Love-for-Variety

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International Seminar on Trade (May 2025)

Background

- Price index under CES demand system

$$P(\mathbf{p}) = \left[\int_{\Omega} p_{\omega}^{1-\sigma} d\omega\right]^{\frac{1}{1-\sigma}} = V^{\frac{1}{1-\sigma}} \bar{p} \quad \Longrightarrow \quad \underbrace{\frac{\partial \ln P}{\partial \ln V} = \frac{1}{1-\sigma}}_{\text{love for variety}}$$

  - $V \equiv \mid \Omega \mid$ is the measure of available varieties
  - $\bar{p} \equiv \left[\int_{\mathscr{P}} p^{1-\sigma} dF(p)\right]^{\frac{1}{1-\sigma}}$ is an average price measure

- Benassy's crtique: love for variety is arbitrarily linked to the degree of market power (σ)
  - proposed solution: set $P(\mathbf{p}) = V^{\nu} \bar{p}$

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- Recent development: explosion of non-CES models to accommodate variable markups, but less attention to how love for variety is linked to market power in non-CES frameworks

Overview of Contribution

- This paper bridges this gap, focusing on symmetric homothetic demand systems:
  - price elasticity of demand: $\zeta(\mathbf{p}/p_\omega)$ for $\omega \in \Omega \subset \overline{\Omega}$
  - price index: $P(\boldsymbol{p})$
- Consider symmetric prices: $\boldsymbol{p}/p_\omega = \mathbf{1}_\Omega^{-1} \equiv (\overbrace{1,\cdots,1}^{\Omega}, \overbrace{\infty,\cdots,\infty}^{\overline{\Omega}/\Omega})$
- Define two measures as a function of $V \equiv \mid \Omega \mid$

$$\underbrace{\sigma(V) \equiv \zeta(\mathbf{1}_\Omega^{-1})}_{\text{substitutability}} \qquad \underbrace{\mathcal{L}(V) \equiv \frac{\partial \ln P(\mathbf{1}_\Omega^{-1})}{\partial \ln V}}_{\text{love-for-variety}}$$

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- **Main result:** For a sub-class of symmetric homothetic demand systems (*HSA*, *HDIA*, *HIIA*):

$$\underbrace{\partial\zeta(.)/\partial p_\omega > 0}_{\text{2nd law of demand}} \iff \sigma'(V) > 0 \implies \mathcal{L}'(V) < 0$$

General Assessment

- The theory is elegant and provides a sharp theorem, linking σ to $\mathcal{L}$ within an important class of non-CES demand systems
- At the same time: σ and $\mathcal{L}$ are counterfactual elasticity measures under
  1. symmetric price patterns ($p_\omega = p$ for all $\omega \in \Omega$)
  2. irrelevance of independent alternatives (IIA)
- These two restrictions may limit practical applications

Main comments:

- *clarifying relation to quantitative literature:* the non-CES framework is in some ways more restrictive than nested or mixed-CES demand in state-of-the-art quantitive models
- *formalizing applications:* the paper has a lot potentially important applications, but they are not clearly formalized (the current discussion of applications is a bit hand-wavy)

Connection to Quantitative Trade Literature

- Gains from increased variety depend on
  1. how love-for-variety varies across $\omega \in \Omega$
  2. how love-for-variety varies with $V = \mid \Omega \mid$
- The quantitative trade literature has made progress in measuring cross-ω variation
  - partition varieties into $s = 1, .., S$ product segments: $\Omega = \Omega_1 \cup \cdots \cup \Omega_S$
  - relax symmetry and IIA but impose CES within product segments
  - estimate product-level love-for-variety, $\mathcal{L}_s = \frac{\partial \ln P_s(\mathbf{p}_s, V_s)}{\partial \ln V_s}$
    (Adao et al. 2017; Lashkaripour-Lugovskyy 2023)

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    (Adao et al. 2017; Lashkaripour-Lugovskyy 2023)
- The evidence provided by these studies reject symmetric preferences and IIA
- *This paper*: relaxes parametric assumptions, but brings back symmetry & IIA to characterize $\mathcal{L}'(V)$ under symmetric price patterns

Application to Gains from Trade?

- The paper references gains from trade as a potential application, but this connection requires further clarification and development.
- Under *HSA*, *HDIA*, *HIIA* demand—if the firm size distribution is Pareto with parameter θ:
  - the markup distribution is invariant to trade openness $\longrightarrow$ V is invariant to trade openness
  - the gains from trade for country i are independent of demand (Arkolakis et al. 2019; Fally, 2019)

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- I presume the authors are thinking about the gains from trade *without* Pareto (e.g., non-CES Armington model with internationally-homogeneous prices)
  - If that is the case, it would helpful to formalize this model

Possible Application: Optimal Policy Design

- I think the main result could inform optimal policy design, but the link is not trivial
- The optimal policy consist of a markup proportional to *consumer surplus* and a countervailing subsidy to consumer prices (based on firm productivity φ):

$$\mu_{\varphi}^{*} = \underbrace{\frac{\int_{0}^{x_{\varphi}^{*}} p_{\varphi}(x)dx}{p_{\varphi}^{*}x_{\varphi}^{*}}}_{\delta_{\varphi}}, \qquad \tau_{\varphi}^{*} = \frac{1}{\mu_{\varphi}^{*}}$$

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- Under CES: $\delta_\varphi = 1 + \frac{1}{\sigma - 1}$ coincides with love-for-variety...
- ... but the connection is more nuanced beyond CES: *what does diminishing-love-for-variety (as defined here) entail for δ_φ and optimal policy design?*
- Relatedly: gains from increased variety under general price patterns depend on δ_φ (Baqaee-Farhi-Sangani, 2024), but how is δ_φ linked to this paper's love-for-variety measure?

Conclusion

- Overall, the paper makes a significant contribution toward understanding the calculus of love for variety in settings with non-CES demand systems.
- The theoretical framework is sharp and elegant...
- ... but the main result is derived under (1) independence of irrelevant alternatives and (2) symmetric prices, which may complicate practical applications
- The paper could strengthen its contribution by formalizing one or two practical applications