Discussion of
“Detecting Home Production”
by Mariane Baxter and Dana Rotz

Discussion by Yongsung Chang
Outline of Discussion

1. Literature
2. Methodology
3. Contribution
4. Comments/Questions/Suggestion
Home Production: Why care?

Helps us to understand market behavior:
Allocation of time and goods

- Labor Supply (Becker, 1965)
- Female Wage Discrimination (Becker, 1984)
- Economic Development (Parente-Rogerson-Wright, 1997; Greenwood et al.; 2005)
- Life-cycle Expenditure (Aguiar-Hurst, 2007)

Key is **willingness** to substitute goods and time and activities.
However, ...

- Isomorphic to preferences.
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- By definition, output not measured.
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- Isomorphic to preferences.
- By definition, output not measured.
- Inputs (especially, time) hard to measure.
Tough Question

Can you identify the shape of home production technology?
This paper ...

- Examines: Market Hours $\rightarrow$ Consumption Pattern
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- Very detailed expenditure data (CEX, survey and diary data)
- 1-earner households vs. 2-earner households
- Sample with husband always working
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- Measurement (Data) Problem
  - CEX (Consumption) is not panel data.
  - PSID (Hours) does not have a good consumption data.
Propensity Score Matching: Clever ...

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- Match type-1 household with a type-2 household with the closest propensity score of being type 1.
- Widely used to estimate “Average Treatment Effect”.
Methodology

Propensity Score of Being a Type 1

- Estimate Prob(type 1) = f(X), X: characteristics
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- Match type-1 household with a type-2 household with the closest propensity score of being type 1.
- Each consumption category j, compute expenditure differences $= E[C_{ij}(\text{type}1) - C_{ij}(\text{type}2)]$
Results are consistent with our priors

1-earner households purchase

- More: food at home (4%), dinnerware and housewares (20%), utilization of home capital (fuels) (2%), travel (5%), pets (8%)
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Suggest strong substitution between market goods and home goods.
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Expenditure items somewhat unclear...

1-earner households purchase

- general leisure expenses: cable, satellite TV (-7%), electronics (-10%)
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  - Imperfect control of income effects
  - Substitution between time and goods within leisure activity
Comments/Questions/Suggestions

Propensity Score Matching is Very nice...

But, potential identification problem...

- Decision to work or not depends on income and preferences (home production)
Propensity Score Matching is Very nice...

But, potential identification problem...

- Decision to work or not depends on income and preferences (home production)
  - What if the main reason is the latter?
Two households with similar propensity scores

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<tr>
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<th>“Smith” Family</th>
<th>“Jones” Family</th>
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<td>Prob (Type 1)</td>
<td>99%</td>
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- Differences in preferences?
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- Differences in preferences?
- Wealth?
- (May exploit Engel Curve?)
Propensity vs. Regression

- Propensity score may look similar but the underlying reasons may be different.
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  - kids vs. low potential income
Propensity vs. Regression

- Propensity score may look similar but the underlying reasons may be different.
  - kids vs. low potential income
  - Regression is less subject to this criticism
Regression: e.g., Chang, 2000

- CEX married households 1990-1994
- Coarse categories only
- Regress expenditure share on household leisure
  - durable goods (-0.13%), food away from home (-0.72%), household operation services (-1.31%)
  - entertainment durables (0.18%), food at home (0.08%)
While our finding that household’s leisure is negatively correlated with its expenditure share on durables in the CEX is consistent with the previous empirical studies on substitution elasticity in consumer demand based on time series, one should note that this is a cross-sectional correlation. Evidence on substitutability between time and goods based on a dynamic panel data would be more compelling.

Table 3
Estimation of (8) based on the CEX for 1990–1994: married households\textsuperscript{a}

<table>
<thead>
<tr>
<th>Category</th>
<th>Durable goods</th>
<th>Entertainment durables</th>
<th>Non-durables and service consumption</th>
<th>Food at home</th>
<th>Food outside</th>
<th>Household operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log (income)</td>
<td>0.34</td>
<td>0.32</td>
<td>− 0.15</td>
<td>− 0.35</td>
<td>− 0.07</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>(36.8)</td>
<td>(9.7)</td>
<td>(−36.8)</td>
<td>(−39.5)</td>
<td>(−4.4)</td>
<td>(5.4)</td>
</tr>
<tr>
<td>Log (leisure)</td>
<td>− 0.13</td>
<td>0.18</td>
<td>0.06</td>
<td>0.08</td>
<td>− 0.72</td>
<td>− 1.31</td>
</tr>
<tr>
<td></td>
<td>(−3.9)</td>
<td>(1.6)</td>
<td>(3.9)</td>
<td>(2.7)</td>
<td>(−13.6)</td>
<td>(−10.8)</td>
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Can Go beyond “detecting”

- Would be great if estimate the technology parameters.
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- Synthetic cohort approach (Becker-Ghez, 1974; Aguiar-Hurst 2007)
  - Allow you combine CEX and ATUS
  - Exploit the largest variation in market hours: retirement
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- Synthetic cohort approach (Becker-Ghez, 1974; Aguiar-Hurst 2007)
  - Allow you combine CEX and ATUS
  - Exploit the largest variation in market hours: retirement
- Production function for each activity (Becker vs. Gronau)
Becker 1965 vs. Gronau 1977

- **Gronau**
  - $U(C) + v(L)$
  - $C = g(C_m, C_h), C_h = h(K_h, N_h)$
Becker 1965 vs. Gronau 1977

- **Gronau**
  - \( U(C) + v(L) \)
  - \( C = g(C_m, C_h), C_h = h(K_h, N_h) \)

- **Becker**
  - \( U(X_1, X_2, ..., X_J) \)
  - \( X_j = f^j(C_j, L_j), \)
  - \( \frac{f^j_C}{f^j_L} = \frac{P_j}{W} \)
Substitution between Time and Good within Activity

Different ways to spend leisure time:

- Goods intensive way - High wage earner
  - go to Lakers game
  - High \( \frac{C_j}{L_j} \) ratio

- Time intensive way - Low wage earner
  - Watch TV at home
  - Low \( \frac{C_j}{L_j} \) ratio
Intra- vs. Inter-temporal Substitution

- Leisure activities: high inter-temporal substitution
  - Alaskan Cruise
  - Non-convexity
- Food: low inter-temporal substitution
Aguiar and Hurst, 2009

Figure 2a:
Expenditures over the Lifecycle, Categories that Do Not Decline After Middle Age

Notes: This figure plots mean expenditure by age for different consumption categories conditional on cohort and family status controls. More specifically, each point represents the coefficient on the corresponding age dummy from the estimation of equation 1, with age 25 being the omitted group. The consumption categories we explore in Figure 2a are Entertainment (filled circles), Utilities (squares), Other Nondurables (diamonds), Housing Services (triangle), and Domestic Services (open circles). The consumption categories we explore in Figure 2b are Clothing and Personal Care (filled circles), Transportation (squares), Food at Home (diamonds), and Food Away from Home (triangle). See the note to Figure 1 for empirical strategy and sample description. See text and Appendix A for a discussion of the consumption categories.
Figure 2a: Expenditures over the Lifecycle, Categories that Do Not Decline After Middle Age

Figure 2b: Expenditures over the Lifecycle, Categories that Decline After Middle Age

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Figure 7: Summary of Life Cycle Expenditure Patterns

a. Lifecycle Profile of Expenditures

b. Lifecycle Profile of Cross Sectional Variance

Notes:
Figures 6a are identical to Figures 1a and 1b, respectively, except that we disaggregate nondurable consumption into only three categories. The categories are food (diamonds) which includes food away from home and food at home, work related expenses (circles) which include transportation and clothing/personal care, and "core nondurables" which includes all other categories of total nondurable expenditure (including housing services but excluding alcohol and tobacco). See the notes to Figures 1a and 1b for additional sample and estimation descriptions.
Figure 3a: Cross Sectional Variance of Expenditure Over the Lifecycle, Decreasing Variance Categories

Figure 3b: Cross Sectional Variance of Expenditure Over the Lifecycle, Increasing Variance Categories

Notes: This figure depicts the life cycle profile of the variance of log expenditure for different consumption categories conditional on cohort and family composition controls. Specifically, we compute the standard deviation of the residuals at each age and cohort from the regression of log expenditure for each category on age, cohort, and family composition controls (equation (1)), and then remove cohort fixed effects from the age-specific variances (equation (2)). The consumption categories we explore in Figure 3a are Entertainment (filled circles), Utilities (squares), Other Nondurables (diamonds), Housing Services (triangle), and Food at Home (open circles). The consumption categories we explore in Figure 3b are Clothing and Personal Care (filled circles), Transportation (squares), Food at Home (triangles), and Domestic Services (diamonds). All data are weighted to be nationally representative using the CEX core weights. See the note to Figure 1 for empirical strategy and sample description. See text and Appendix A for a discussion of the consumption categories.
Summary

- Very nice paper, important contribution.
- Detailed expenditure category.
- Could be even better if estimate the home prod. technology
  - Especially if combined with Time Use Survey