear, we obtain the marriage matching function:

$$\Pi_{ij} = \frac{\mu_{ij}}{\sqrt{\mu_{io}\mu_{oj}}}$$

where $\mu_{ij}$ is the number of $ij$ marriages, $\{\mu_{io}, \mu_{oj}\}$ are the stock of singles and $\ln \Pi_{ij} = \pi_{ij}$ is the total systematic gain to marriage per partner relative to remaining unmarried.

# Model

- In addition to $\pi_{ij}$ we can also identify the systematic net gains to marriage for type-*i* man and type-*j* woman separately:

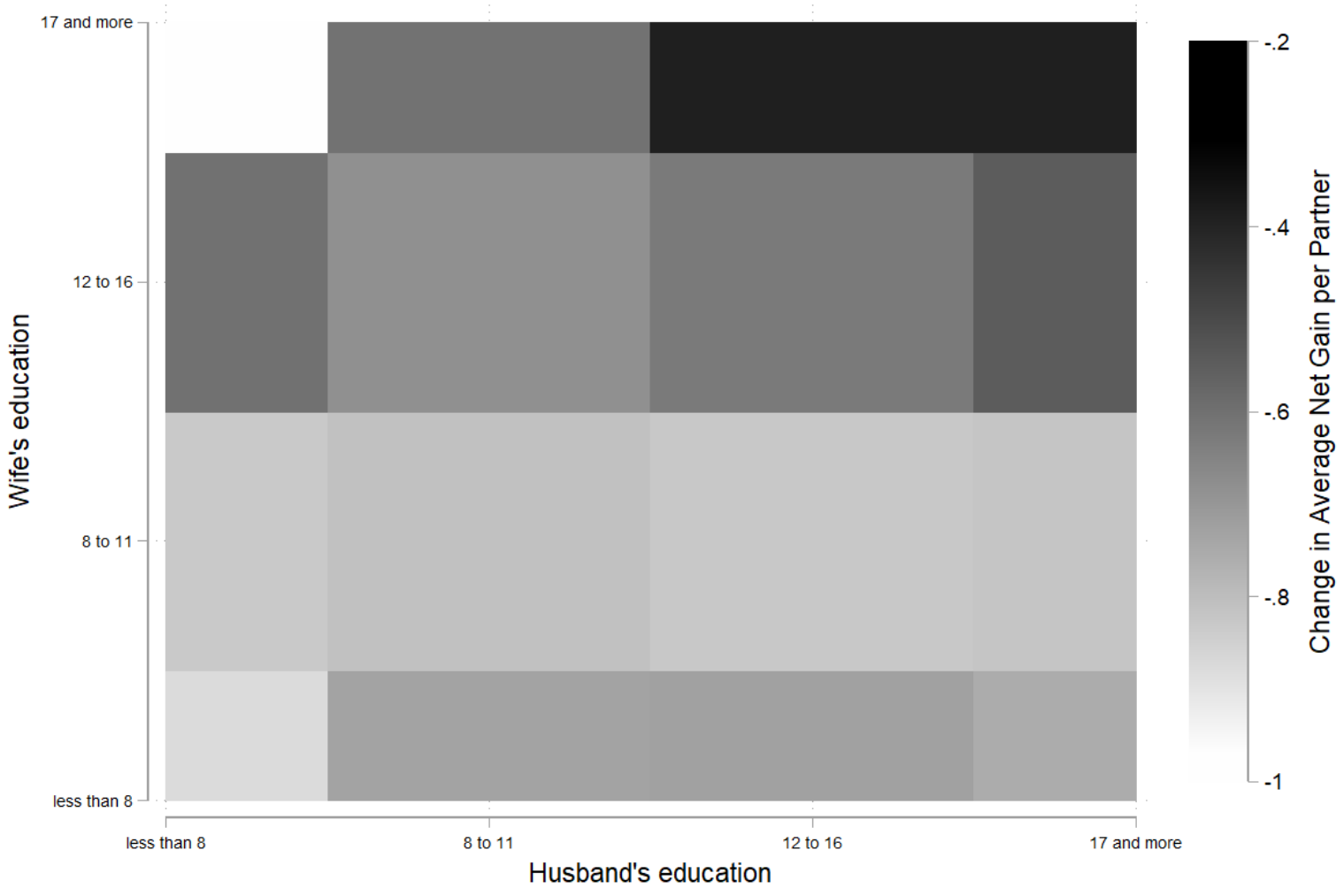
$$\ln\left(\frac{\mu_{ij}}{\mu_{io}}\right) = \alpha_{ij} - \tau_{ij}$$
$$\ln\left(\frac{\mu_{ij}}{\mu_{oj}}\right) = \gamma_{ij} + \tau_{ij}$$

- where $\alpha_{ij} = \tilde{\alpha_{ij}} - \tilde{\alpha_{io}}$ is the systematic gross return to type-*i* man relative to being unmarried (analogously for type-*j* woman $\gamma_{ij}$)

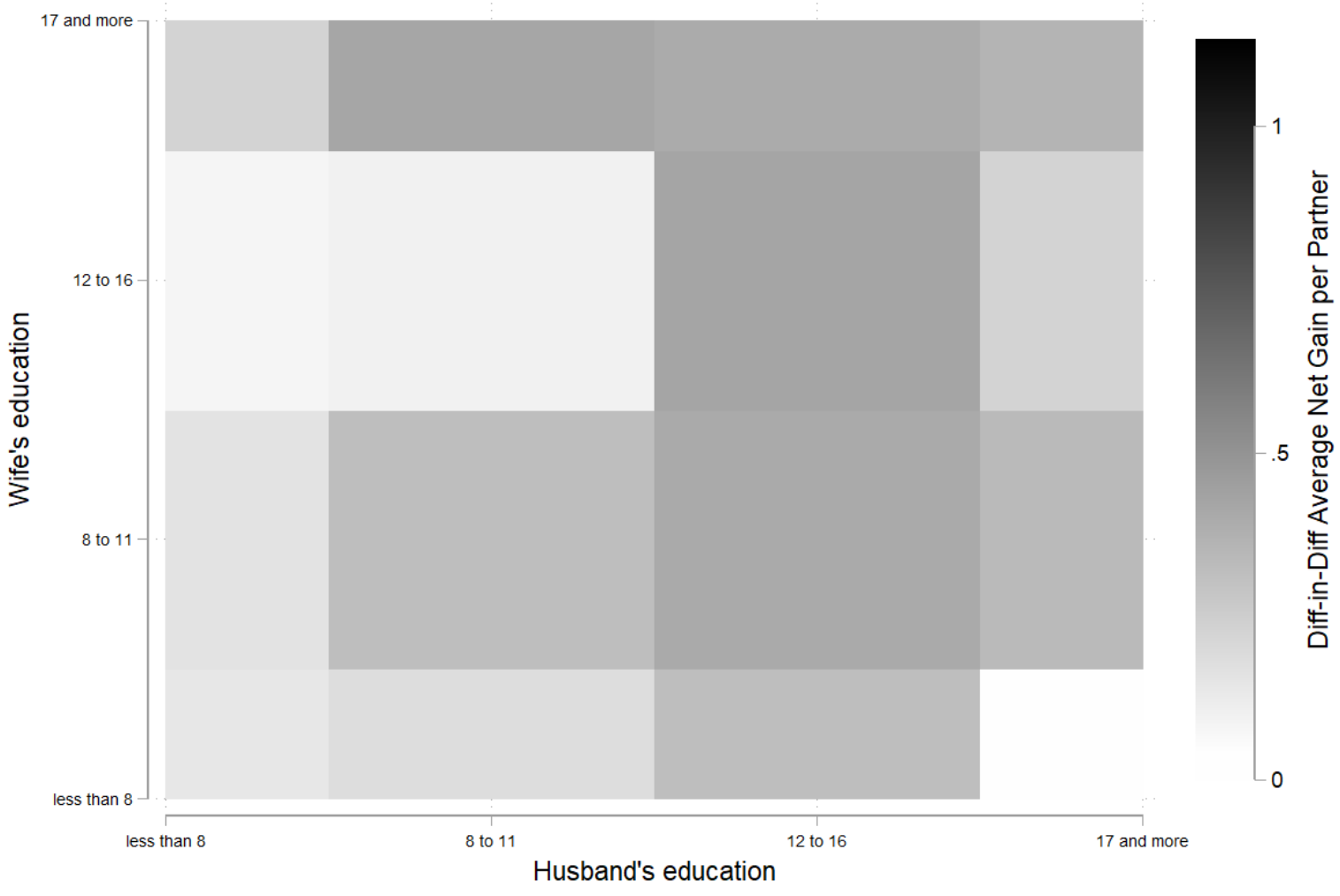
# Empirical implementation

- Compute flow of new marriages for each pairs of age groups and schooling levels ($\{\mu_{ij}\}$) in 1993, 2003 and 2013 using Civil registry records
  - Actually combine 3 years of data around each date to better capture smaller cells
- Stocks of singles ($\{\mu_{io}\}$, $\{\mu_{oj}\}$) computed from cross-section household survey CASEN (eventually will use census data)
- Then construct systematic gains from marriage $\pi_{ij}$ and wife's share of gains $w_{ij} = \frac{\gamma_{ij}}{\pi_{ij}}$

# Pre-Trends in Gains from Marriage By Schooling ($\pi_{ij}^{03}$-$\pi_{ij}^{93}$)



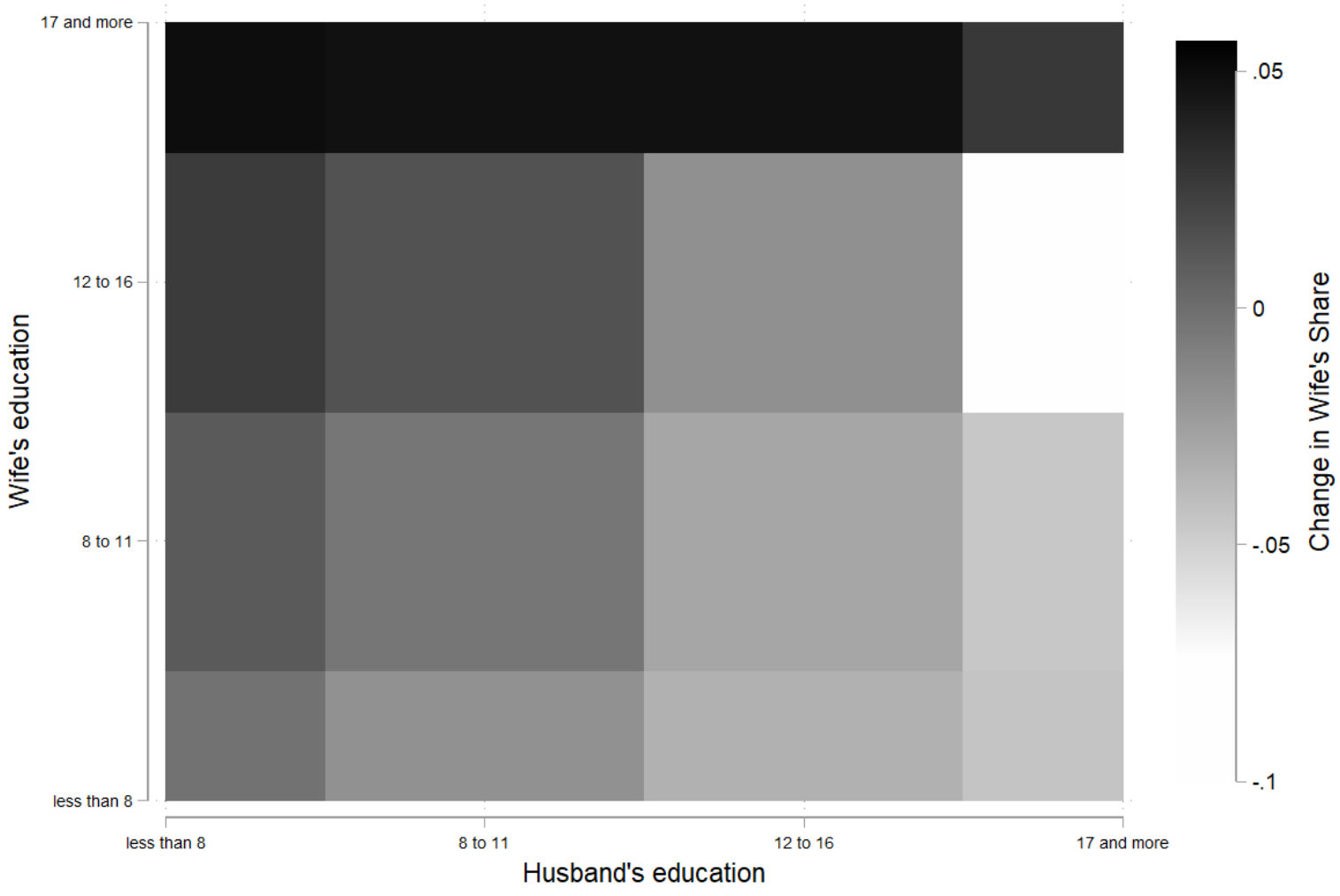
# Trend Break in Gains from Marriage By Schooling $(\pi_{ij}^{13}-\pi_{ij}^{03})-(\pi_{ij}^{03}-\pi_{ij}^{93})$



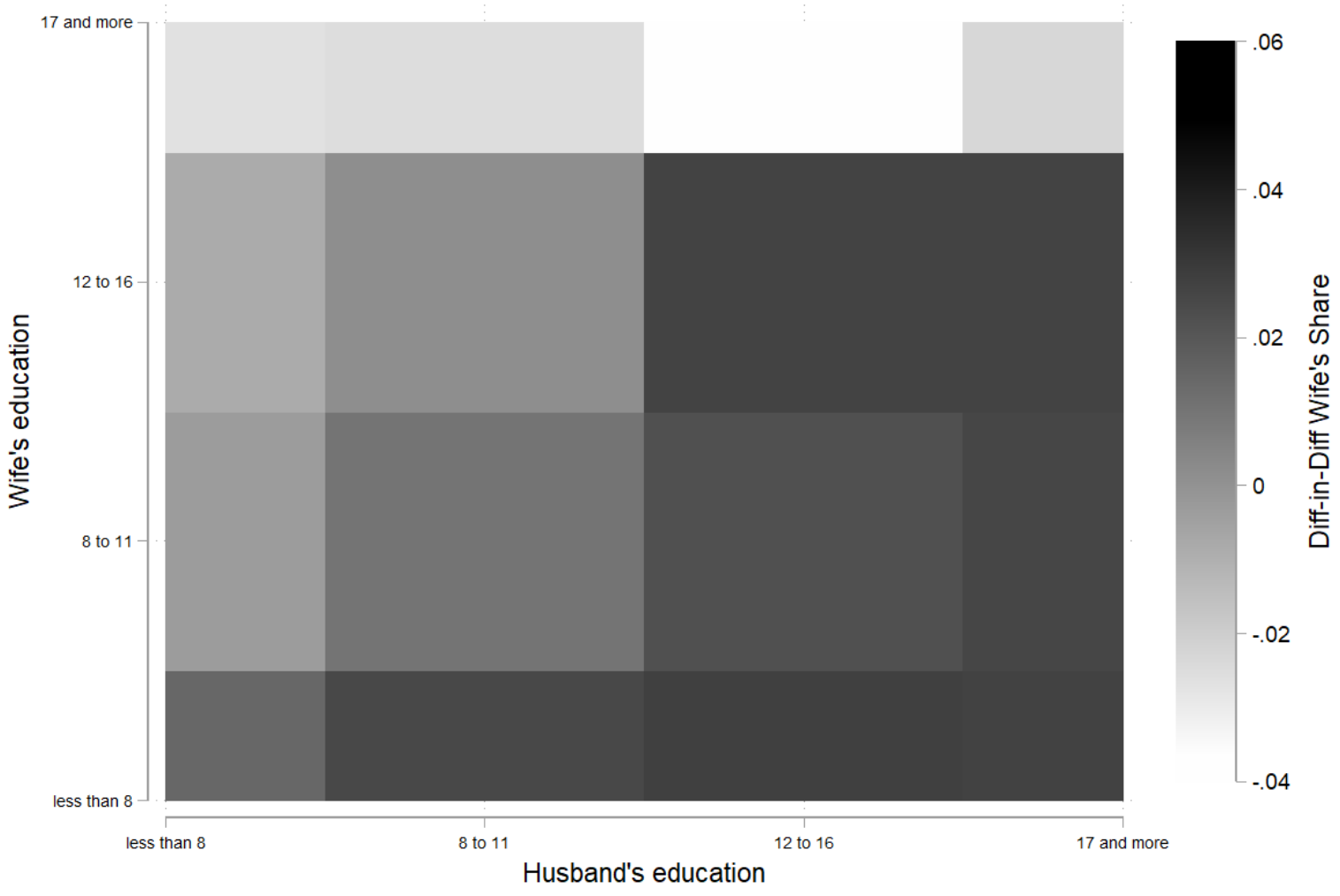
## Results Summary: Changes to marital surplus by Schooling

1. 1993-2003 trend:
    - Marital gains decline but less for highly educated couples
    - Consistent with the reduction in marriage rates and increase in assortative mating found in the U.S. literature
2. After legalization:
    - Marital gains increase for all, more so for couples with educated husbands and very educated wives.
    - Liu (2020) and Reynoso (2020) link some of the increase in assortative mating, singlehood to unilateral divorce legislation.

# Pre-Trends in Wife's Share By Schooling ($w_{ij}^{03}$-$w_{ij}^{93}$)



# Trend Break in Wife's Share By Schooling $(w_{ij}^{13}-w_{ij}^{03})-(w_{ij}^{03}-w_{ij}^{93})$



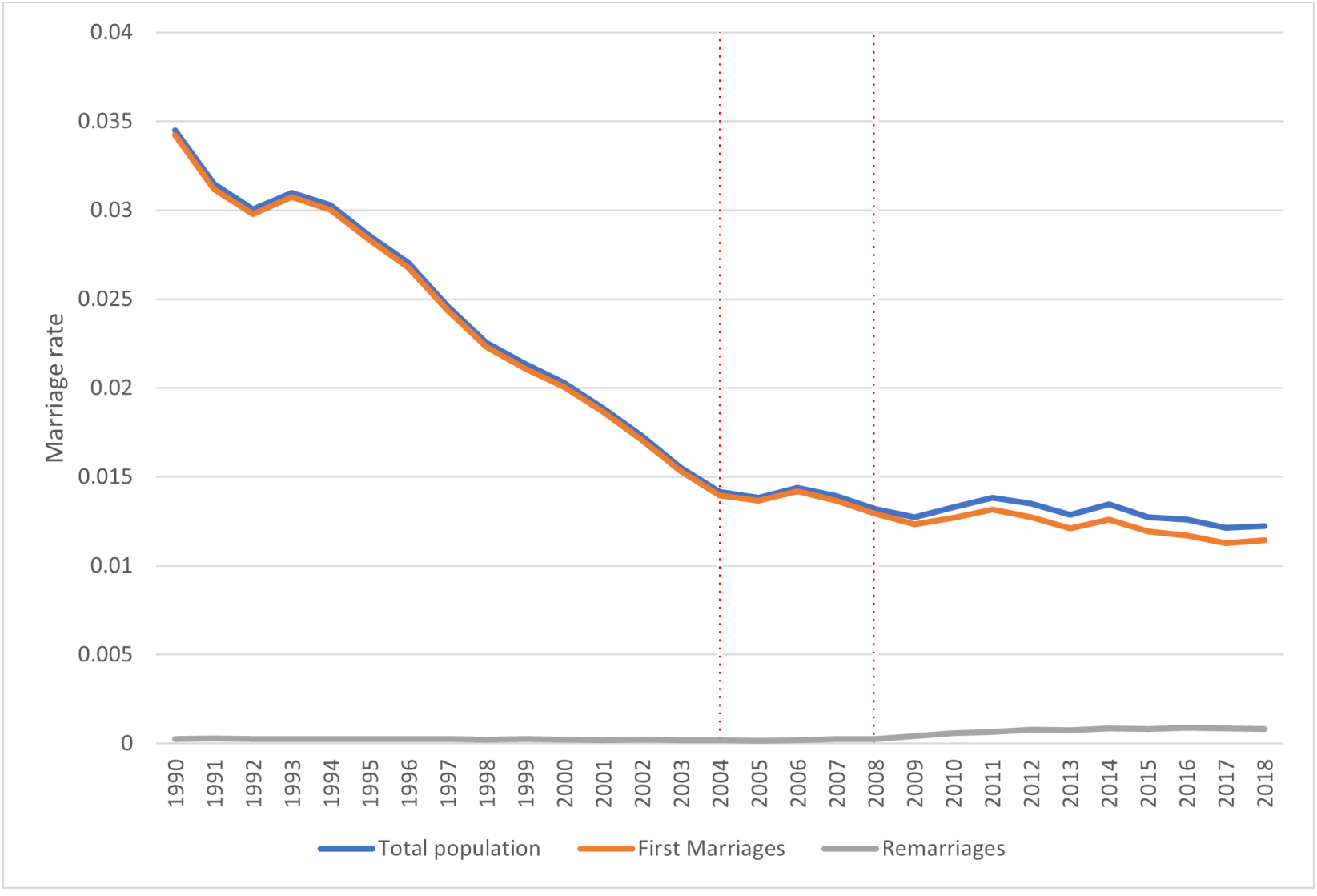
## Results Summary: Wive's share by Schooling

1. 1993-2003 trend:
    - Distribution of gains shifts towards more educated partner (could reflect growing skill premium (Parro and Reyes, 2017)
2. After legalization:
    - Distribution of gains shifts towards less educated partner (Homemaker provision)
    - Consistent with literature: easier access to divorce (Stevenson and Wolfers, 2003; Corradini and Buccione, 2023) , stronger alimony provision (Rangel, 2006) and more favorable asset division rules (Chigavazira et al., 2019, Huang et al. 2023) shift bargaining power to women.

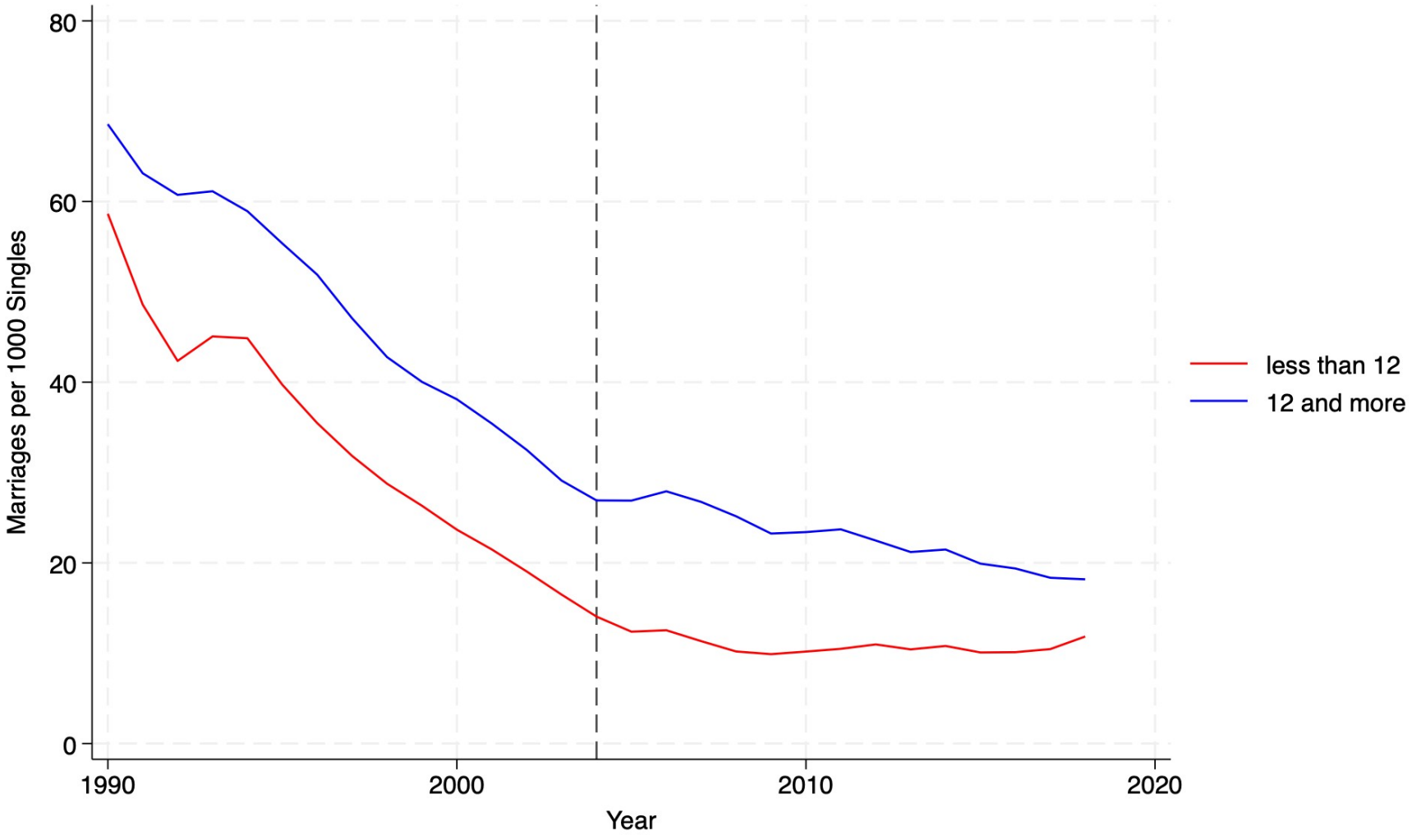
# Data sources

1. Panel Household survey (EPS)
    - Marital histories 2000-2015
    - Information on asset regime
    - Linked administrative pension contribution information: complete formal labor history and earnings.
2. Cross-sectional survey (CASEN)
    - Use it to obtain population series by schooling and marital status
3. Civil registry: births and marriages 1990-2020

# Marriage Rates



# Marriage Rates By Female Schooling



# Husband's Schooling By Bride's Schooling

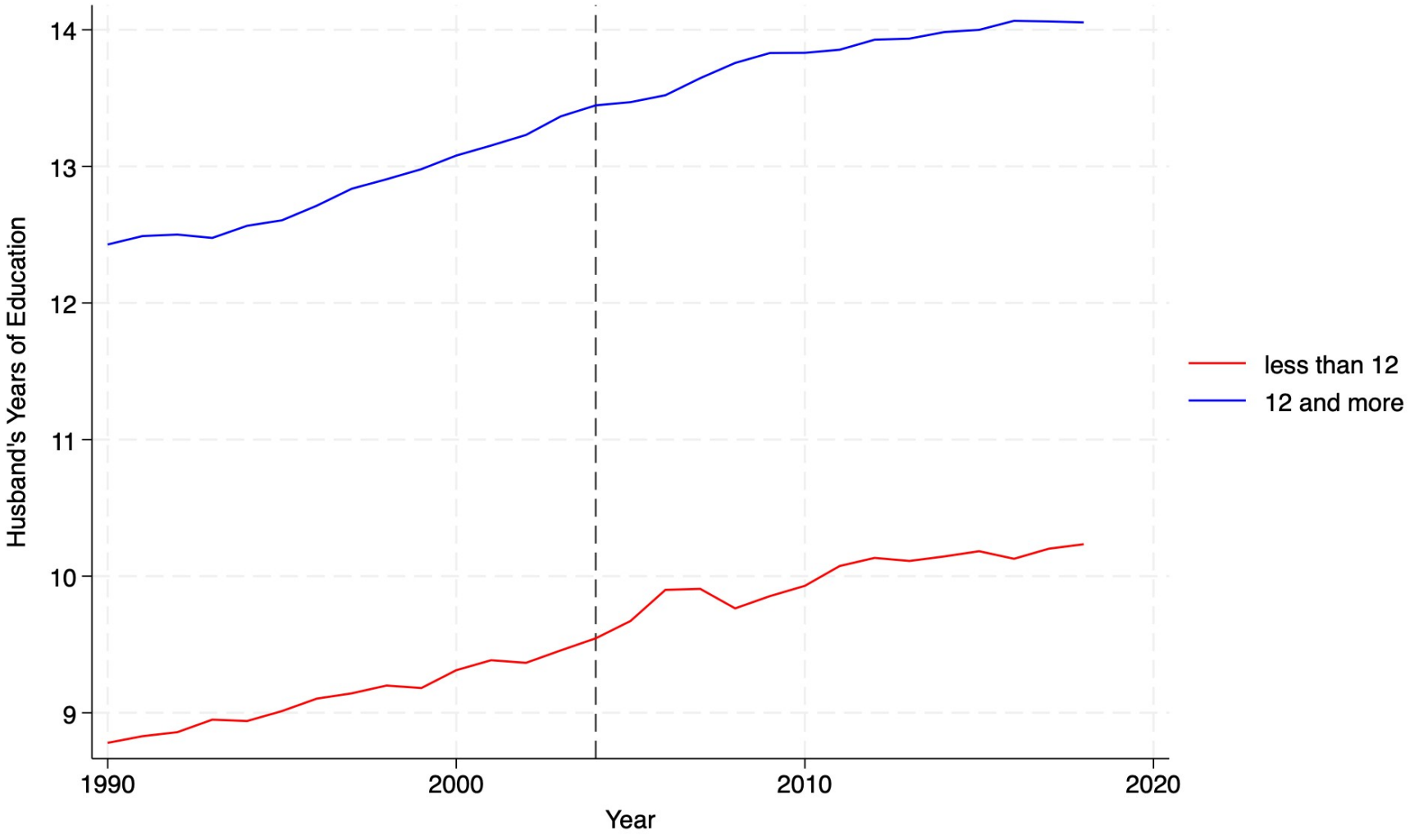
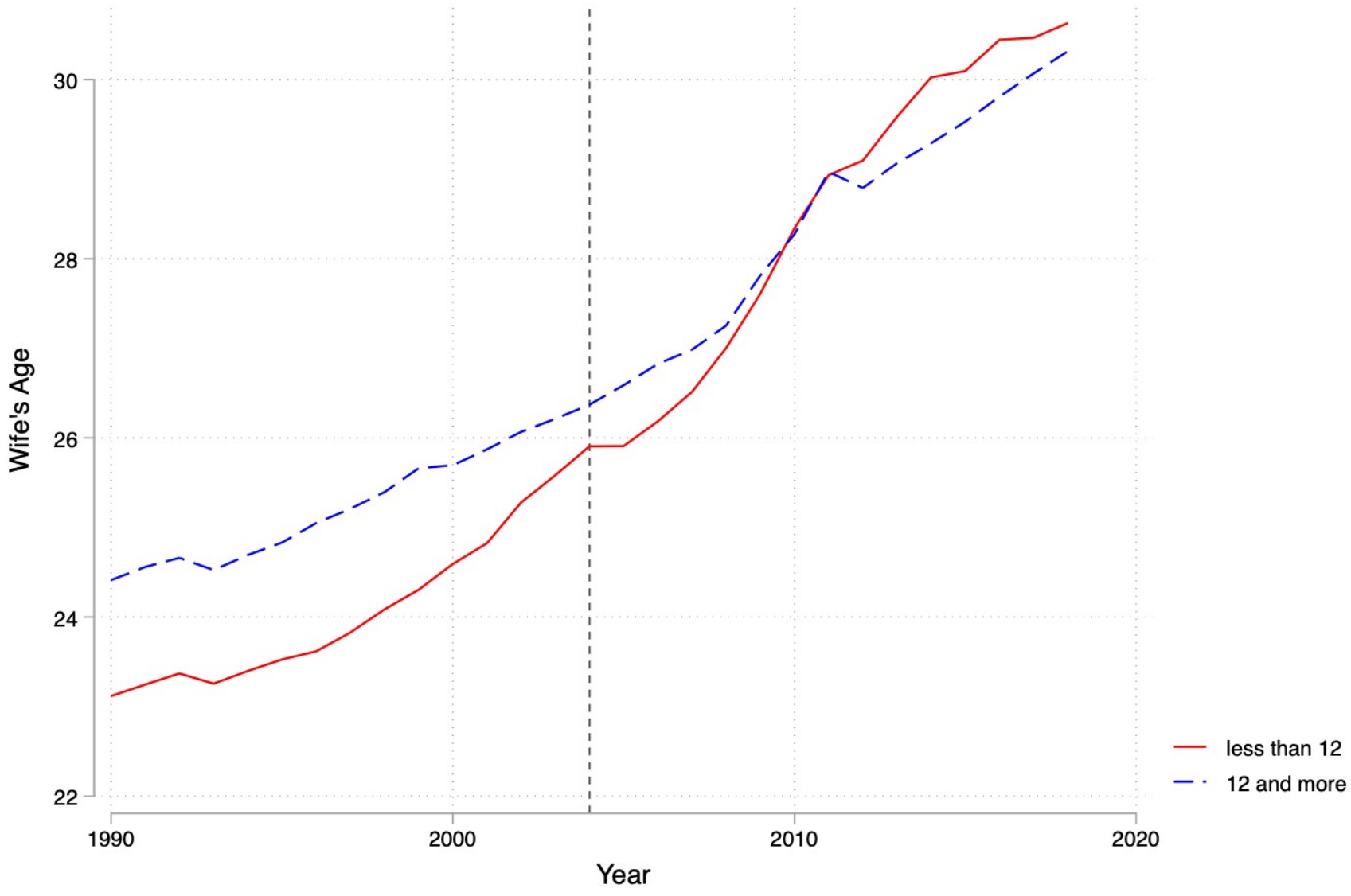
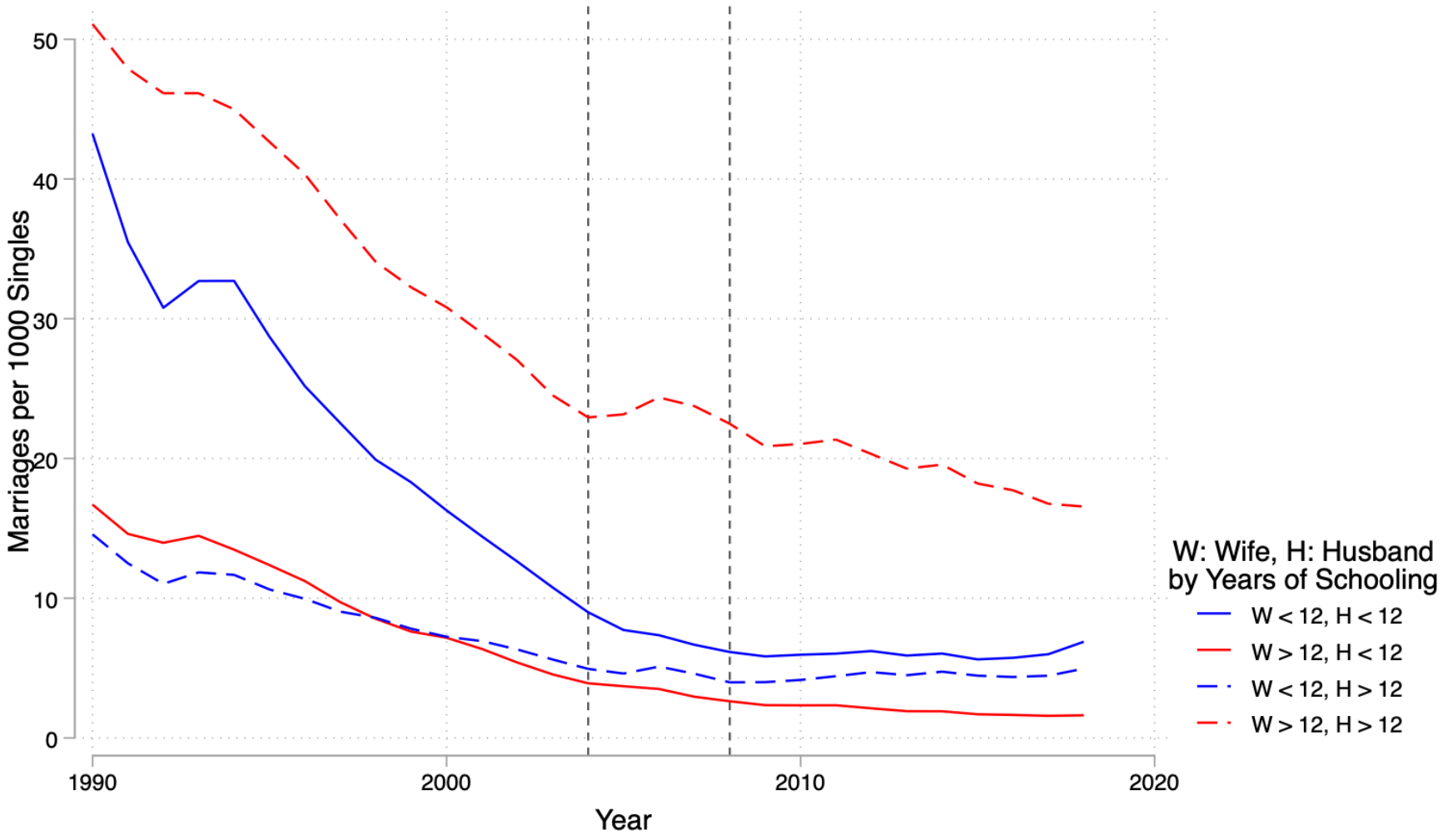



Figure 1: Enter Caption

# Heterogeneity: Age at marriage by schooling



# Heterogeneity: Marriage Rates By Female and Male Schooling




Note: Marriage rates computed as number of marriages over number of single females by schooling level.
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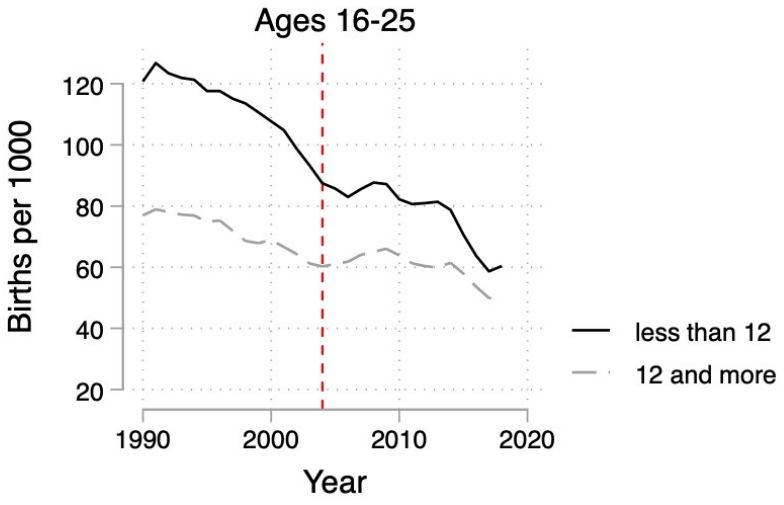
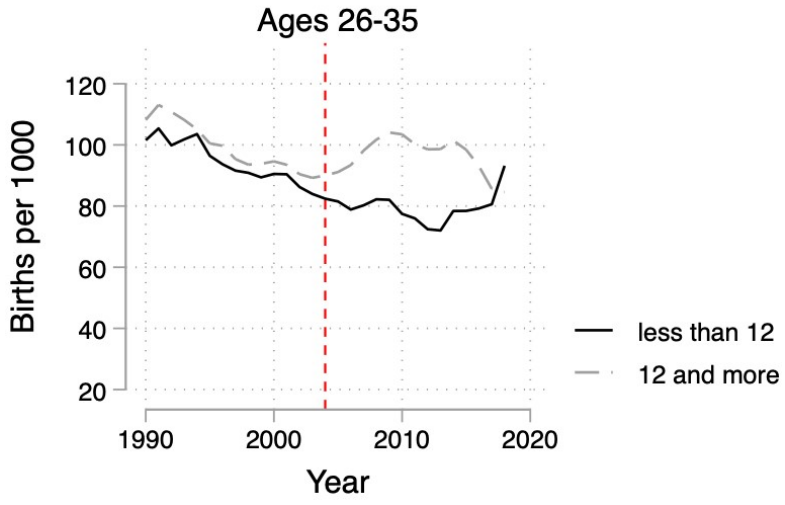
# Fertility Rates By Female Age and Schooling



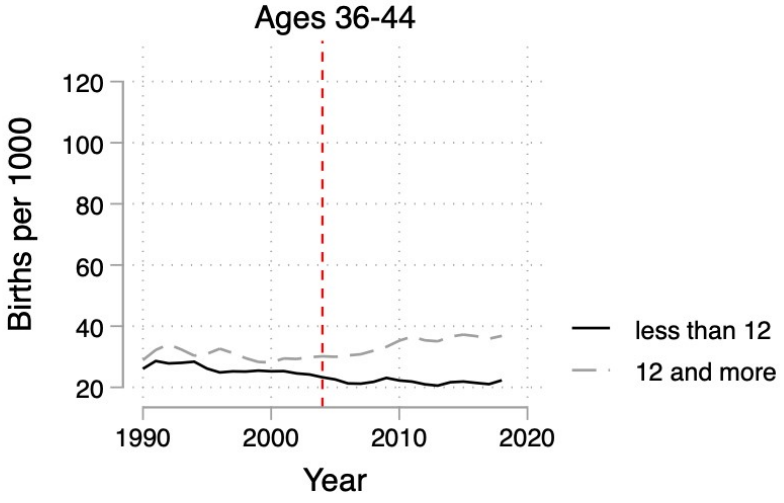
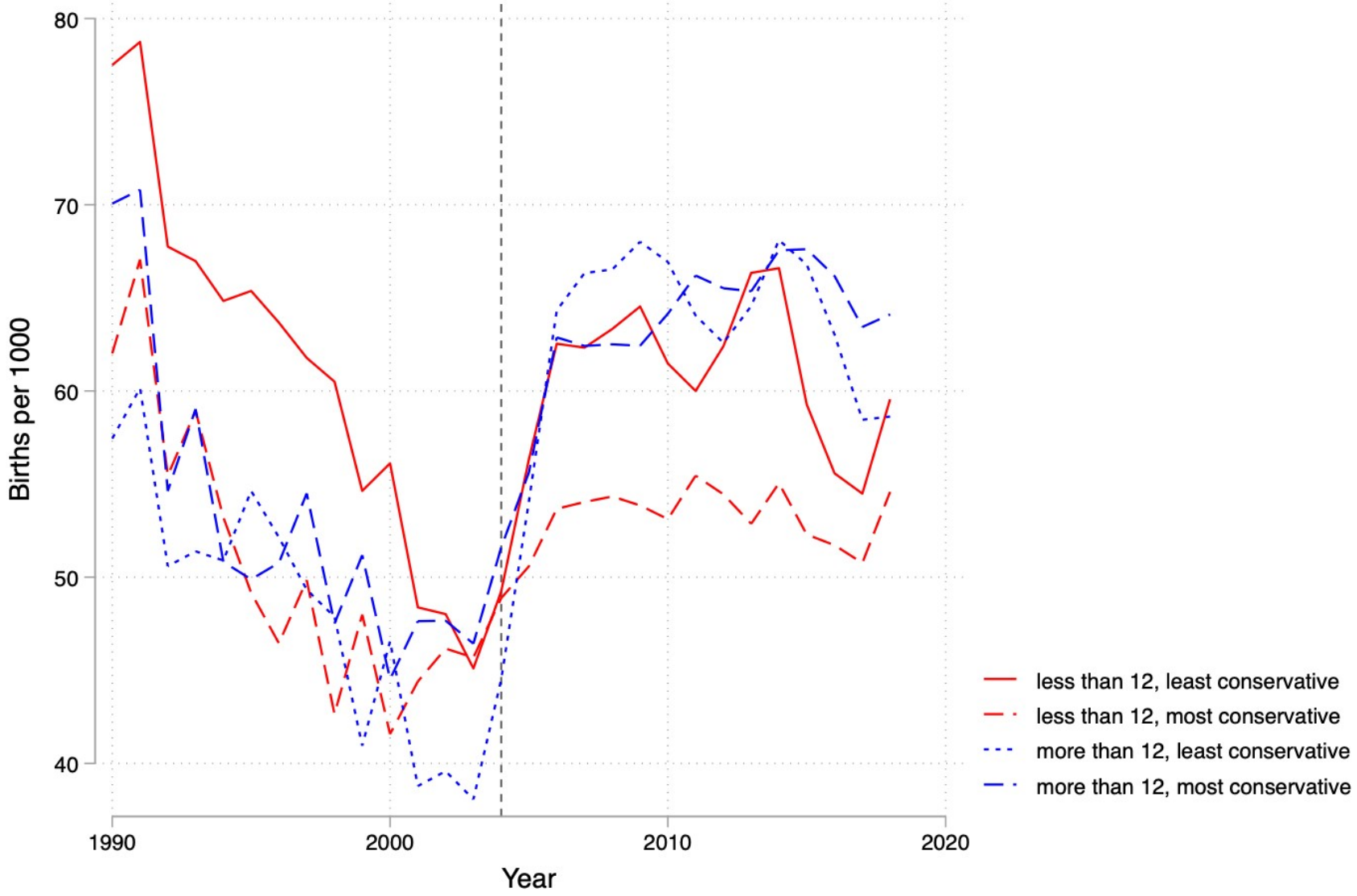






Figure 2: Enter Caption

# Birth Rates by Schooling and Municipality Conservative Vote Share



# Age Difference in marriages