

Discussion of:  
**“Who Suffered from Superstition in the Marriage  
Market: The Case of Hinoeuma in Japan”**  
by Hideo Akabayashi

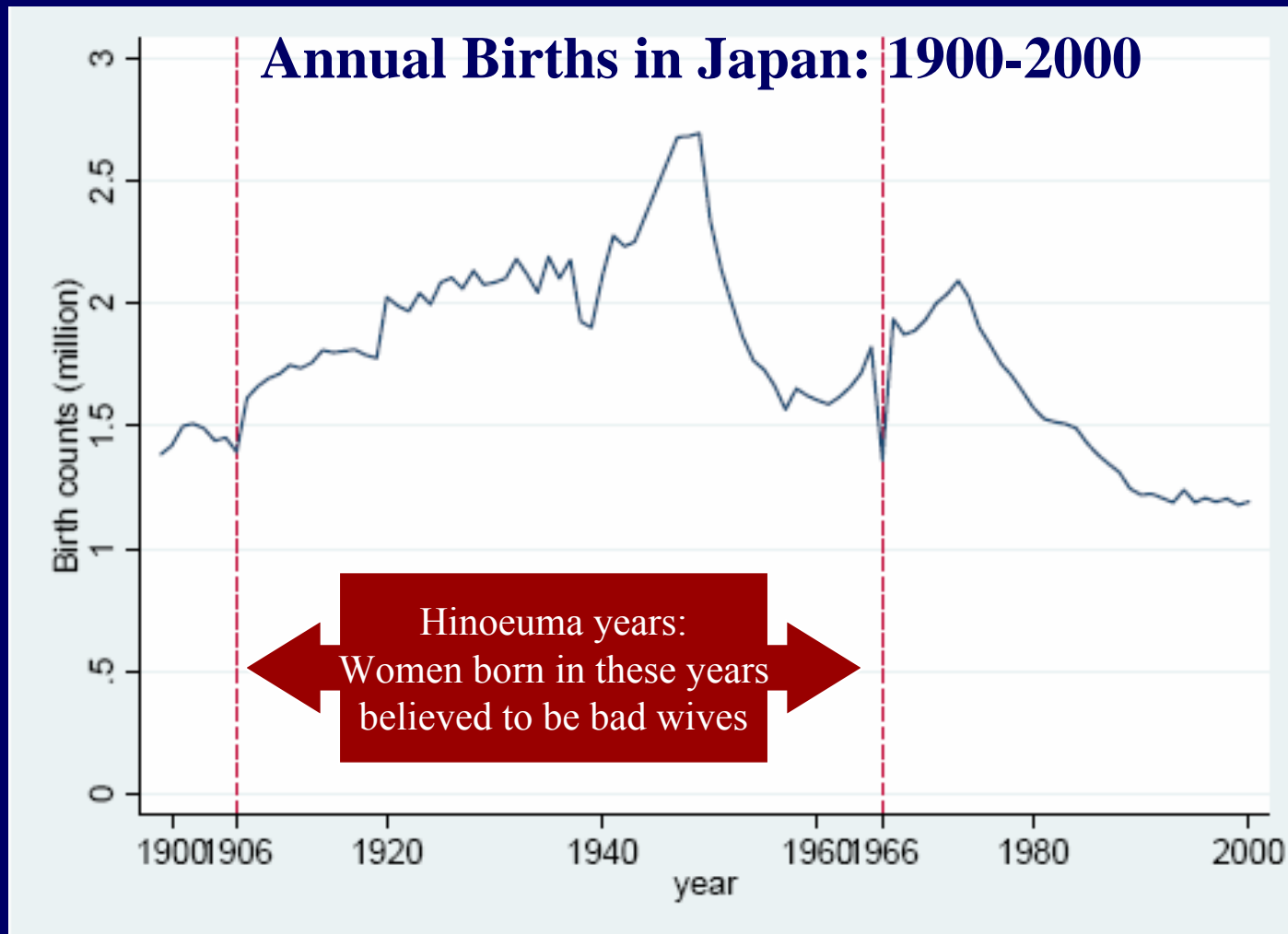
Justin Wolfers

The Wharton School, University of Pennsylvania  
CEPR, IZA & NBER

AEA Meetings, January 7, 2007

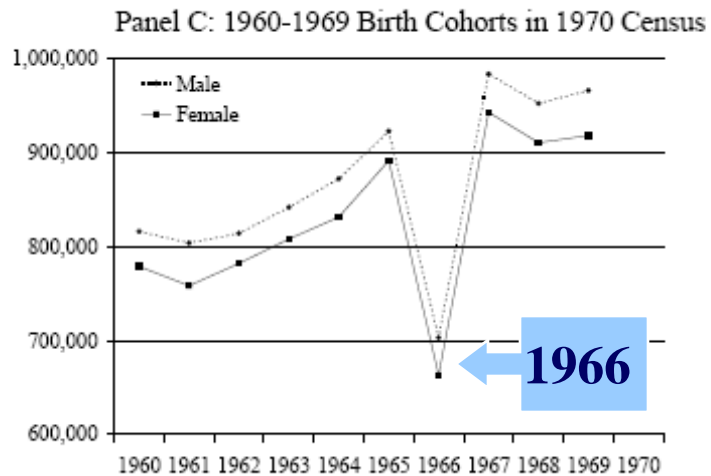
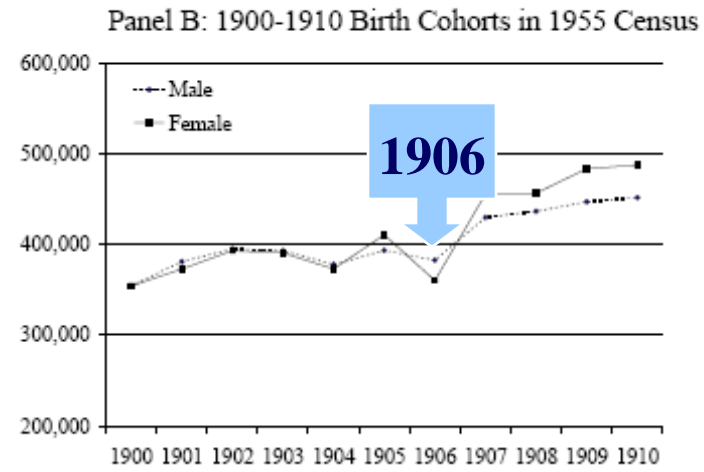
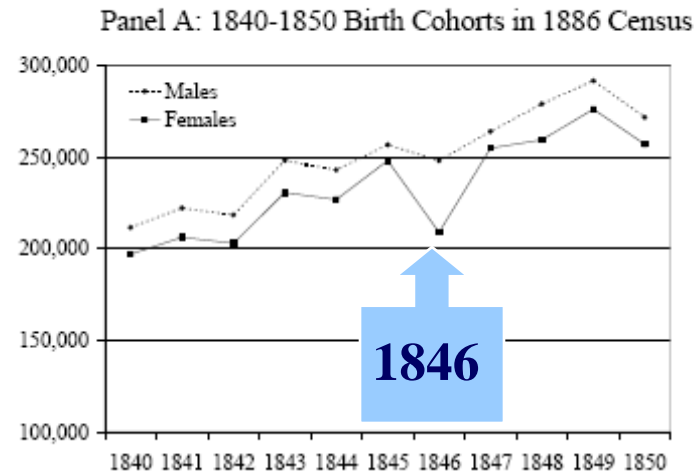
# Amazing Fact

- Births in Japan profoundly affected by superstition



# Effects of Fire-Horse Years on Births

Figure 2: Population Size by Sex and Birth Cohort for Three Fire Horse Episodes



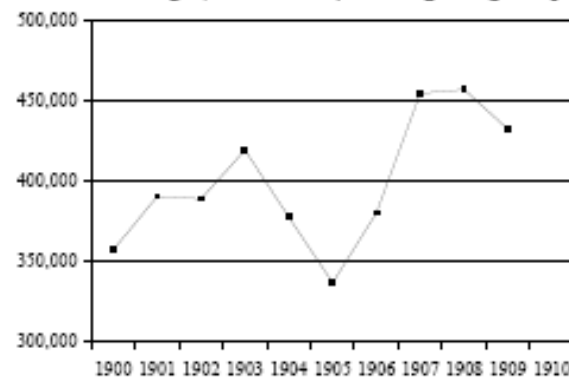
Notes: These graphs show male and female population size by birth cohort for three different fire horse episodes. The dotted line shows the male population, and the solid line shows the female population. The fire horse years studied are 1846, 1906, and 1966. The Census years are 1886, 1955, and 1970. Hence, the ages of the birth cohorts are different for the different points along each graph. For these three censuses, the three fire horse cohorts were 44, 39, and 4, years old respectively. Year is measured from January to December. Data sources: Japan Ministry of Home Affairs (1886); Japan Statistics Bureau (1955, 1975).

Source: "Missing Women and the Year of the Fire Horse: Changes in the Value of Girls and Child Avoidance Mechanisms in Japan, 1846, 1906, and 1966", by Chris Rohlf, Alexander Reed, and Hiroyuki Yamada, *mimeo*, University of Chicago  
Justin Wolfers, "Comments on Akabayashi"

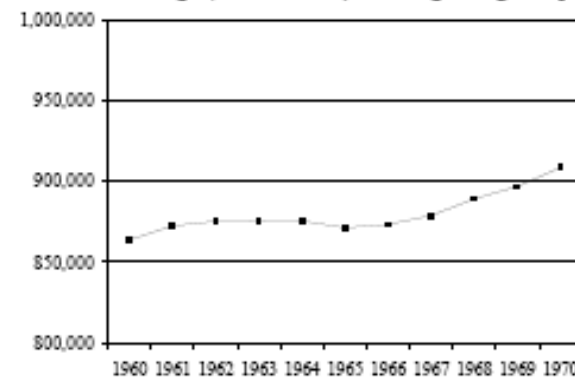
# Methods Used to Reduce Fertility

Figure 3: Sex-Blind Child Avoidance Techniques

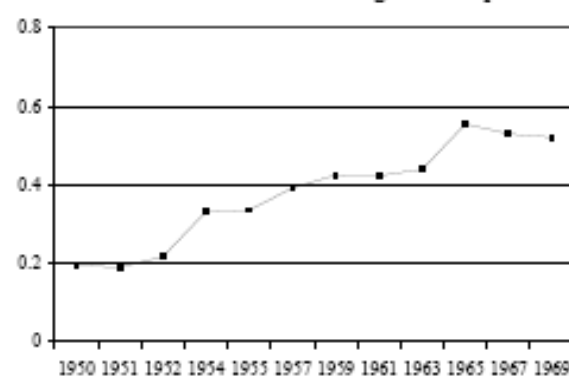
Panel A: Marriages, 1900-1909 (Year Beginning in April)



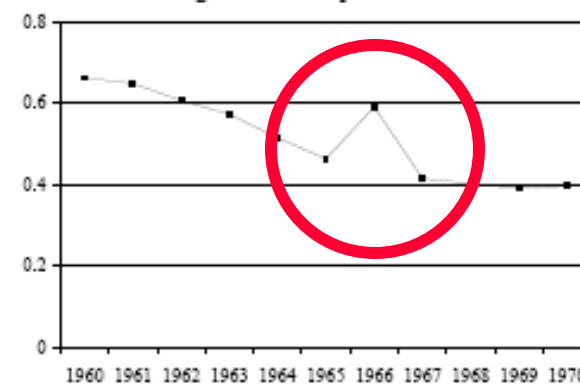
Panel B: Marriages, 1960-1970 (Year Beginning in April)



Panel C: Fraction of Wives Using Contraception



Panel D: Legal Abortions per Live Birth



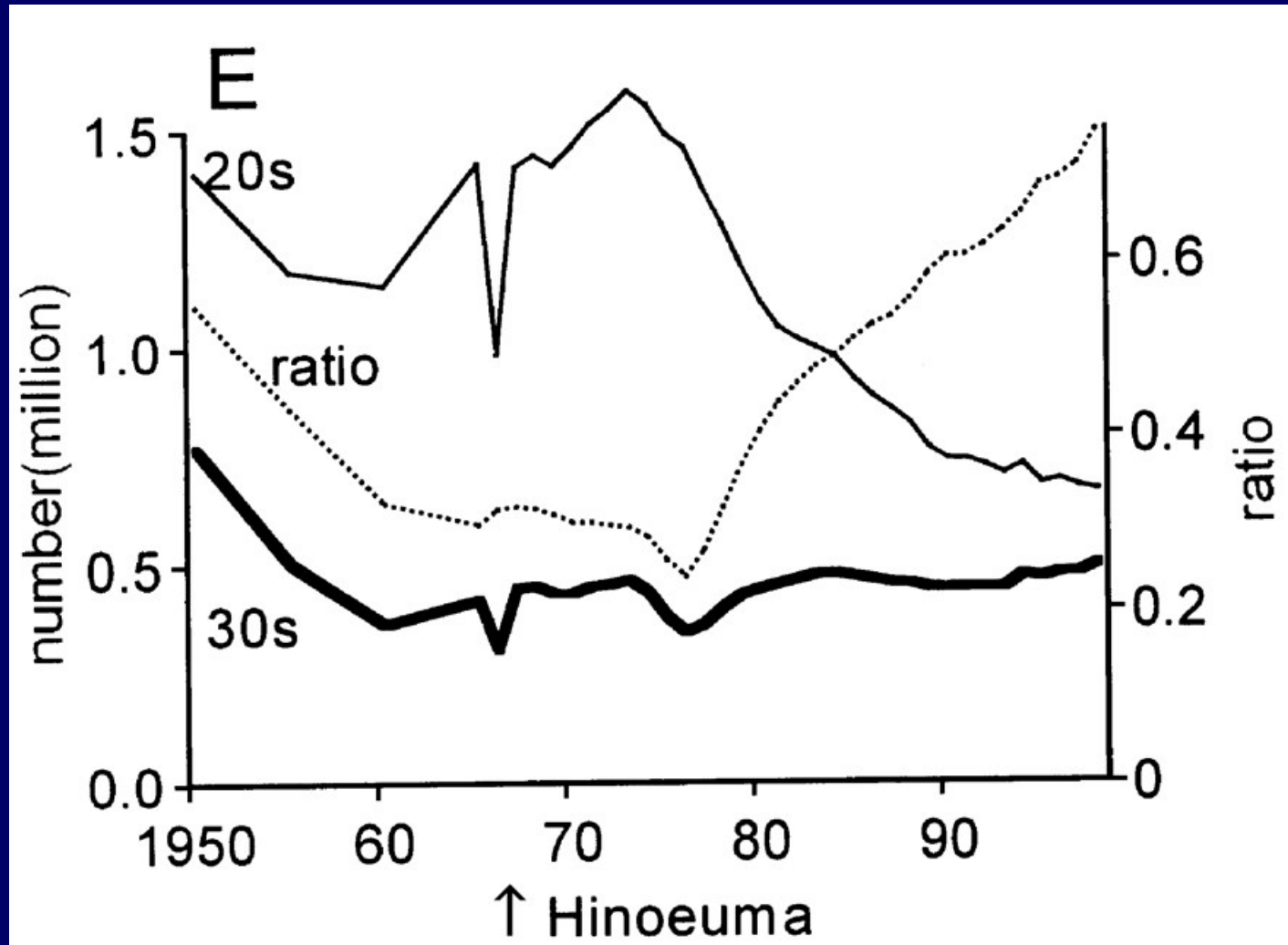
Notes: See notes to Figure 2 and Table 1. For Panels A and B, the year runs from 1 April to 31 March, nine months before the calendar year. The year is defined in this way so that 1905 and 1965 are the years when conceptions were likely to produce fire horse children. Sample for Panel C includes married women 50 and under. Contraception data are irregular. Sources described in the text.

Source: "Missing Women and the Year of the Fire Horse: Changes in the Value of Girls and Child Avoidance Mechanisms in Japan, 1846, 1906, and 1966", by Chris Rohlfs, Alexander Reed, and Hiroyuki Yamada, *mimeo*, University of Chicago

# What Can We Learn from this “Experiment”?

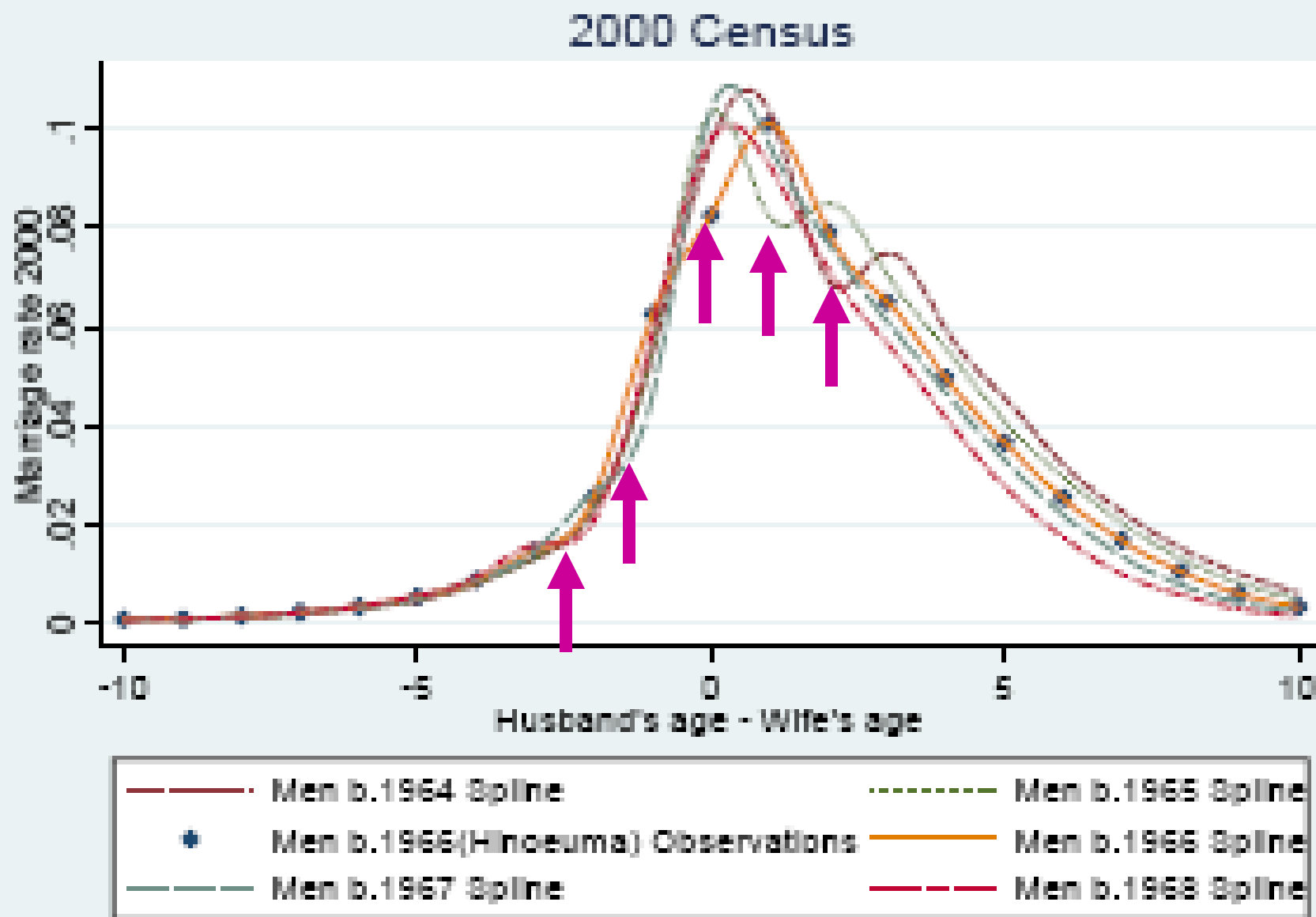
- Does the Hinoeuma superstition lead people to make costly decisions?
  - An easier paper: Is there prejudice against potential Hinoeuma daughters by potential parents? (YES!)
    - » Are these decisions costly?
  - This paper: Is there prejudice against Hinoeuma women by potential spouses?
    - » And who is hurt by this prejudice in equilibrium?
- “Exogenous” variation in cohort size
  - This paper: Are there increasing returns in the marriage market matching function?

# Japanese Births, by Mother's Age

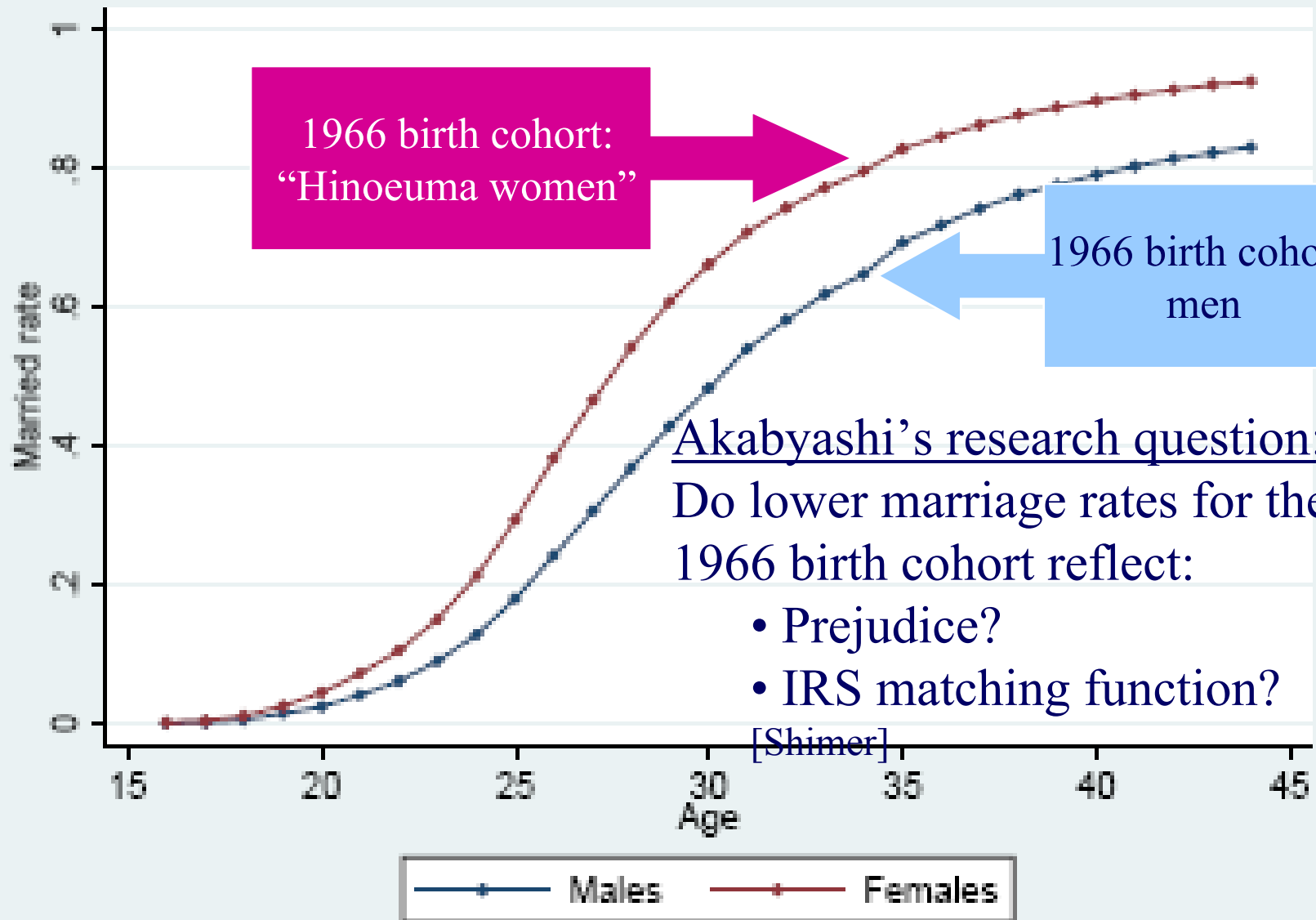


Source: "Recent trend of increase in proportion of low birthweight infants in Japan", by Hiroki Ohmia, Kenzou Hirookab, Akira Hatab and Yoshikatsu Mochizukic, *International Journal of Epidemiology* 2001;30:1269-1271

# Are Hinoeuma Women Unwanted Spouses?



# Marriage Rate by Age, 2000 Census





# Distinguishing Prejudice from IRS Matching

## This paper's recipe

1. Estimate the marriage market matching function
2. Predict matching rates from this equation
  - These predictions incorporate “usual” IRS
3. Observe negative residuals for 1966 birth cohort  
⇒ Infer prejudice

## But

- Mis-specification may be mis-labelled prejudice

# Estimating the Matching Function

□ Panel Estimation:

Husband's Age \* Wife's age \* Time \* Prefecture

$$\log(\Delta C_{ijkt}) = \alpha_{ij} + \beta_1 \cdot \log M_{ikt-5} + \beta_2 \cdot \log W_{ikt-5} + \lambda_{k(t-i)(t-j)} + \varepsilon_{ijkt}$$

## #Marriages

= 5-year change in  
#married involving

- Husband from
- Wife from cohort
- in prefecture  $k$

## #Eligible men

From that cohort  
= 5-year lag of  
single men

- of cohort  $I$
- in prefecture  $kd$

## #Eligible women

From that cohort  
= 5-year lag of  
single men

- of cohort  $J$
- in prefecture  $k$

## Fixed effects

Husband age ( $t-I$ )  
\* Wife age ( $t-J$ )  
\* Prefecture  
fixed effects

□ IV Strategy: Instrument for *eligible men* and *eligible women* by size of birth cohort

# Estimating the Matching Function

## □ Panel Estimation:

Husband's Age \* Wife's age \* Time \* Prefecture

$$\log(\Delta C_{ijkt}) = \alpha_{ij} + \beta_1 \cdot \log M_{ikt-5} + \beta_2 \cdot \log W_{ikt-5} + \lambda_{k(t-i)(t-j)} + \varepsilon_{ijkt} \\ + \beta_3 * \text{Competing men} + \beta_4 * \text{Competing women} \quad (\beta_3, \beta_4 < 0)$$

## Econometric Problems

### □ What is missing?

- Competing cohorts!  $\Rightarrow \hat{\beta}_2 = \beta_2 + \rho\beta_4 < \beta_2$  if  $\rho > 0$
- Consider the effects of the Hinouema cohort:
  - » True effects: Large  $\beta_2 \Rightarrow$  Small cohort predicts low marriage rates
  - » Equation-based forecast: Smaller  $\beta_2 \Rightarrow$  Predict moderate marriage rates
- Interpretation:
  - » Akabayashi: Negative residuals for Hinouema cohort reflects prejudice
  - » My interpretation: Negative residuals reflect mis-specification
- A test: Different predictions for Hinouema-cohort men!

# Estimating the Matching Function

## □ Panel Estimation:

Husband's Age \* Wife's age \* Time \* Prefecture

$$\log(\Delta C_{ijkt}) = \alpha_{ij} + \beta_1 \cdot \log M_{ikt-5} + \beta_2 \cdot \log W_{ikt-5} + \lambda_{k(t-i)(t-j)} + \varepsilon_{ijkt} \\ + \beta_3 * \text{Competing men} + \beta_4 * \text{Competing women} \quad (\beta_3, \beta_4 < 0)$$

## Econometric Problems

### □ What is missing?

– Competing cohorts!  $\Rightarrow \widehat{\beta}_2 = \beta_2 + \rho\beta_4 < \beta_2$  if  $\rho > 0$

### □ Leans heavily on extrapolation beyond sample

– Most of the sample involves large cohorts

– Yet the crucial prediction is for the small Hinoeuma cohort

### □ IV strategy

– Size of birth cohorts affects more than just #singles

### □ Stationarity

Justin Wolfers, "Comments on Akabayashi"