# Income and Fertility in Couples:

# New Evidence from Longitudinal Tax Data in Tuscany

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# Motivation & Aim

✓ **Context**

**1.** Historically negative income-fertility link, turning positive at macro/micro-level (van Wijk 2024; Hart 2015): Also for women?

**2.** Reversal in education gaps; more dual-earner couples and women breadwinners (van Babel 2012; Kowalewska & Vitali 2020)

**3.** Increasing economic prerequisites for parenthood (van Wijk & Billari 2024) → €640/month per child (¼ family budget in Italy)

✓ **Motivation → Contributions**

**1. SES:** Few (micro) papers on income, most on education/employment (Scherer & Brini 2023; Alderotti et al. 2021; Nitsche et al. 2021)

**2. Data:** Cross-sectional data and completed fertility → reverse causality (child penalty) (Kleven et al., 2025; Kolk, 2022)

**3. Countries:** Focus on *gender-equal* Northern Europe countries (Jalovaara & Miettinen, 2013; Hart, 2015; van Wijk, 2024)

**4. Assortative Mating:** Both partners' joint economic resources influencing fertility decisions (Nitsche, 2024)

✓ **Aim:** Income → Transition to Parenthood (1st child)

- by: Sex, Assortative Mating, Period

# Competing Theories & Hypotheses

## A. *Couple Role Specialization* (Becker 1991)

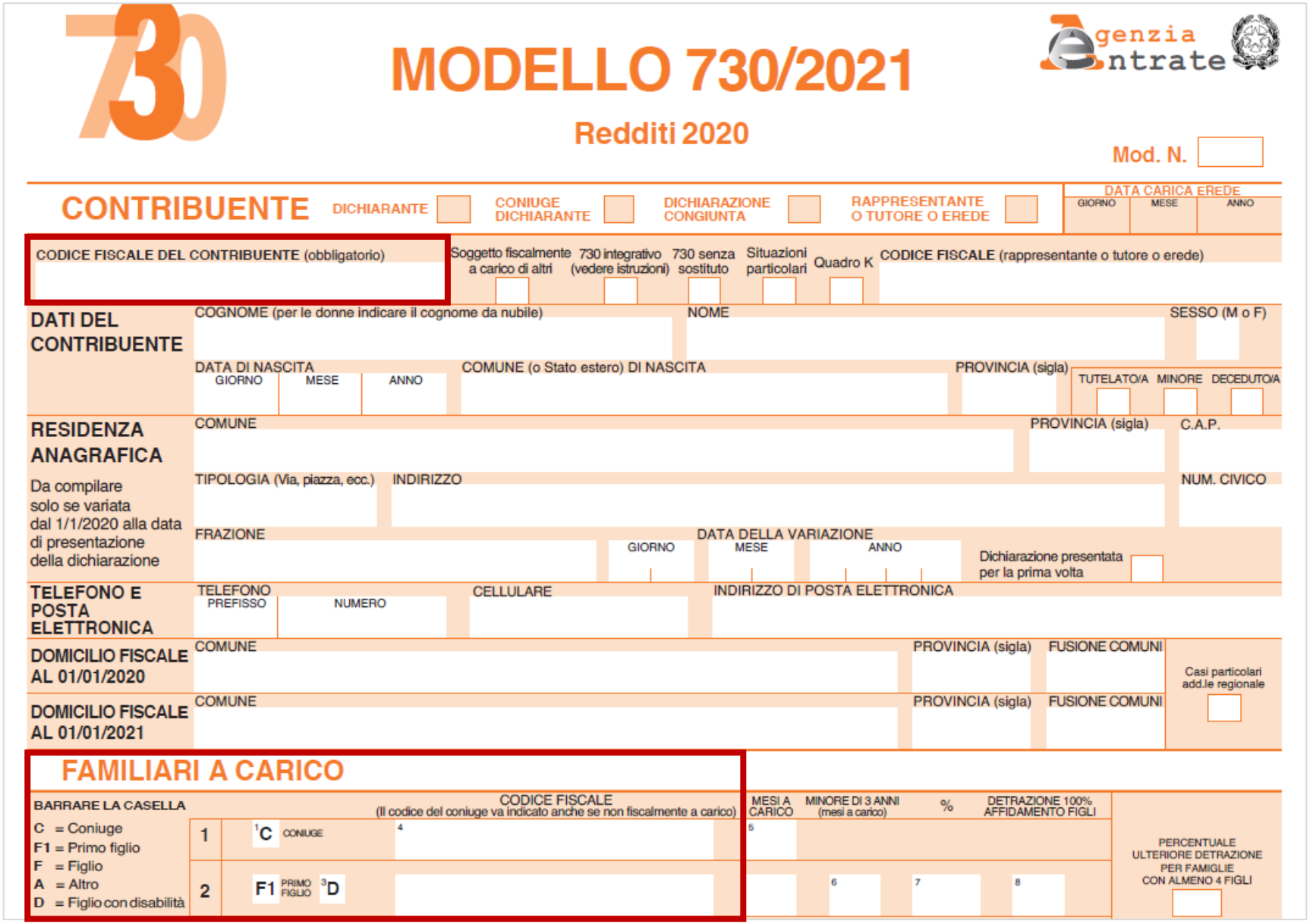
- ✓ The higher the women income → the higher the (career) opportunity costs of childbearing
- ✓ Gendered roles → Women's specialization in unpaid domestic labor + childcare; Men's specialization in market work
- ✓ Women's opportunity costs > Men's

## B. *Couple Resource Pooling* (Oppenheimer 1994)

- ✓ More shared/pooled resources → Less financial instability for either partner
- ✓ Outsourcing domestic and childcare services → Childrearing + career development
- ✓ *Gender Revolution* (Esping-Andersen and Billari, 2015) → Public/private gender equity (dual-earners; equal income contribution)

| Income → 1st Child | H1. Gendered Sign | H2. Trends | H3. Assortative Mating |
|---|---|---|---|
| ***A. Role Specialization*** | Negative for women, positive for men | Stable over time | Hypergamous couples (e.g., man earns more) have the highest transition to parenthood |
| **B. *Resource Pooling*** | Positive for women/men | Increasing over time | High-income homogamous couples have the highest transition rates to parenthood |

# Data



730

MODELLO 730/2021

Redditi 2020

Agenzia Entrate

Mod. N.

CONTRIBUENTE DICHIARANTE | CONIUGE DICHIARANTE | DICHIARAZIONE CONGIUNTA | RAPPRESENTANTE O TUTORE O EREDE

DATA CARICA EREDE — GIORNO | MESE | ANNO

CODICE FISCALE DEL CONTRIBUENTE (obbligatorio)

Soggetto fiscalmente a carico di altri | 730 integrativo (vedere istruzioni) | 730 senza sostituto | Situazioni particolari | Quadro K

CODICE FISCALE (rappresentante o tutore o erede)

DATI DEL CONTRIBUENTE

COGNOME (per le donne indicare il cognome da nubile) | NOME | SESSO (M o F)

DATA DI NASCITA — GIORNO | MESE | ANNO | COMUNE (o Stato estero) DI NASCITA | PROVINCIA (sigla) | TUTELATO/A | MINORE | DECEDUTO/A

RESIDENZA ANAGRAFICA

Da compilare solo se variata dal 1/1/2020 alla data di presentazione della dichiarazione

COMUNE | PROVINCIA (sigla) | C.A.P.

TIPOLOGIA (Via, piazza, ecc.) | INDIRIZZO | NUM. CIVICO

FRAZIONE | DATA DELLA VARIAZIONE — GIORNO | MESE | ANNO | Dichiarazione presentata per la prima volta

TELEFONO E POSTA ELETTRONICA

TELEFONO — PREFISSO | NUMERO | CELLULARE | INDIRIZZO DI POSTA ELETTRONICA

DOMICILIO FISCALE AL 01/01/2020

COMUNE | PROVINCIA (sigla) | FUSIONE COMUNI | Casi particolari add.le regionale

DOMICILIO FISCALE AL 01/01/2021

COMUNE | PROVINCIA (sigla) | FUSIONE COMUNI

FAMILIARI A CARICO

BARRARE LA CASELLA

C = Coniuge
F1 = Primo figlio
F = Figlio
A = Altro
D = Figlio con disabilità

| | | CODICE FISCALE (Il codice del coniuge va indicato anche se non fiscalmente a carico) | MESI A CARICO | MINORE DI 3 ANNI (mesi a carico) | % | DETRAZIONE 100% AFFIDAMENTO FIGLI |
|---|---|---|---|---|---|---|
| 1 | 1 C CONIUGE | 4 | 5 | | | |
| 2 | F1 PRIMO FIGLIO 3 D | | | 6 | 7 | 8 |

PERCENTUALE ULTERIORE DETRAZIONE PER FAMIGLIE CON ALMENO 4 FIGLI

# Data and Methods

## Data

- Population tax panel data (2003-2022) on individual income tax returns (*Irpef:* 2004-2023) in Tuscany (N = 2.7 million)
- Fiscal family members (spouses + children) identified by linked IDs (*Codice Fiscale*)
- Dyadic balanced panel (2005-2022) of married couples
  - 1.4 million person-years from 161,948 married couples (women aged 18-50)
  - At least one spouse submits a tax return in 2022, and the other between 2003-2022
  - Married individuals must declare the spouse in the tax return, regardless of work status
  - Joint retrospective fiscal observation window for both spouses (from "fiscal marriage")

| Average | Married Couples | |
|---|---|---|
| | Husband | Wife |
| Birth Year | 1971 | 1975 |
| Age at 1st Birth | 36 | 33 |
| Child Birth Year | 2013 | |
| Real Gross Income (t-2) | €21,040 | €13,278 |
| Yearly Income Decile | 6.1 | 4.8 |
| Couple Income Share | 62% | 38% |
| n individuals | 323,896 | |
| | 161,948 | 161,948 |
| n person-years | 1,360,154 | |
| | 680,077 | 680,077 |

- Robustness check with single/cohabitors (n=6,679,218) to account for (positive) selection into marriage/parenthood

## Models

- Discrete-time event history models with binary logistic regression

# Variables

## Income*

- Lagged ($t$-2) year-specific gross annual (labour) income deciles (zero/missing as independent category) for both spouses, winsorised at $p$99
- Income tertiles' assortative mating + sensitivity check with deciles

## Controls

- 3-year period dummies
- Tax return ($t$-2) (No; Yes: 770, 730, Unico)
- Years since "fiscal" marriage (baseline risk)
- Wife's and husband's ages at marriage
  - Single/Cohabitors: Age + Age$^2$
- Country of birth (macro regions)

## Outcome

- Transition to parenthood / 1$^{st}$ child
  - Yearly 0-1 transition

| | | **Men** | |
|---|---|---|---|
| **Women** | Bottom Tertile (1) | Medium Tertile (2) | Top Tertile (3) |
| Bottom Tertile (1) | Low Homogamy (12.8%) | | Women's Hypergamy (45.7%) |
| Medium Tertile (2) | | Medium Homogamy (12.4%) | |
| Top Tertile (3) | Women's Hypogamy (15.8%) | | High Homogamy (13.4%) |

| | **Married Couples** | **Single/Cohabitors** | |
|---|---|---|---|
| | | Men | Women |
| 1st Child (time-fixed) | 60% | 15% | 18% |
| 1st Child (time-varying) | 14% | 1.4% | 1.9% |

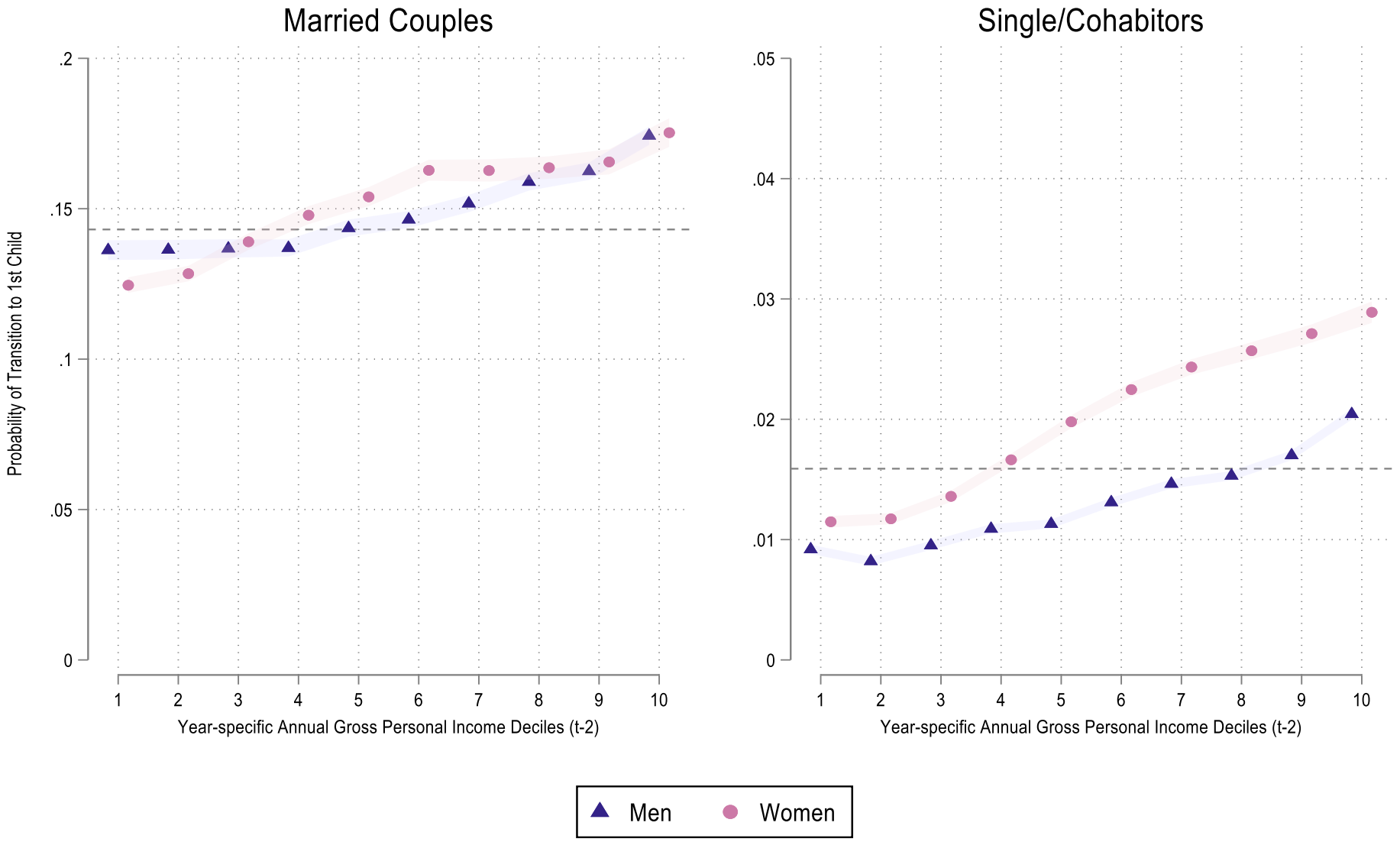
# Context: Tuscany as Central/Average Italian Region

**Summary statistics in the population (Italy and Tuscany) in 2022**

| 2022 | Italy | Tuscany |
|---|---|---|
| Population | 58,997,201 | 3,661,981 |
| Fiscal Population | 42,026,960 | 2,778,334 |
| Number of Births | 329,600 | 21,600 |
| Number of 1st Marriages | 146,205 | 8,858 |
| Total Fertility Rate (TFR) | 1.24 | 1.16 |
| GDP per Capita (x 1,000 constant euro) | 33.8 | 35.6 |
| Gross Annual Income (mean) | €22,806 | €23,204 |
| Women's Employment Rate (age 25-34) | 66% | 70% |
| Women's Inactivity Rate (age 25-34) | 34% | 24% |
| % Religious Marriages | 44% | 30% |
| % Births in Marriage | 59% | 51% |
| Women's Age at Marriage (mean) | 33.6 | 35.1 |
| Mother's Age at 1st Birth (mean) | 32.4 | 32.7 |

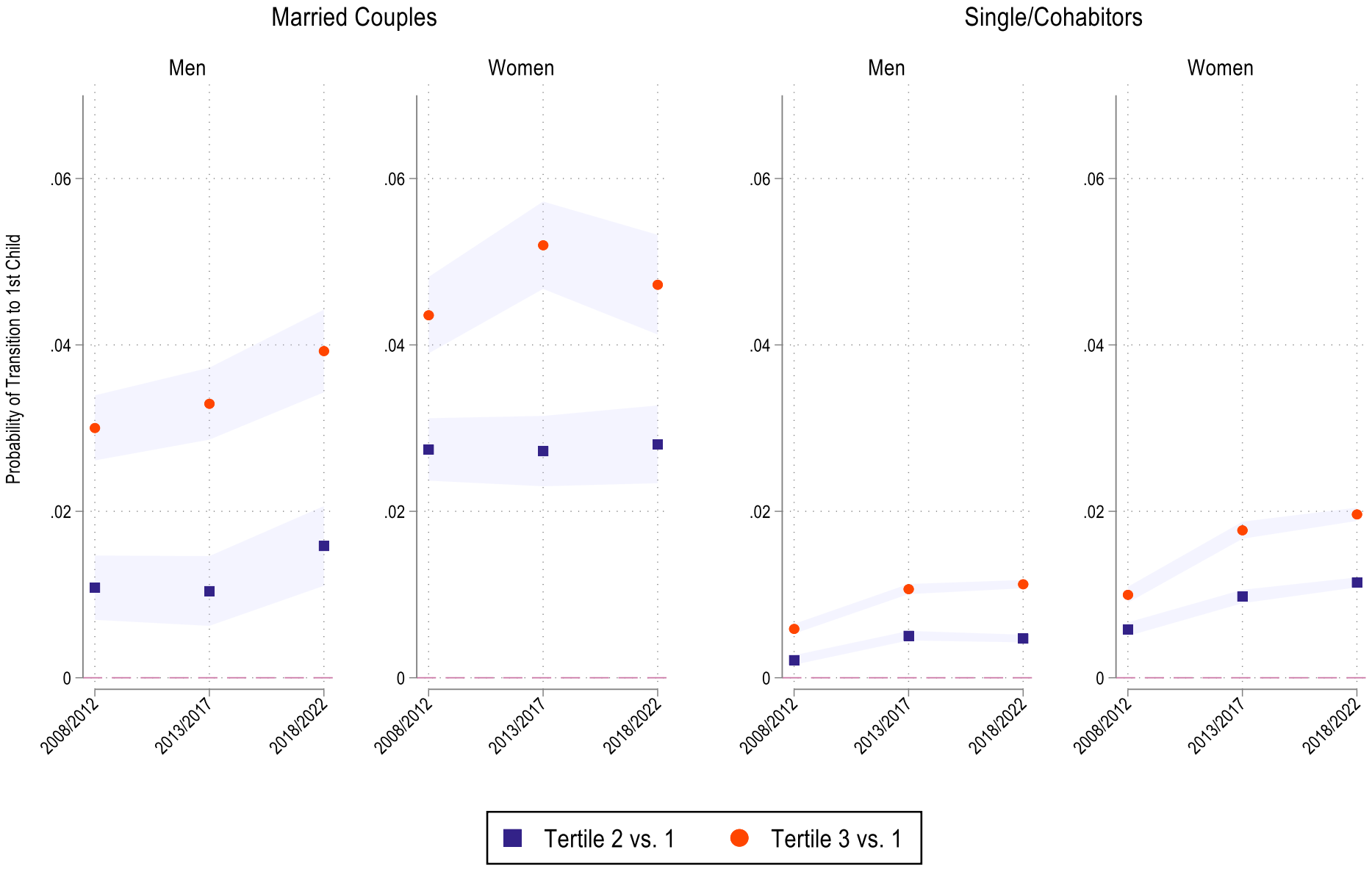
Source: Regione Toscana, Ufficio Regionale di Statistica (2022); Istat (2022).

# Findings *H1b*: Positive Income-Fertility Link by Gender

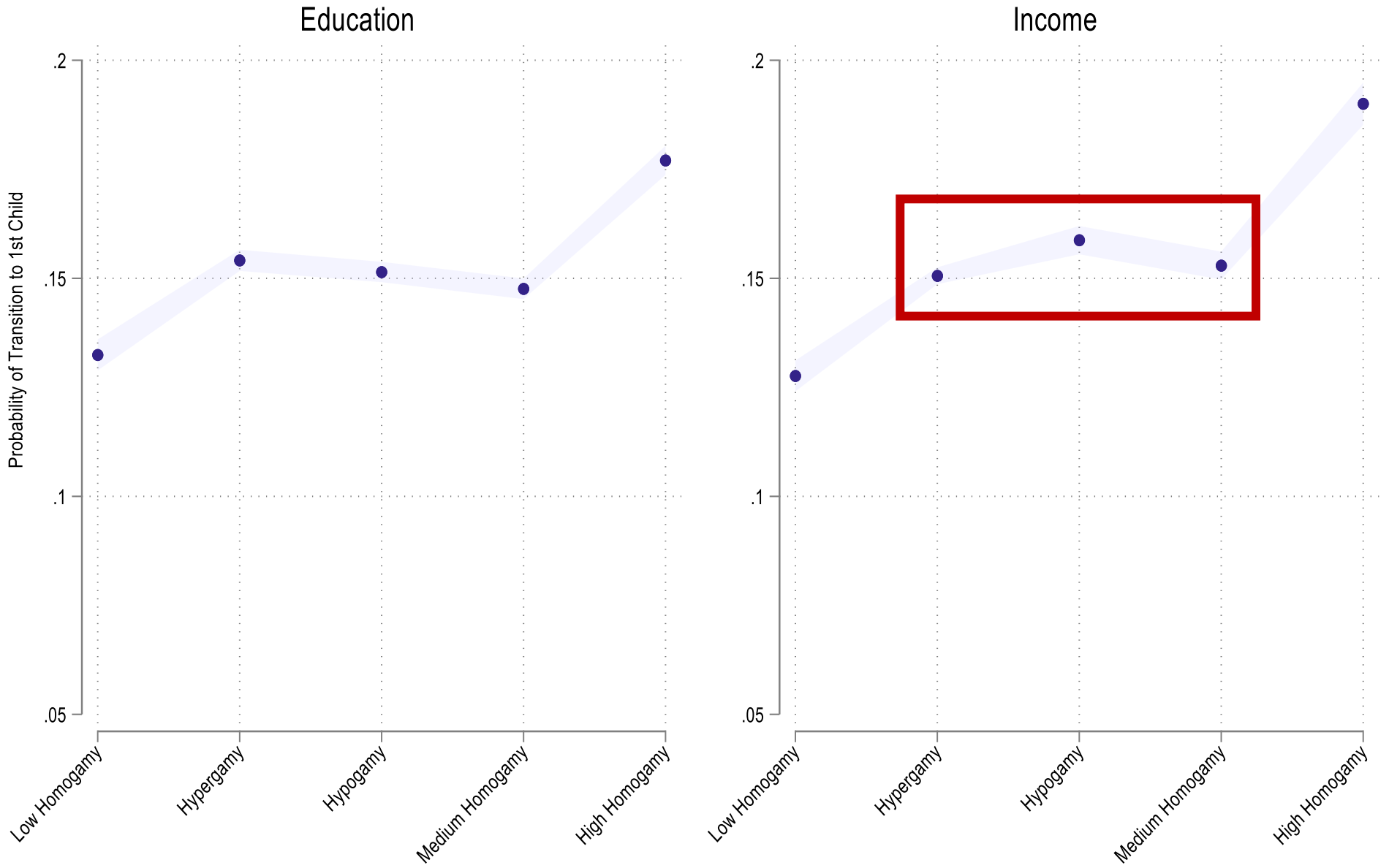



*Controls:* wife and husband age at marriage, time from marriage, wife and husband country of birth, wife and husband tax return (t-2), and calendar year-group dummies.

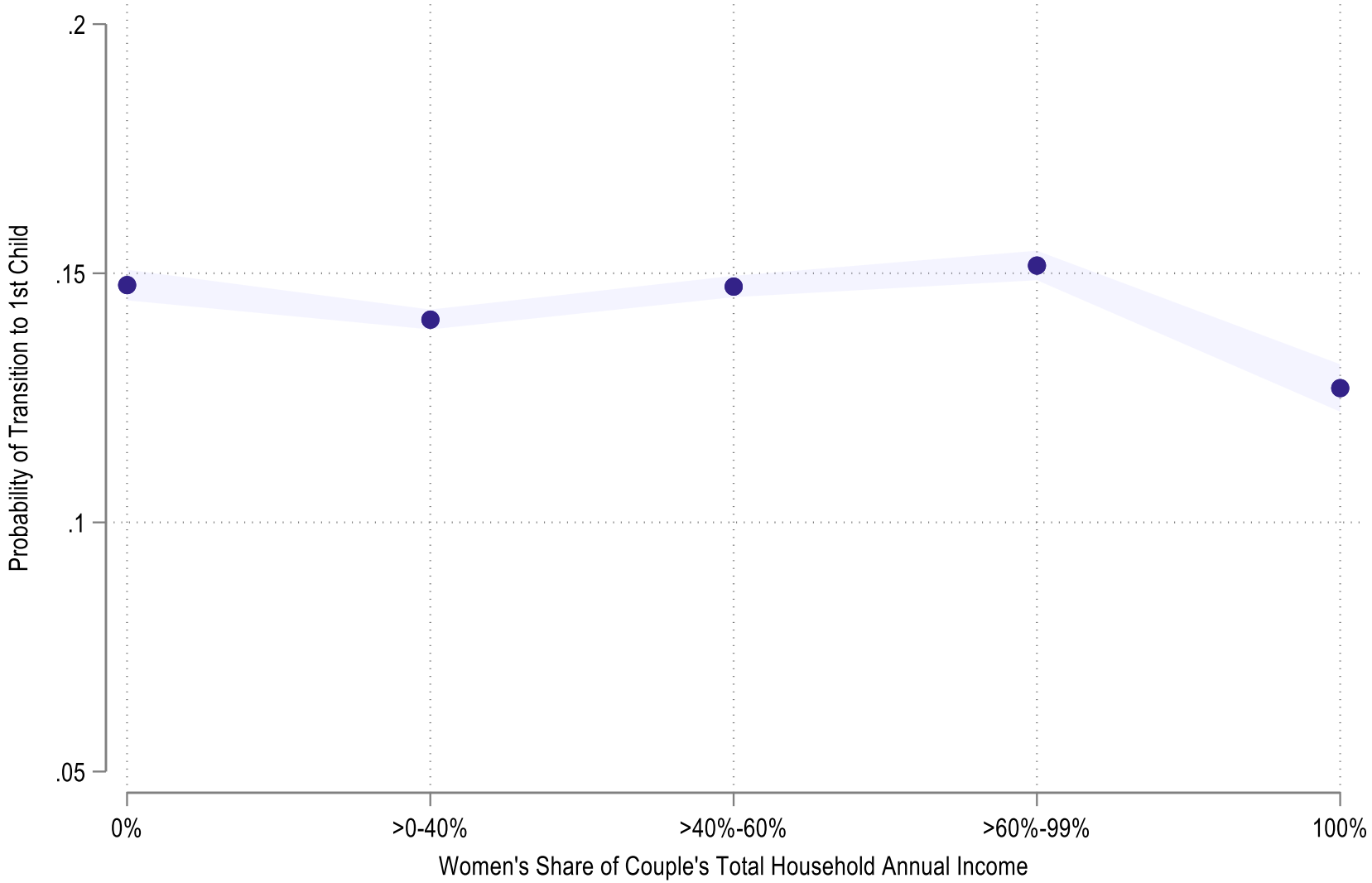
# Findings *H2b*: Trends



# Findings *H3b*: Assortative Mating and Income Pooling



# RC: Relative Income




Controlling for total married couple's income year-specific deciles

# Conclusion

## Findings

- ***H1b.* Income-fertility by Sex:** Men's/women's incomes ≈ *linearly* increase first birth rates → ***Resource pooling***
- ***H2b.* Trends:** This positive link grew slightly stronger in 2010s → ***Rising economic parenthood prerequisites?***
- ***H3b.* Assortative mating:** High-income couples → highest 1st child transition → ***Challenge traditional sex roles***

## Implications

- **Women's income effect reversed:** Even among married couples in Italy (lower-bound), a stronghold of traditional family roles (Tuscany as a mean region) → Private externalisation of house/child-care compensating weak social policy?
- **Fertility stratification:** (Growing) Income inequality raise barriers to parenthood

# Limitations

- **Timing / Probability?** → Income gradients mainly reflect persistent probability inequalities
- **External Validity** → Findings replicated in Italy and Central regions with panel EU-SILC data
- **Selection bias** → Married couples selection on traditional values/income (men) → Robustness check with single/cohabitors despite low baseline (single) + FE-model (isolating childbearing risk)
- **Confounders** → Yet robust to controls: education, tax return and zero/missing income (employment status) + Fixed Effects models (time-constant confounding)
- **Underreported men income from capital** (financial) **+ self-employment** (*economia sommersa*) → female hypogamy *bias?* Control for tax return type and robustness check by deciles

# Thanks for your attention! ☺

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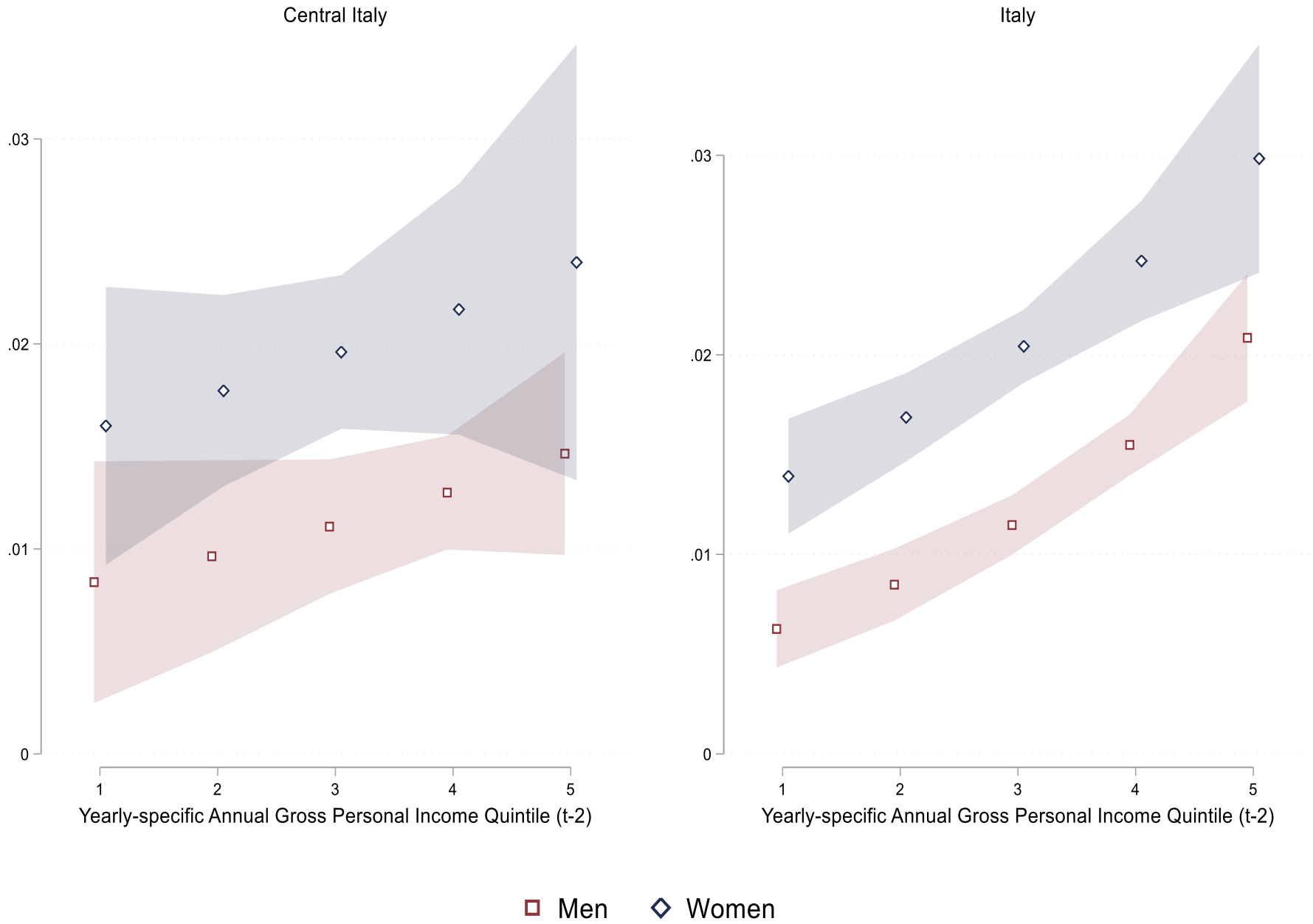
**Table A.2.** Summary statistics (mean) and sample size (2005-2022)

| Person-years | Married Couples | | Single/Cohabitors | | Total |
|---|---|---|---|---|---|
| | Husband | Wife | Men | Women | |
| | | | Mean | | |
| Fiscal year | 2012.8 | 2012.8 | 2014.4 | 2014.3 | |
| No Tax Return | 12.6 | 23.9 | 17.0 | 18.6 | |
| Tax Model 770 | 16.4 | 12.6 | 35.2 | 31.8 | |
| Tax Model Unico | 28.4 | 25.2 | 21.6 | 18.9 | |
| Tax Model 730 | 42.7 | 48.0 | 26.2 | 30.6 | |
| Birth Year | 1971.8 | 1975.1 | 1979.0 | 1980.5 | |
| Age | 40.9 | 37.8 | 35.4 | 33.8 | |
| Age (2022) | 50.1 | 46.9 | 42.9 | 41.5 | |
| Age at 1st Birth | 36.8 | 33.9 | 36.1 | 34.2 | |
| 1st Child Birth Year | 2013.4 | 2013.4 | 2016.5 | 2016.3 | |
| 1st Child (time-fixed-between) | 60.2% | 60.2% | 14.7% | 17.5% | |
| 1st Child (time-varying-within) | 14.3% | 14.3% | 1.4% | 1.9% | |
| Year at Fiscal Marriage | 2008.9 | 2008.9 | | | |
| Person-years | 7.5 | 7.5 | 13.8 | 12.7 | |
| n individuals (analytical sample) | 323,896 | | 664,242 | | 998,138 |
| | 32% | | 68% | | 100% |
| | 161,948 | 161,948 | 365,180 | 299,062 | |
| n person-years (analytical sample) | 1,360,154 | | 6,679,218 | | 8,039,372 |
| | 680,077 | 680,077 | 3,980,921 | 2,698,297 | |




Source: EU-SILC data – longitudinal modules (2004-2020); n=54,385. Notes: logistic discrete-time event history models; age 18-45; controls: age, age-squared, education (low, medium, high), employment status t-2 lagged (employed, unemployed, inactive).

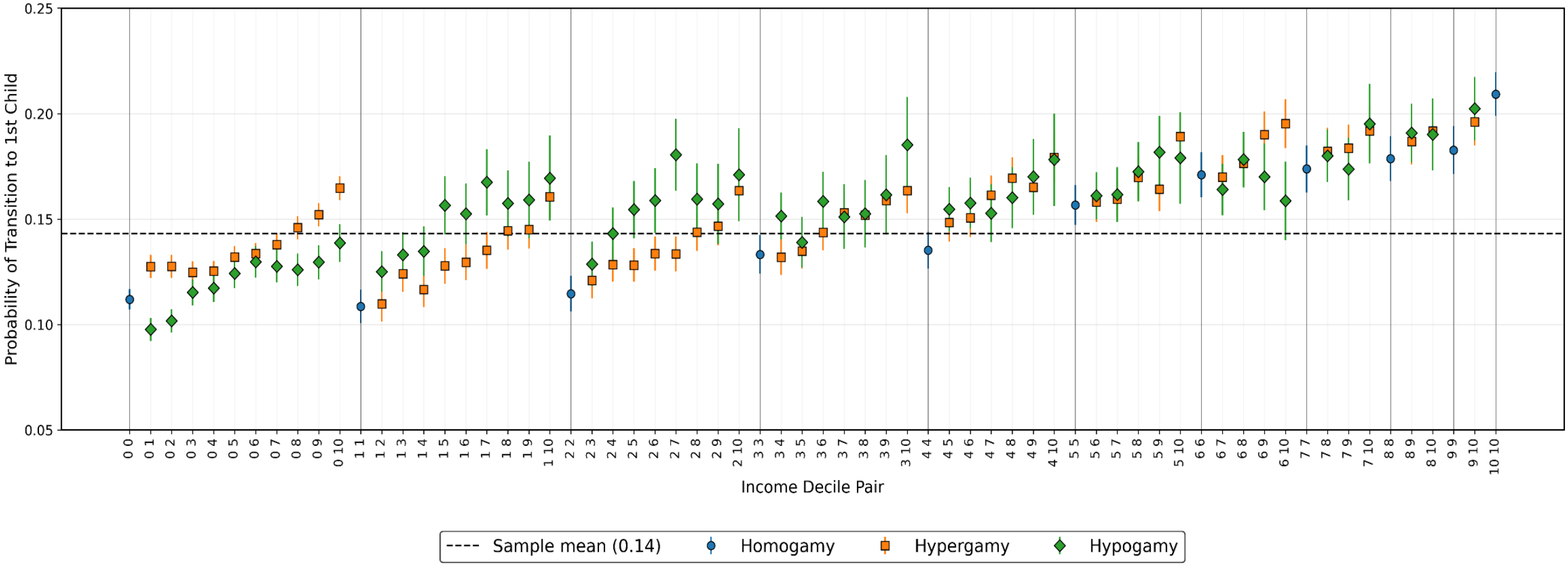
**Table 4.** Model 3B: Predicted probabilities of 1st child transition by the interaction between the wife's and husband's income tertiles in married couples (women's model: n = 680,077)

| Income Tertile | | Income Level | Coeff. | p-value | [95% conf. interval] | |
|---|---|---|---|---|---|---|
| Women | Men | | | | | |
| | | | Hypergamy | | | |
| 1 | 2 | Low-Medium | 0.133 | 0.000 | 0.130 | 0.136 |
| 1 | 3 | Low-High | 0.149 | 0.000 | 0.147 | 0.152 |
| 2 | 3 | Medium-High | 0.174 | 0.000 | 0.170 | 0.177 |
| | | | Hypogamy | | | |
| 2 | 1 | Medium-Low | 0.148 | 0.000 | 0.144 | 0.152 |
| 3 | 1 | High-Low | 0.159 | 0.000 | 0.154 | 0.165 |
| 3 | 2 | High-Medium | 0.169 | 0.000 | 0.165 | 0.174 |
| | | | Homogamy | | | |
| 1 | 1 | Low | 0.122 | 0.000 | 0.119 | 0.125 |
| 2 | 2 | Medium | 0.154 | 0.000 | 0.151 | 0.157 |
| 3 | 3 | High | 0.187 | 0.000 | 0.183 | 0.190 |

Notes: Logistic discrete-time event history model. Controls: wife and husband age at marriage, time from marriage, wife and husband country of birth, wife and husband tax return ($t_{-2}$), and calendar year-group dummies.

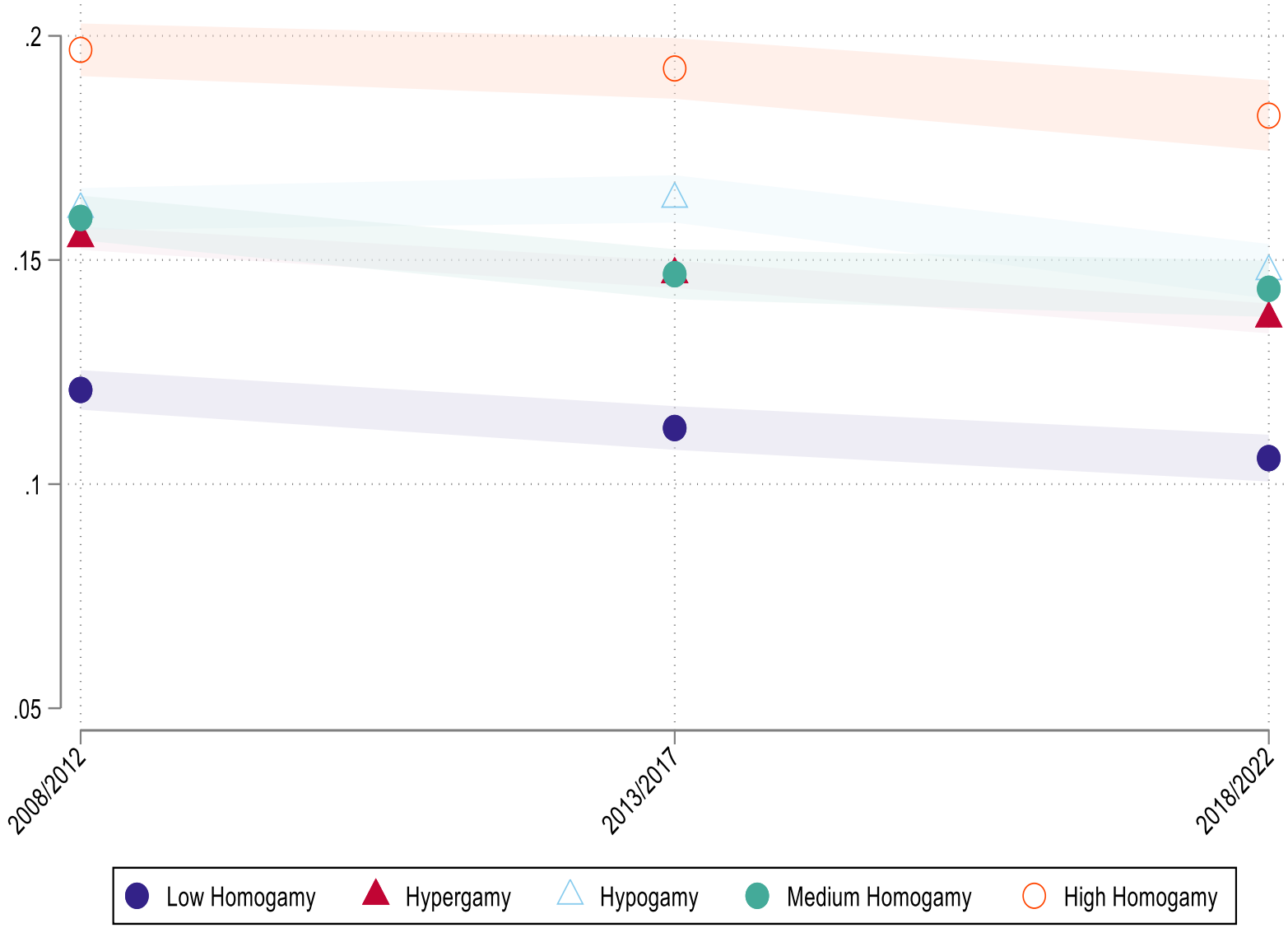
# RC: Assortative Mating by Deciles

**Figure A.3.** Model 3C: Predicted probabilities of 1st child transition by married couples' income assortative mating: year-specific income deciles wife-husband interaction




Notes: Logistic discrete-time event history model with 95% CI (women's model: n = 680,077). Controls: wife and husband age at marriage, time from marriage, wife and husband country of birth, wife and husband tax return ($t_{-2}$), and calendar year-group dummies.

# RC: Assortative Mating Trends



# Assortative Mating Distribution over Time

**Table A.3.** Couple's income (year-specific tertiles) assortative mating distribution (column %) by period

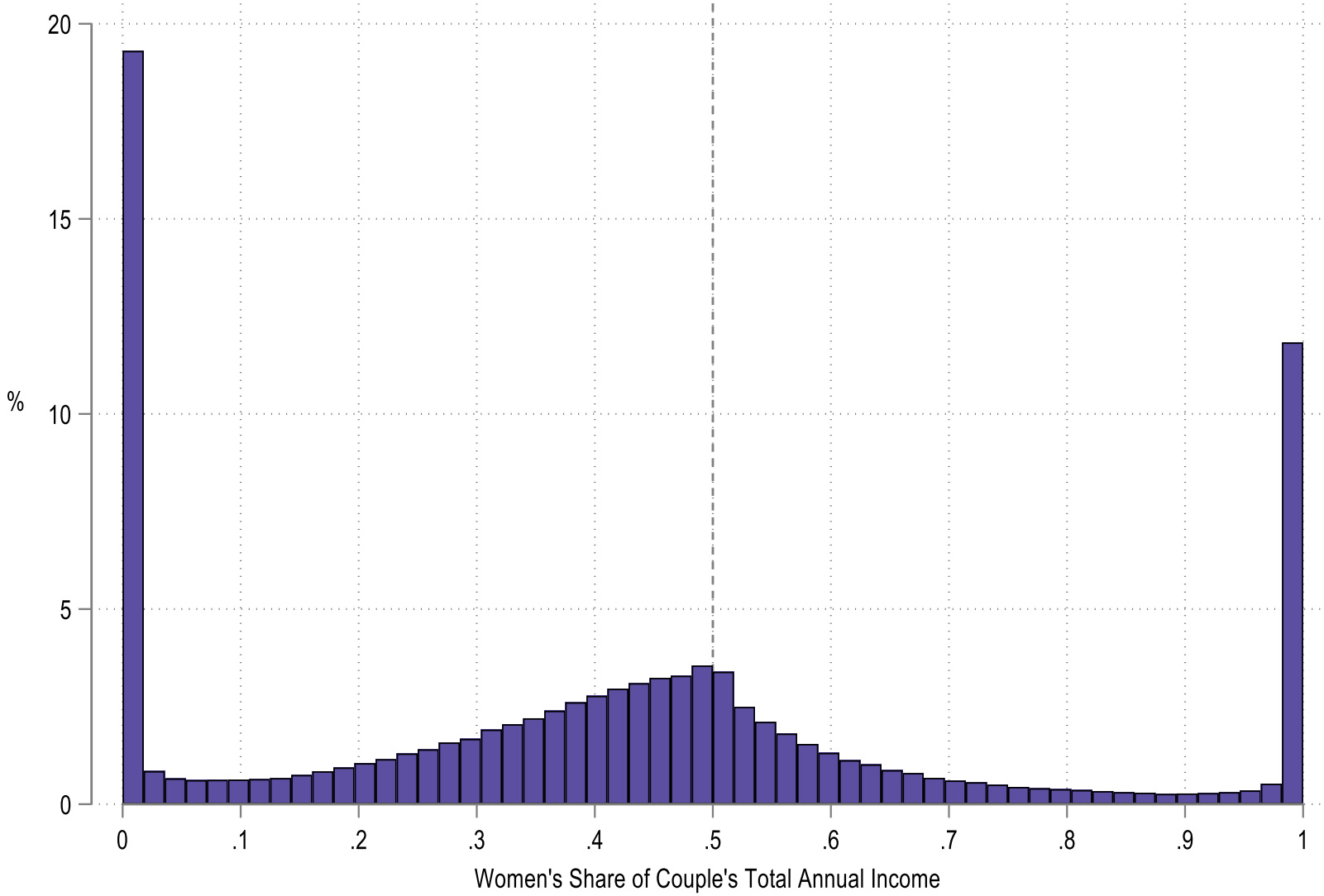
| | 2008/2012 | 2013/2017 | 2018/2022 | Total |
|---|---|---|---|---|
| Low Homogamy | 11.90 | 12.78 | 14.08 | 12.76 |
| Hypergamy | 47.13 | 44.31 | 45.22 | 45.71 |
| Hypogamy | 15.11 | 16.73 | 15.66 | 15.78 |
| Medium Homogamy | 12.49 | 12.47 | 12.12 | 12.39 |
| High Homogamy | 13.37 | 13.71 | 12.91 | 13.36 |
| Total | 100 | 100 | 100 | 100 |

# Income in IRPEF*

**Income = *Reddito Complessivo Annuale***

- **Fiscally-Dependent Family Member (*coniuge a carico*):** Income < €2,840.51, independently of its source.
- **Minimum Taxable Income:** Employees < €8,000; Self-employed and employers < €4,800.
- **Unemployment Benefits:** Income from NASpI must be declared (*reddito imponibile da lavoro dipendente*)
- **Social Security Contributions:** Net employee income; gross self-employment and business income.
- **Self-employed/Employers Flat-Rate Income** (*Forfettario*): Not observed before 2015 (substitute taxation).
- **Financial Capital Income:** Almost all is excluded and does not count toward the total taxable income.
- **Non-Financial Capital Income:** The income from owning a home and other buildings or lands is included.

# Relative Income




Notes: Among couple-years where both spouses submitted a tax return and excluding couple-years where both spouses declared 0 income.

**Figure A.6.** Predicted probabilities of transition to 1st child over year-specific total household income deciles (wife + husband income), controlling for wife's relative contribution

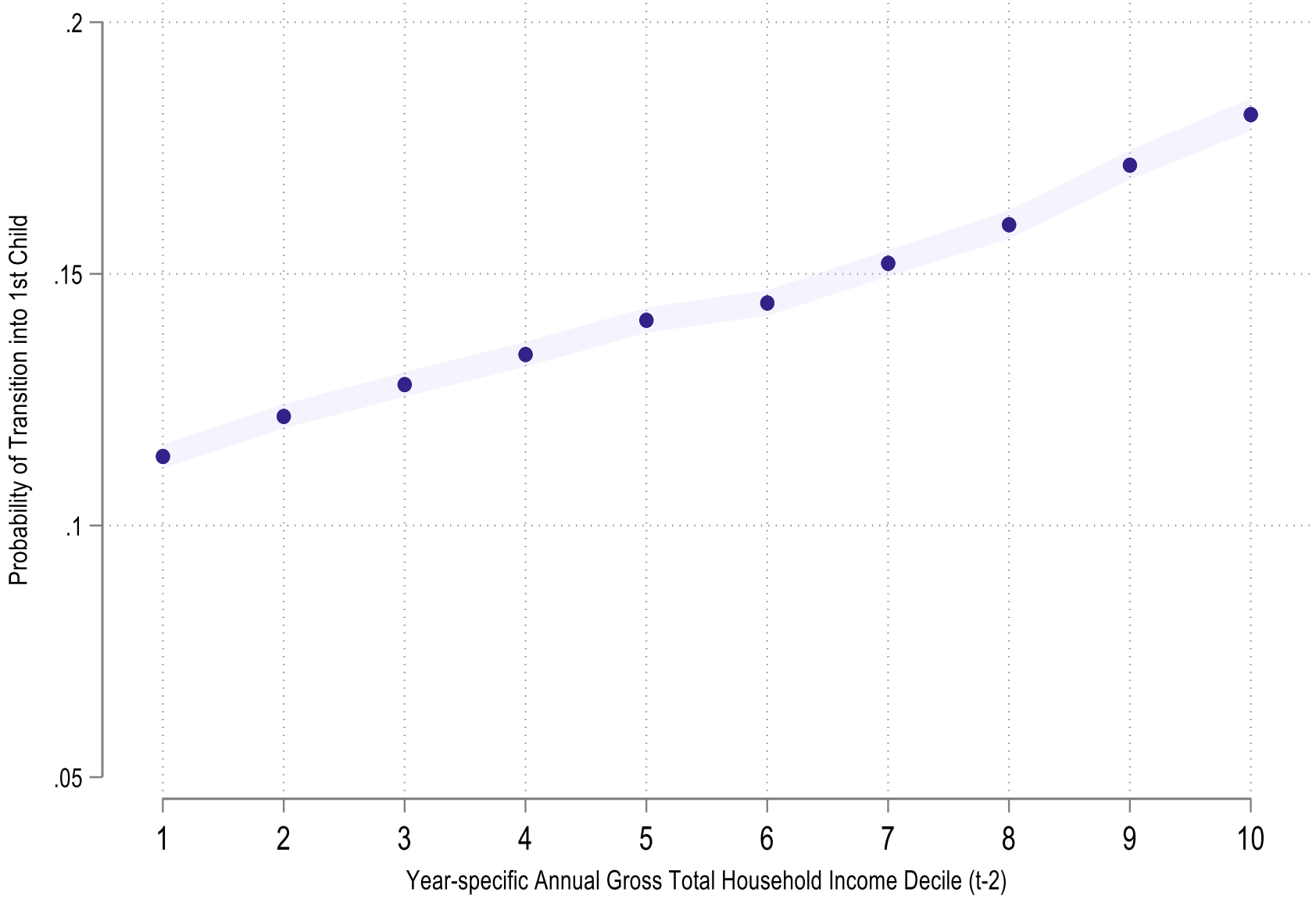
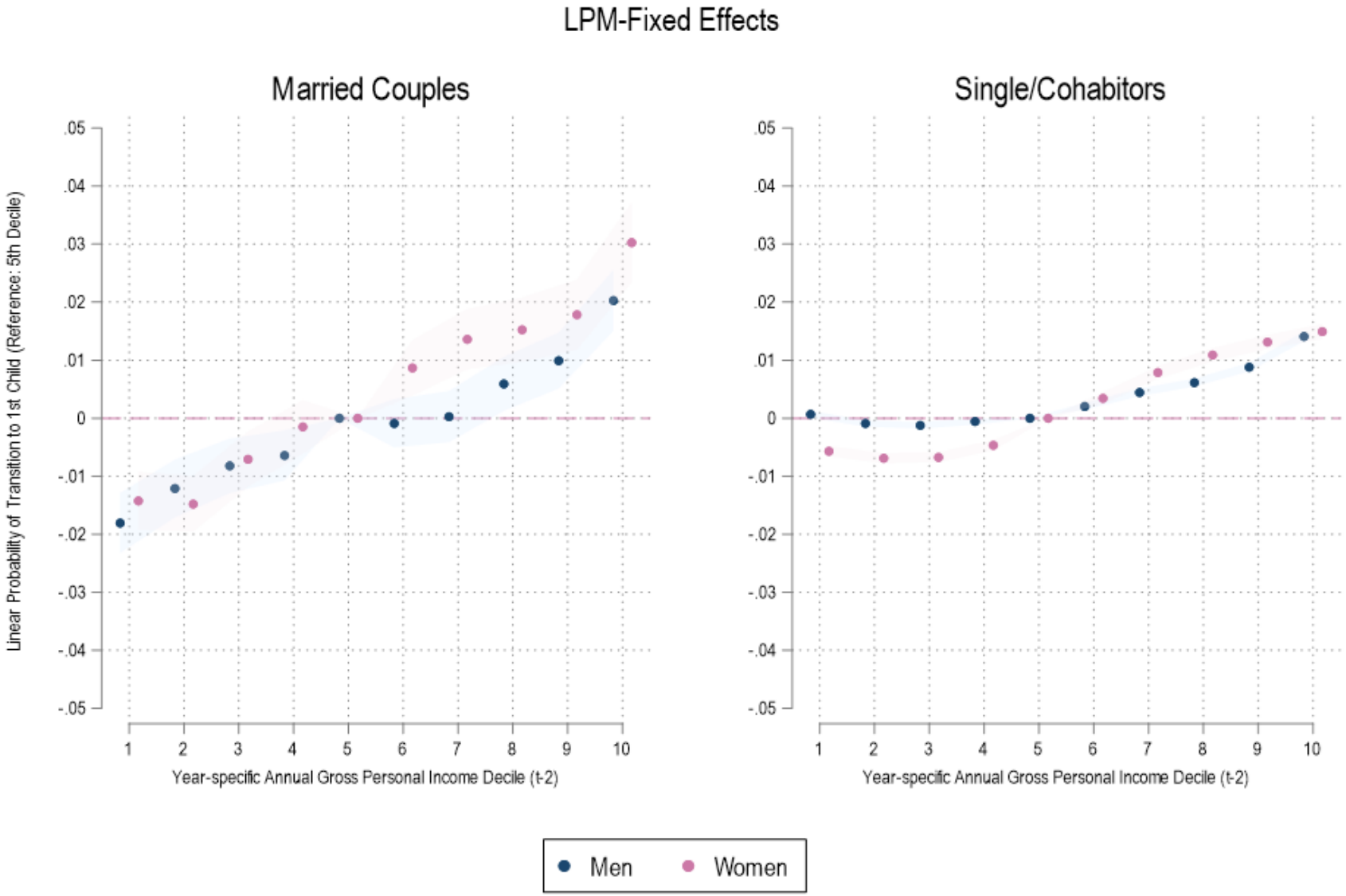


**Table A.1.** Lexis-like table: Women's age selection for married couples: age by birth year and fiscal year

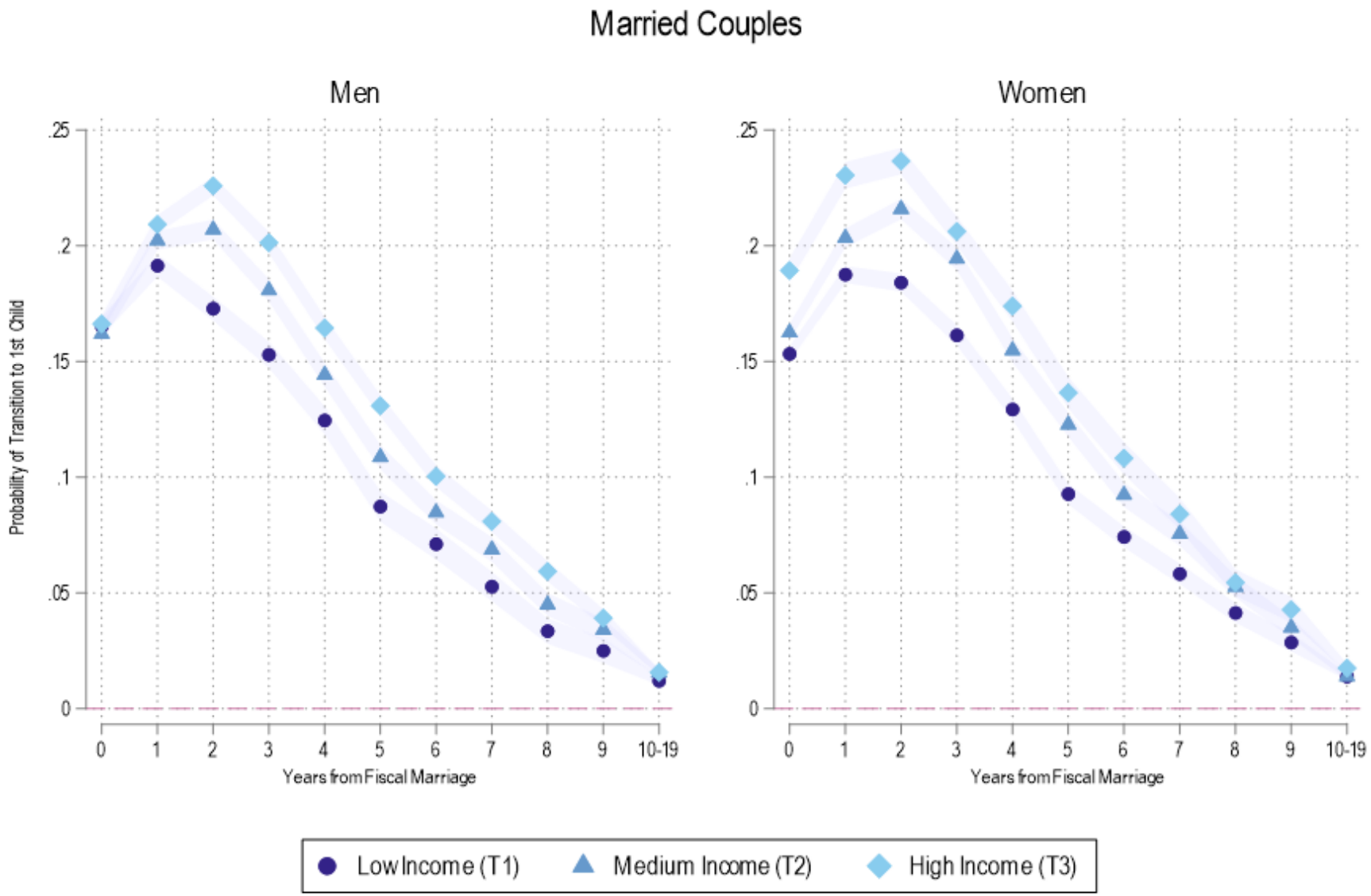
| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1961** | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | | | | | | | | | | |
| **1962** | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | | | | | | | | | |
| **1963** | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | | | | | | | | |
| **1964** | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | | | | | | | |
| **1965** | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | | | | | | |
| **1966** | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | | | | | |
| **1967** | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | | | | |
| **1968** | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | | | |
| **1969** | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | | |
| **1970** | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | |
| **1971** | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| **1972** | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 |
| **1973** | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| **1974** | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| **1975** | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
| **1976** | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| **1977** | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 |
| **1978** | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 |
| **1979** | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
| **1980** | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| **1981** | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| **1982** | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 |
| **1983** | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| **1984** | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
| **1985** | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| **1986** | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
| **1987** | | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| **1988** | | | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
| **1989** | | | | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| **1990** | | | | | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| **1991** | | | | | | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| **1992** | | | | | | | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| **1993** | | | | | | | | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| **1994** | | | | | | | | | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| **1995** | | | | | | | | | | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| **1996** | | | | | | | | | | | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |

**Figure A.1.** Model 1B: Linear probability fixed-effects (LPM-FE) model of transition to 1st child over income deciles by married/unmarried and sex




Notes: Clustered SE and 95% CI ($n_{married}$ = 1,282,770; $n_{single}$ = 6,650,419). Controls: women's age dummies, spouse income deciles ($t_{-2}$), time from marriage dummies, self and spouse tax return ($t_{-2}$), and calendar year-group dummies (married couples). Age dummies, tax return ($t_{-2}$), and calendar year-group dummies (single/cohabitors).

**Figure A.8.** Model 1C: Predicted probabilities of transition to 1st child over years from fiscal marriage and income tertiles (interaction)




Notes: Logistic discrete-time event history model with 95% CI (n = 1,360,154). Controls: wife and husband age at marriage, wife and husband country of birth, spouse income tertiles ($t_{-2}$), wife and husband tax return ($t_{-2}$), and calendar year-group dummies.