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

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Workshop on the Estimation of Economic Models of Earnings Dynamics
Paris, June 13, 2014

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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.
Questions

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?
Literature


- 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.
This paper

- 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)

\[ \log y_{it} = X'_{it} \beta_t + \epsilon_{it} \]

\[ \epsilon_{it} = p^\mu_t \mu_{it} + p^v_t v_{it}, \]

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: \( \mu_{it} = \mu_i \), \( p^\mu_t \) and \( p^v_t \) 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 \( \text{var}^c (\bar{\epsilon}_{ct}) \).
Data

- **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

<table>
<thead>
<tr>
<th>Time Period</th>
<th>SIPP-SSA</th>
<th>PSID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>husbands</td>
<td>couples</td>
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<tr>
<td>1980</td>
<td>0.270</td>
<td>0.185</td>
</tr>
<tr>
<td>1990</td>
<td>0.372</td>
<td>0.235</td>
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<tr>
<td>2000/2001</td>
<td>0.430</td>
<td>0.282</td>
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<tr>
<td>2004/2005</td>
<td>0.470</td>
<td>0.316</td>
</tr>
<tr>
<td>%Δ (2004/2005 - 1980)</td>
<td>74.1%</td>
<td>70.8%</td>
</tr>
</tbody>
</table>
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.
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);

\[ \psi^1_{\bar{\epsilon}_{ct}} > \text{var}^c(\bar{\epsilon}_{ct})? \]

2. **Unconditional swap**: each year, randomly match couples—highlights the importance of labor supply and assortative matching;

\[ \psi^2_{\bar{\epsilon}_{ct}} < \psi^1_{\bar{\epsilon}_{ct}}. \]

We construct analogous measures for the transitory variance.
Permanent var. for actual and rematched couples, 5-year window
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Permanent var. for actual and remarried couples, 5-year window
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</thead>
<tbody>
<tr>
<td><strong>SIPP-SSA</strong></td>
<td></td>
<td></td>
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<tr>
<td>Couples</td>
<td>0.224</td>
<td>0.293</td>
<td>0.328</td>
<td>0.350</td>
<td>56.3%</td>
</tr>
<tr>
<td>Couples, cond. swap</td>
<td>0.237</td>
<td>0.301</td>
<td>0.335</td>
<td>0.365</td>
<td>54.0%</td>
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<tr>
<td>Couples, uncond. swap</td>
<td>0.229</td>
<td>0.289</td>
<td>0.316</td>
<td>0.343</td>
<td>49.8%</td>
</tr>
<tr>
<td><strong>PSID</strong></td>
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</tr>
<tr>
<td>Couples</td>
<td>0.177</td>
<td>0.208</td>
<td>0.225</td>
<td>0.259</td>
<td>46.3%</td>
</tr>
<tr>
<td>Couples, cond. swap</td>
<td>0.173</td>
<td>0.211</td>
<td>0.234</td>
<td>0.256</td>
<td>48.0%</td>
</tr>
<tr>
<td>Couples, uncond. swap</td>
<td>0.173</td>
<td>0.202</td>
<td>0.226</td>
<td>0.251</td>
<td>45.1%</td>
</tr>
</tbody>
</table>
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%. ⇒ 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

**SIPP-SSA data**

**PSID data**
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.
Robustness

- **Ginis** as an alternative measure of inequality.
Gini coefficients

SIPP-SSA data

- Husbands
- Couples
Gini coefficients

SIPP-SSA data

- Husbands
- Couples
- Couples, cond. swap
Gini coefficients
Gini coefficients

PSID data

- Husbands
- Couples
- Couples, uncond. swap
- Couples, cond. swap
Gini coefficients; Hyslop’s selection, dropping females with zero earnings
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Gini coefficients and perm. var., Hyslop’s selection
Gini coefficients; Greenwood et al.’s selection, keeping males with zero earnings
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Gini coefficients; Greenwood et al.’s selection, keeping males with zero earnings
Gini and perm. var., Greenwood et al.'s selection
Correlation of spousal “permanent” incomes

PSID data

Greenwood et al.'s selection

Hyslop's selection

- Couples
- Couples, cond. swap
- Couples, uncond. swap
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**:
  1. husbands and wives who are permanently attached to the labor force have highly correlated permanent earnings;
  2. positive assortative matching contributes importantly to the *level* of permanent earnings inequality;
  3. 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