

# TRENDS IN EARNINGS INEQUALITY AND EARNINGS INSTABILITY AMONG U.S. COUPLES: HOW IMPORTANT IS ASSORTATIVE MATCHING?

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# Introduction

- Over the past 3 decades, employment of prime-age married women, as well as their share of couples' earnings, increased.
- At the same time, U.S. **male earnings inequality** has increased.
- **Male earnings instability** (=within-person variability of earnings) also increased.

How have changes in wives' earnings affected inequality and instability of couples' earnings?

What is the role of assortative matching and coordinated family labor supply in the rise in family earnings inequality?

- Cancian, Danziger, and Gottschalk (1993), Cancian and Reed (1999), Hyslop (2001), Devereux (2004), Pencavel (2006a, 2006b) find an equalizing impact of wives' earnings on family earnings inequality.
- With regards to assortative matching, Hyslop (2001) finds that matching accounts for 20% of inequality in family earnings in the US, and 20% of the rise in family inequality during 1979–1985 period.
- Greenwood et al. (2014): positive assortative matching accounts for 20% of inequality among incomes of singles and married U.S. couples in 2005 but only 3% in 1960; and for the entire trend in inequality between 1960 and 2005.

- We use **administrative data**—U.S. Social Security earnings data matched to Survey of Income and Program Participation (SIPP-SSA)—to study couples' earnings inequality and instability.
- Unlike others who have used these data (e.g., Kopczuk et al. (2009), Sabelhaus and Song (2010), Guvenen et al. (2012)) we focus on **couples** rather than individuals.
- We examine the role of positive assortative matching and family labor supply by comparing **actual couples to randomly matched couples**.

## Methodology following Kopczuk et al. (2010)

$$\begin{aligned}\log y_{it} &= X'_{it}\beta_t + \epsilon_{it} \\ \epsilon_{it} &= p_t^\mu \mu_{it} + p_t^v v_{it},\end{aligned}$$

where  $y_{it}$  is  $i$ 's annual earnings;  $X_{it}$  observed characteristics;  $\mu_{it}$  a permanent component, and  $v_{it}$  a transitory component. Define

$$\bar{\epsilon}_{it} = \frac{1}{2k+1} \sum_{j=t-k}^{j=t+k} \epsilon_{ij}, \quad k > 0$$

Permanent var./inequality :  $\text{var}^i(\bar{\epsilon}_{it})$

Transitory variance :  $\text{var}^i(\epsilon_{it} - \bar{\epsilon}_{it})$

Example:  $\mu_{it} = \mu_i$ ,  $p_t^\mu$  and  $p_t^v$  are constant, and  $v_{it}$  is an i.i.d. shock.  $\text{var}^i \bar{\epsilon}_{it} \approx \text{var}(\mu_i)$  if  $k$  is sufficiently large. We choose  $k = 2$  (5-year window).

## Methodology applied to couples

$$\log \left( y_{ct}^m + y_{ct}^f \right) = X_{ct}^m \beta_t + \epsilon_{ct},$$

where  $c$  stands for couple.  $\epsilon_{ct}$  is a combination of residual earnings of the head and wife.

Permanent var./inequality :	$\text{var}^c (\bar{\epsilon}_{ct})$
Transitory variance :	$\text{var}^c (\epsilon_{ct} - \bar{\epsilon}_{ct})$

$\text{var}^c (\bar{\epsilon}_{ct})$  will be higher due to:

- rising labor force participation of women and **increased assortative matching** on observables (e.g., Greenwood et al. 2014) and unobservables;
- **local** labor market **shocks**.

On the other hand, **coordinated labor supply** (e.g., spouses of high-earnings men do not work due to income effects) will lower  $\text{var}^c (\bar{\epsilon}_{ct})$ .

- **SIPP-SSA** matched data, **1978–2006**: SIPP individuals with linked Social Security Administration (SSA) earnings records (earnings from W-2 records, inclusive of employees' contributions to deferred compensation plans), **19,753** couples per 5-year window.
- **PSID**, **1978–2007** (biennial since 1997): core sample, **1,028** couples per 5-year window.



# Sample restrictions

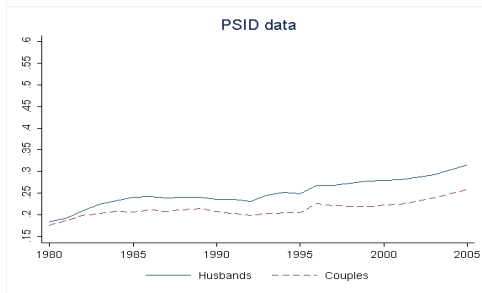
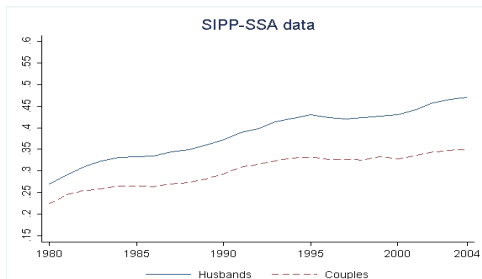
## ★ Male sample

- 25-59 years old
- Non-zero earnings
- Trim 1st percentile and 99th percentile
- Conditions have to be satisfied over 5-year window

## ★ Couples sample

- Husbands satisfy conditions above
- Wives have to be 25-59 over 5-year window
- Couple identified as married over 5-year window
- Wives allowed to have zero earnings

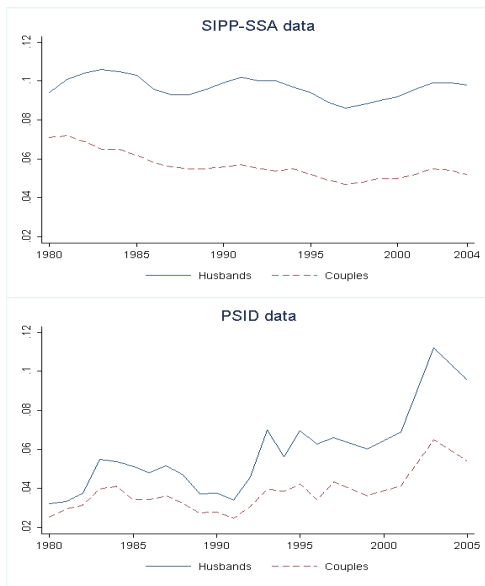
# Permanent variance for couples, 5-year window



# Permanent variance of earnings

	1980	1990	2000/ 2001	2004/ 2005	% $\Delta$ (2004/2005 - 1980)
<b>SIPP-SSA</b>					
Husbands	0.270	0.372	0.430	0.470	74.1%
Couples	0.224	0.293	0.328	0.350	56.3%
<b>PSID</b>					
Husbands	0.185	0.235	0.282	0.316	70.8%
Couples	0.177	0.208	0.225	0.259	46.3%

# Transitory variance for couples, 5-year window



Trending up in the PSID but no trend in SIPP-SSA data

# Summary

- **SIPP-SSA**: the permanent variance of **couples'** earnings is lower and rose by a smaller amount (a **56% increase** for couples' earnings vs. **74%** for **husbands'** earnings).
- **PSID**: **couples'** earnings variance is lower and **increased** by **46%** from 1980 to 2005 while **husbands'** earnings variance increased by **71%**.
- Wives have played a significant role not only in mitigating the rise of permanent earnings inequality but also in smoothing over earnings instability at the family level.

# Matching and Labor Supply

What is the impact of coordination and matching on couples' earnings inequality and instability?

# Counterfactual variances

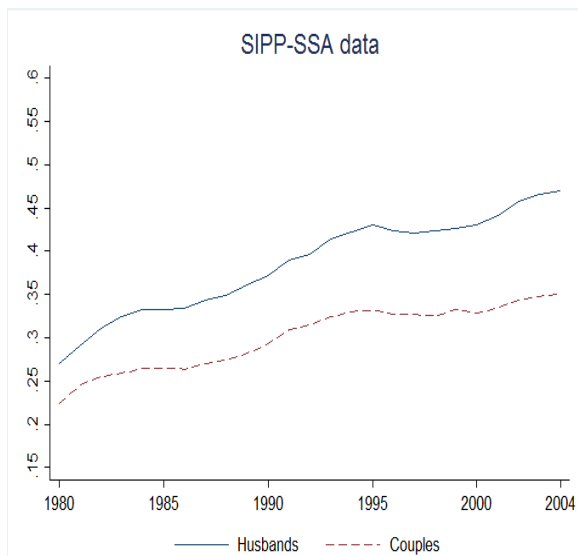
- 1 **Conditional swap**: each **year**, group couples based on **education** of the husband and wife, and **age** of husband and wife, and randomly match couples within groups—highlights the importance of coordinated **labor supply** (but also local labor market shocks and matching on unobservables if important);

$$\psi_{\bar{\epsilon}_{ct}}^1 > \text{var}^c(\bar{\epsilon}_{ct})?$$

- 2 **Unconditional swap**: each **year**, randomly match couples—highlights the importance of **labor supply** and **assortative matching**;  $\psi_{\bar{\epsilon}_{ct}}^2 < \psi_{\bar{\epsilon}_{ct}}^1$ .

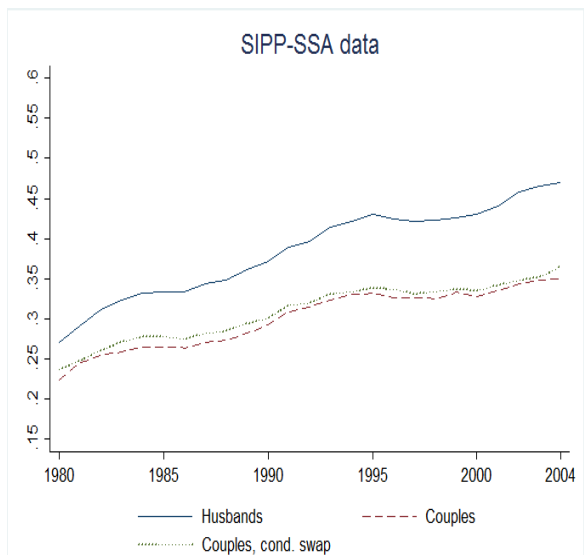
We construct analogous measures for the transitory variance.

# Permanent var. for actual and remarried couples, 5-year window

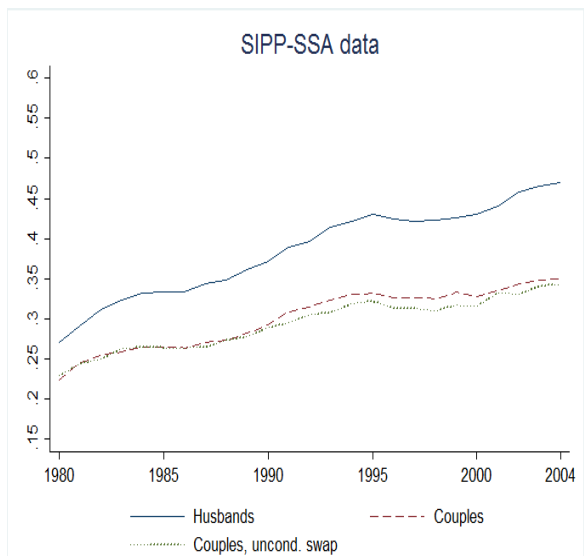




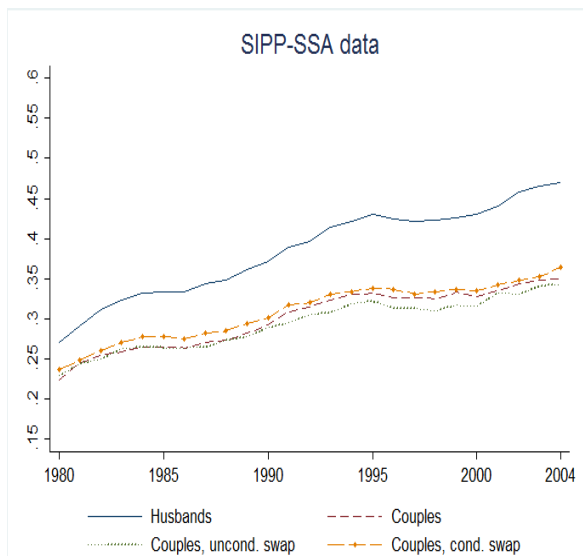
# Permanent var. for actual and rematched couples, 5-year window



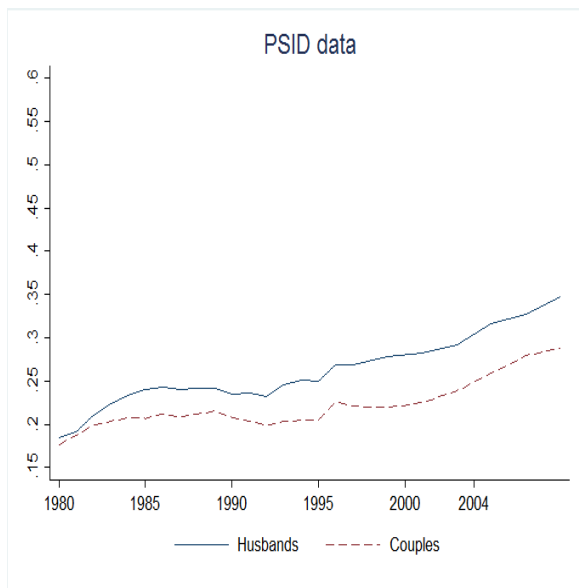
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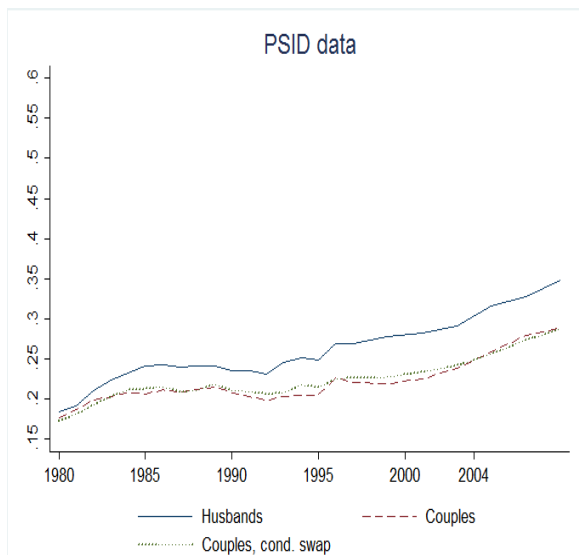
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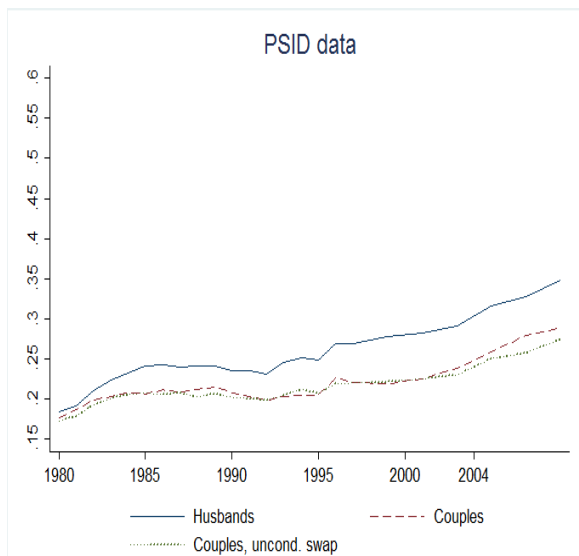
# Permanent variance for actual and rematched couples, 5-year window



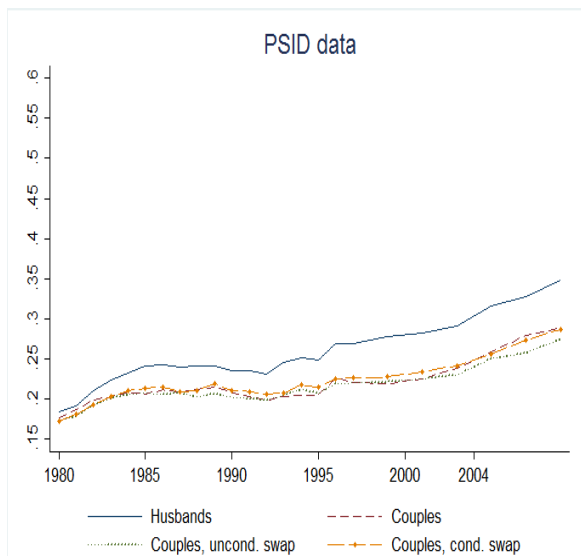
# Permanent variance for actual and rematched couples, 5-year window



# Permanent variance for actual and rematched couples, 5-year window



# Permanent variance for actual and rematched couples, 5-year window



# Permanent variance of earnings

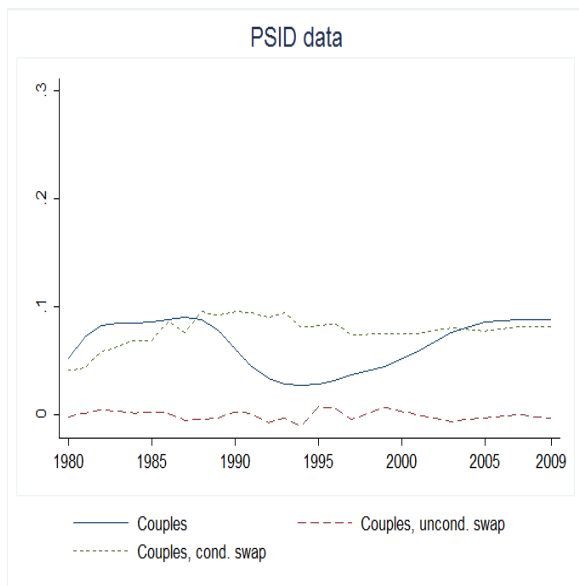
	1980	1990	2000/ 2001	2004/ 2005	% $\Delta$ (2004/2005 - 1980)
<b>SIPP-SSA</b>					
Couples	0.224	0.293	0.328	0.350	56.3%
Couples, cond. swap	0.237	0.301	0.335	0.365	54.0%
Couples, uncond. swap	0.229	0.289	0.316	0.343	49.8%
<b>PSID</b>					
Couples	0.177	0.208	0.225	0.259	46.3%
Couples, cond. swap	0.173	0.211	0.234	0.256	48.0%
Couples, uncond. swap	0.173	0.202	0.226	0.251	45.1%



# Summary

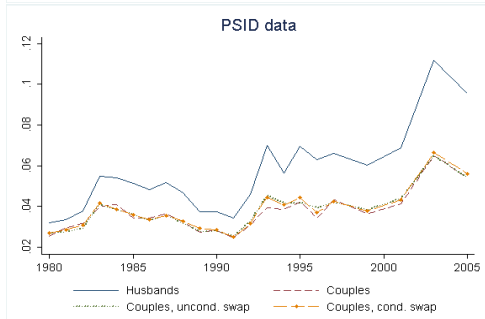
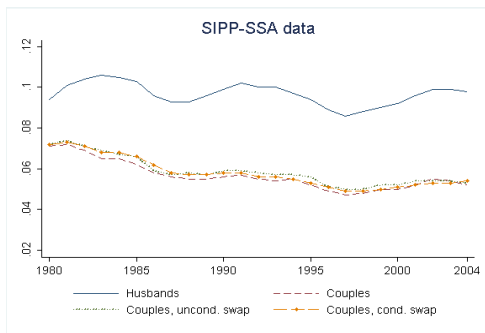
- Relative to the conditionally matched couples, actual couples have slightly lower variance of earnings: consistent with coordinated offsetting labor supply behavior.
- Relative to unconditionally matched couples, conditionally matched couples have higher variance of combined earnings: reflects positive assortative matching on education and age.
- **The key observation:** in SIPP-SSA data, **actual couples'** earnings variance increased by about **56%** from 1980 to 2004. For **randomly matched couples**, earnings variance increases by about **50%**.  $\Rightarrow$  Only 6 out of the 56% (about 11%) rise can be attributed to the combined effects of matching and joint behavior.

# Correlation of spousal incomes, 5-year window



Very low!

# Transitory variance

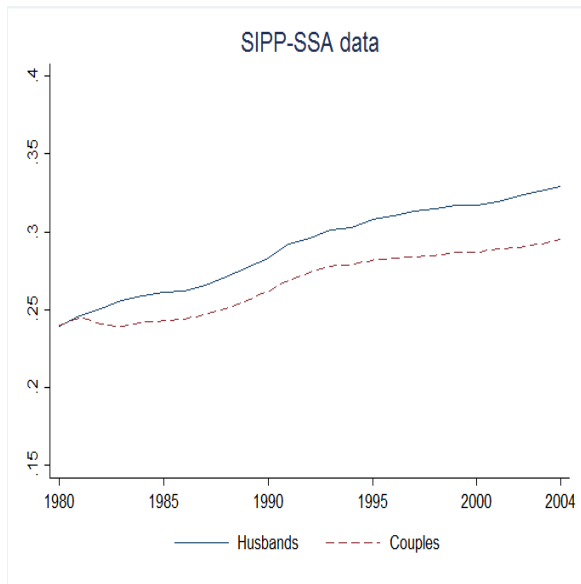


# Summary

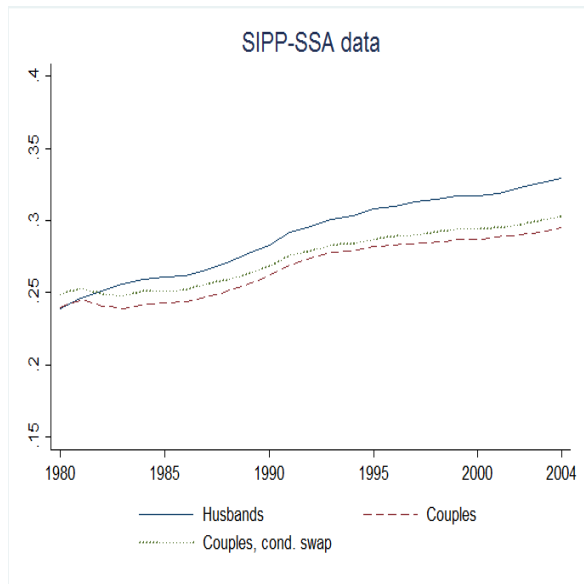
- The overall difference in permanent earnings variance between actual and conditionally matched couples comes primarily from couples with more educated husbands.
- The variance of earnings for conditionally matched couples is higher than that for actual couples suggesting that there may be offsetting labor supply behavior.
- Wives' earnings play an important role both in dampening the cross-sectional inequality of resources for married couples, and in offsetting transitory shocks to those resources.
- Among married couples, who was married to whom appears to be of relatively minor importance for couples' earnings inequality and instability.

- **Ginis** as an alternative measure of inequality.
- **Greenwood et al.'s (2014) selection**: keeping zeros for men.
- **Hyslop's (2001) selection**: dropping females with zero earnings.

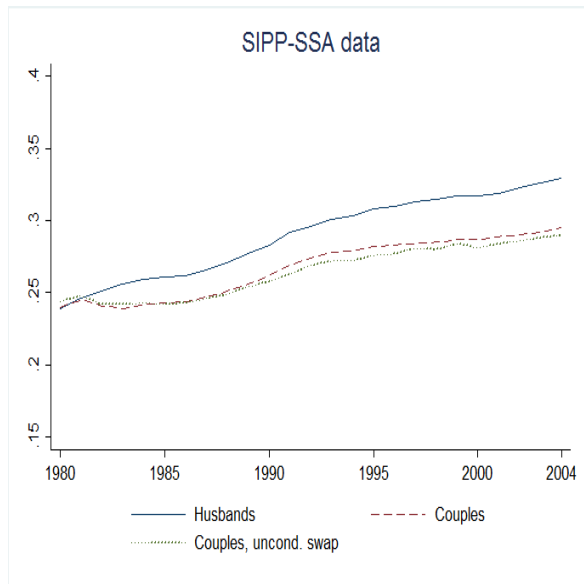
# Gini coefficients



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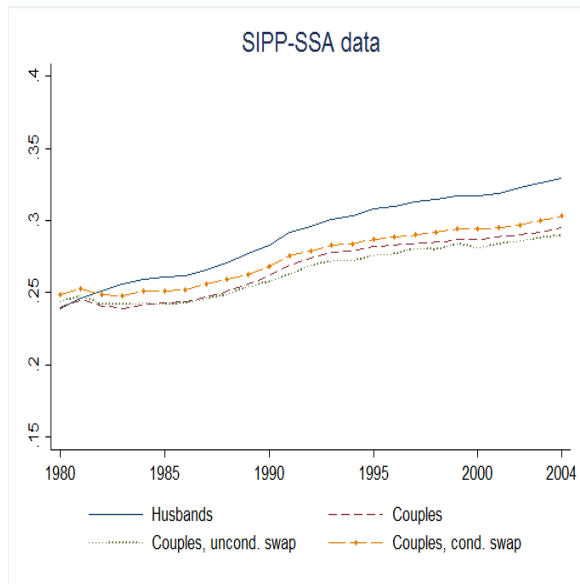


# Gini coefficients

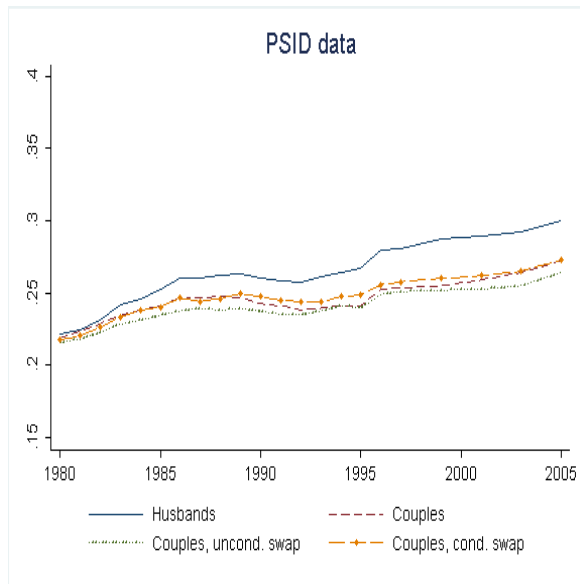




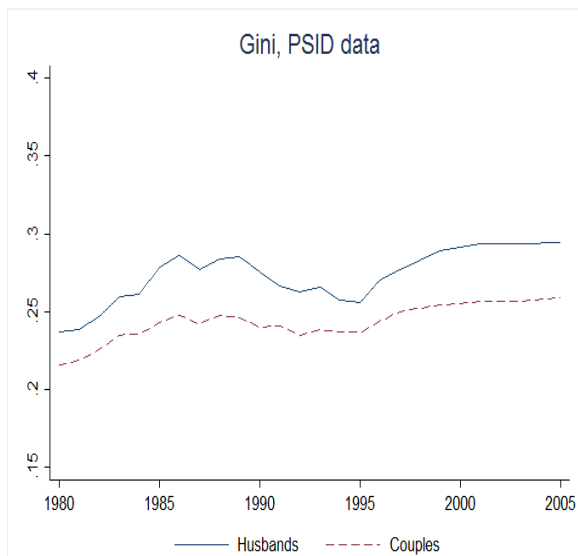
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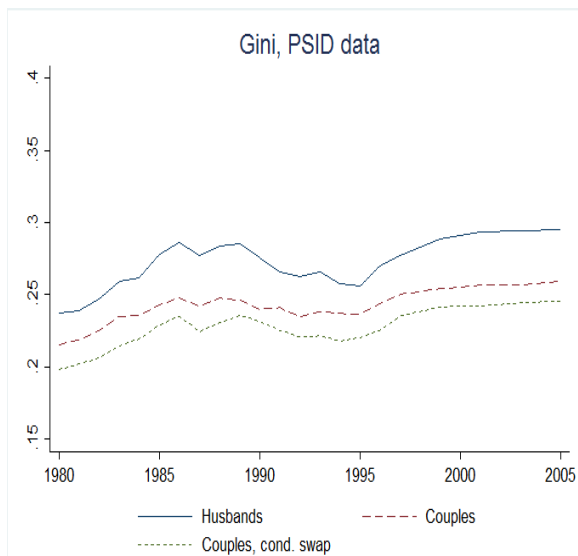
# Gini coefficients



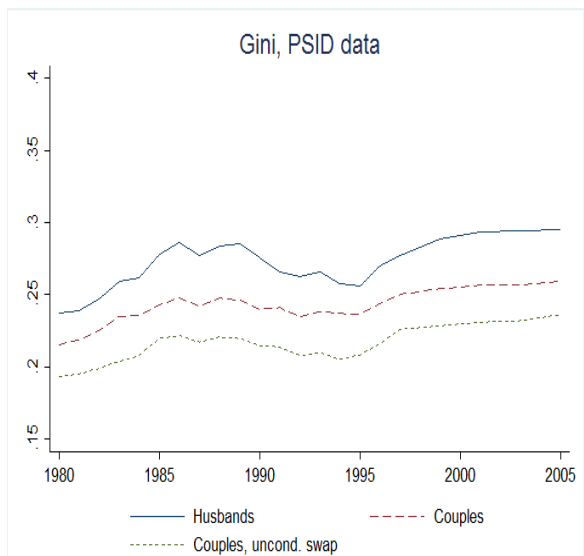
# Gini coefficients; Hyslop's selection, dropping females with zero earnings



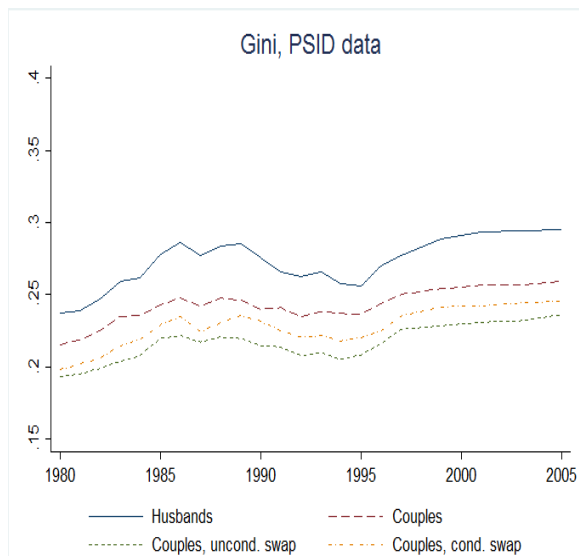
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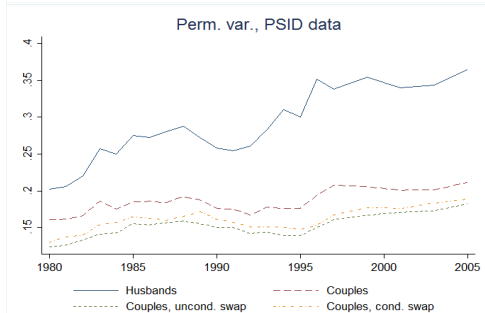
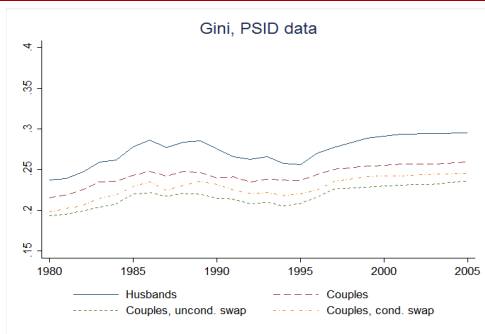
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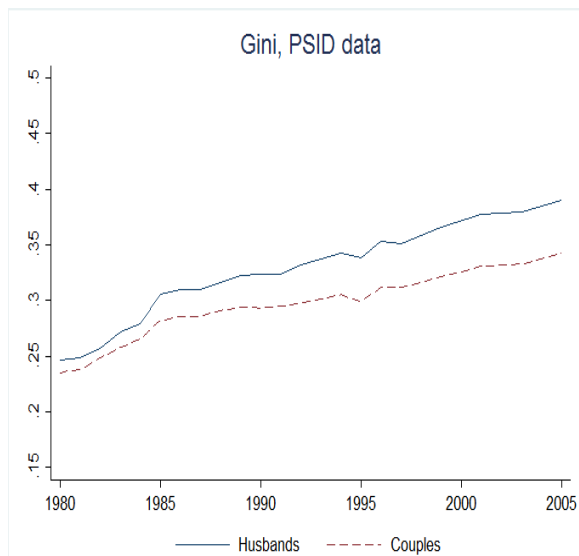
# Gini coefficients; Hyslop's selection, dropping females with zero earnings



# Gini coefficients and perm. var., Hyslop's selection

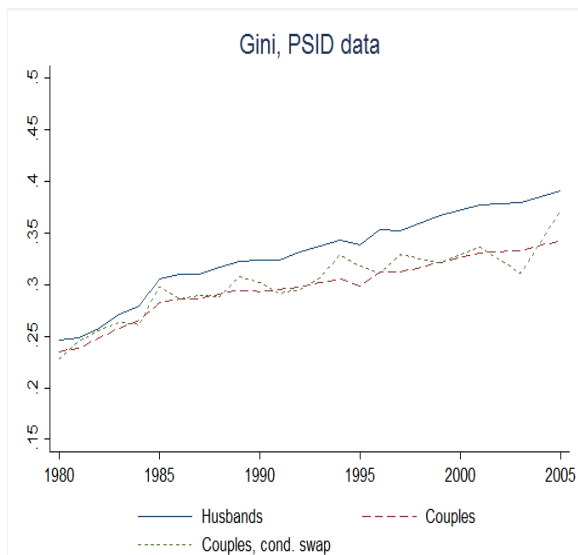


# Gini coefficients; Greenwood et al.'s selection, keeping males with zero earnings

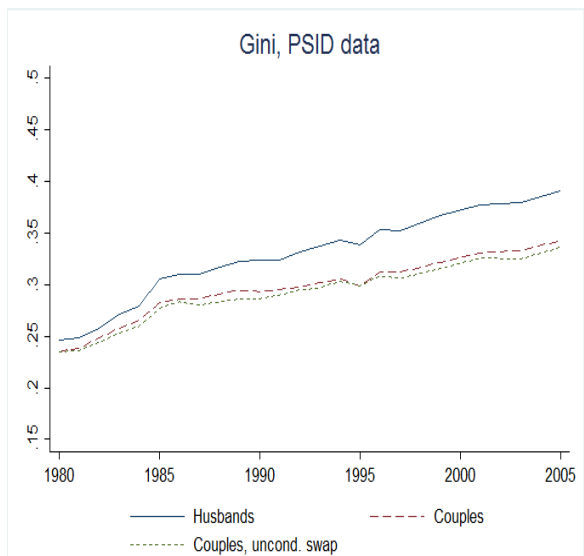




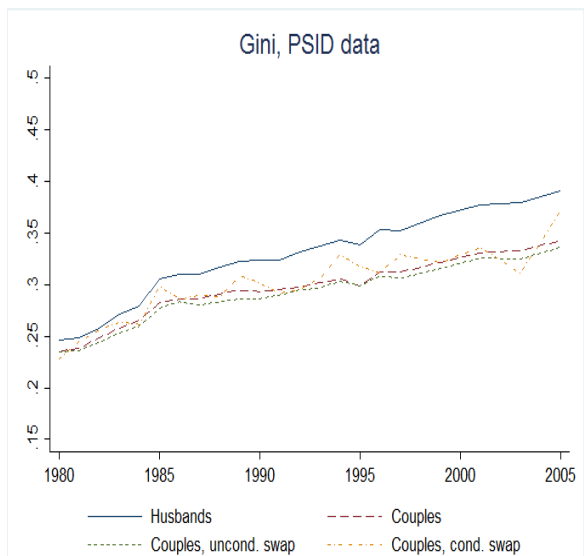
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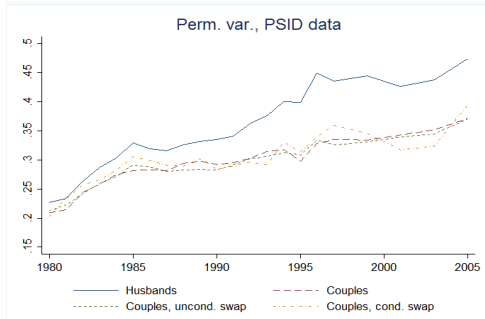
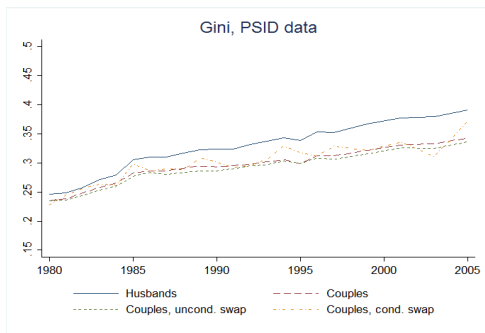
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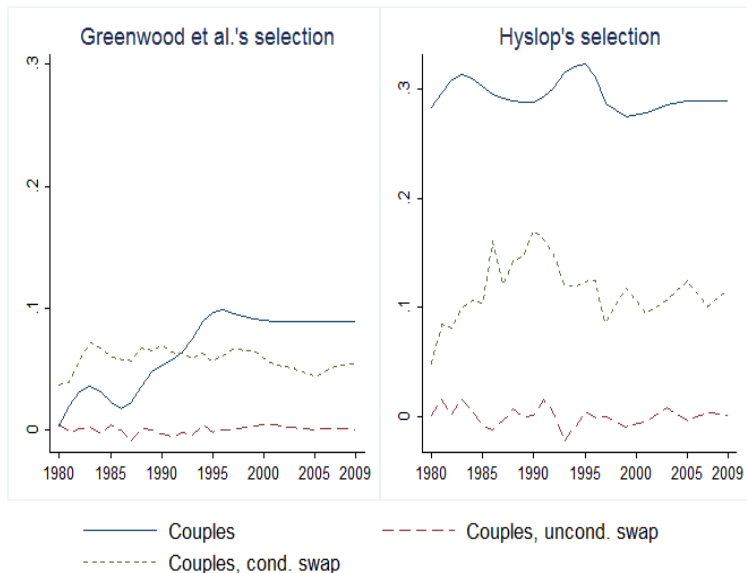


# Gini and perm. var., Greenwood et al.'s selection



# Correlation of spousal “permanent” incomes

## PSID data



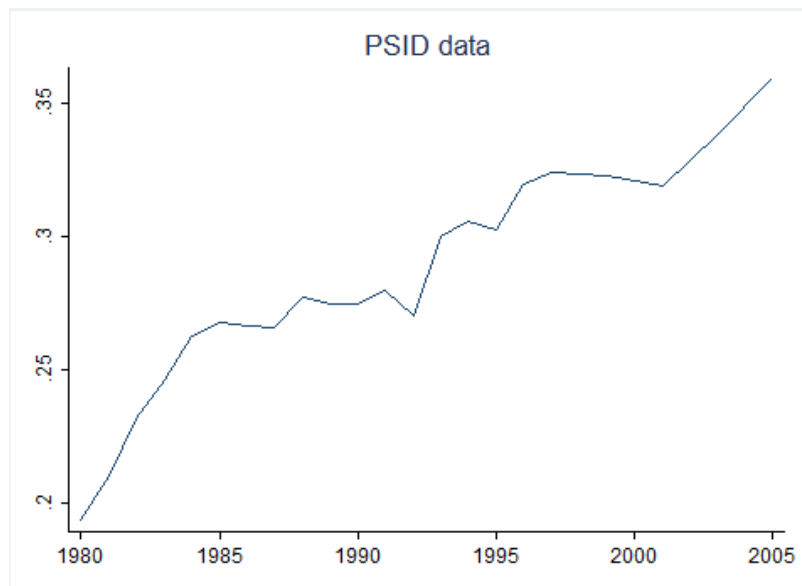
# Summary

- **Gini:** at most 4 out of the 23% (about 17%) of an increase can be attributed to matching and joint labor supply.
- **Hyslop's selection:**
  - (a) husbands and wives who are permanently attached to the labor force have highly correlated permanent earnings;
  - (b) positive assortative matching contributes importantly to the *level* of permanent earnings inequality;
  - (c) little contribution of matching to the trend in earnings inequality over the longer period.
- **Greenwood et al.'s selection:** positive assortative matching does not affect much the relative values of inequality levels for actual versus randomly matched couples.

# Conclusion

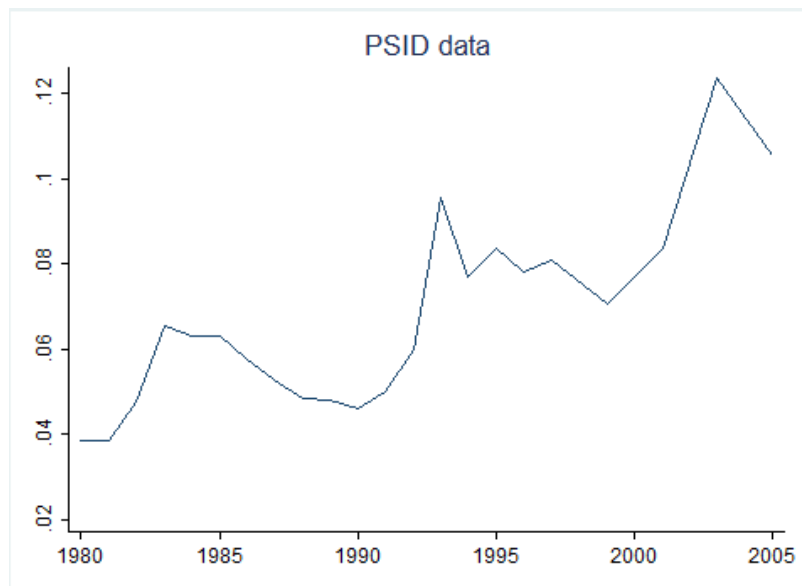
- We used 2 data sets to examine the **trends in the variance of combined earnings** of husbands and wives: large administrative (SIPP-SSA) and small survey (PSID).
- Wives' earnings have muted the rise of permanent earnings inequality as well as smoothed over earnings instability at the family level.
- **Coordination** of spouses' labor supply and positive **assortative matching** played only a **minor role** in determining overall trends in earnings inequality and earnings instability among married couples.

# Variance of log “permanent” male earnings

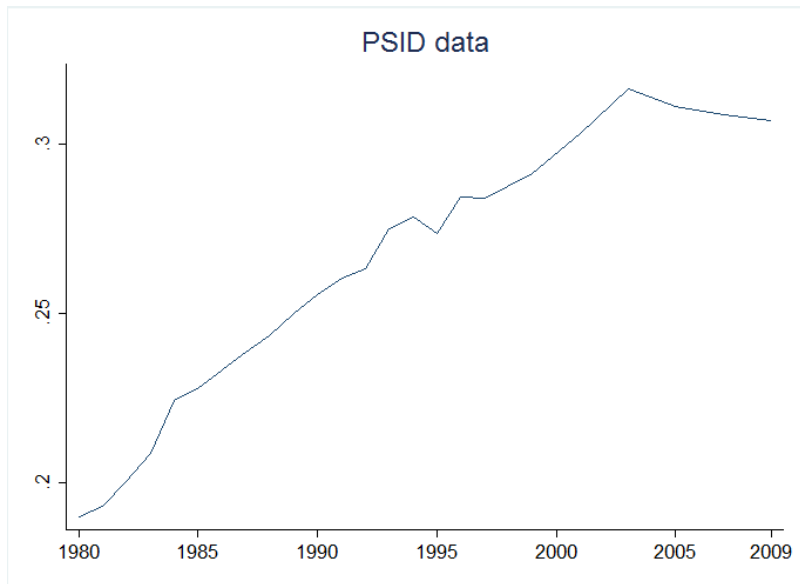




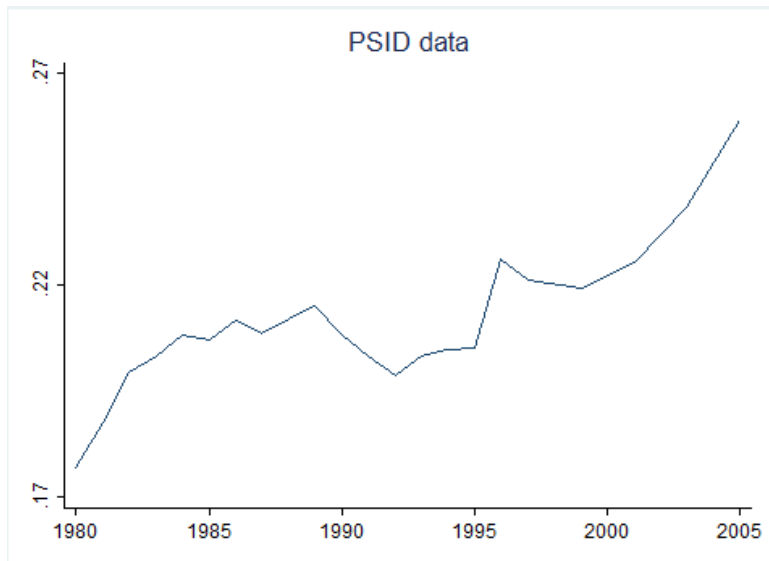
# Transitory variance of male earnings



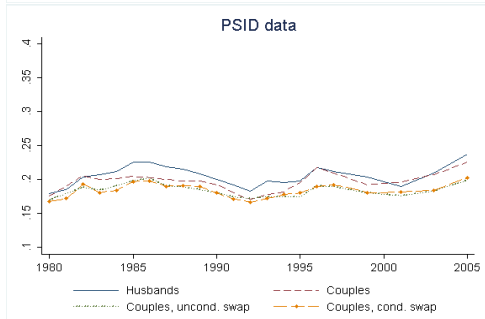
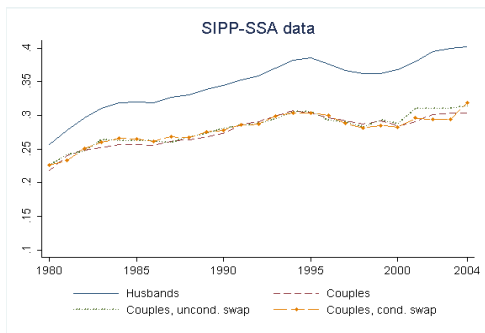
# Wife's earnings share in couples' combined earnings



# Variance of log “permanent” family earnings



# Permanent variance, less educated heads



# Permanent variance, more educated heads

