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Cost of Living Indexes During a Stay-in-Place Order

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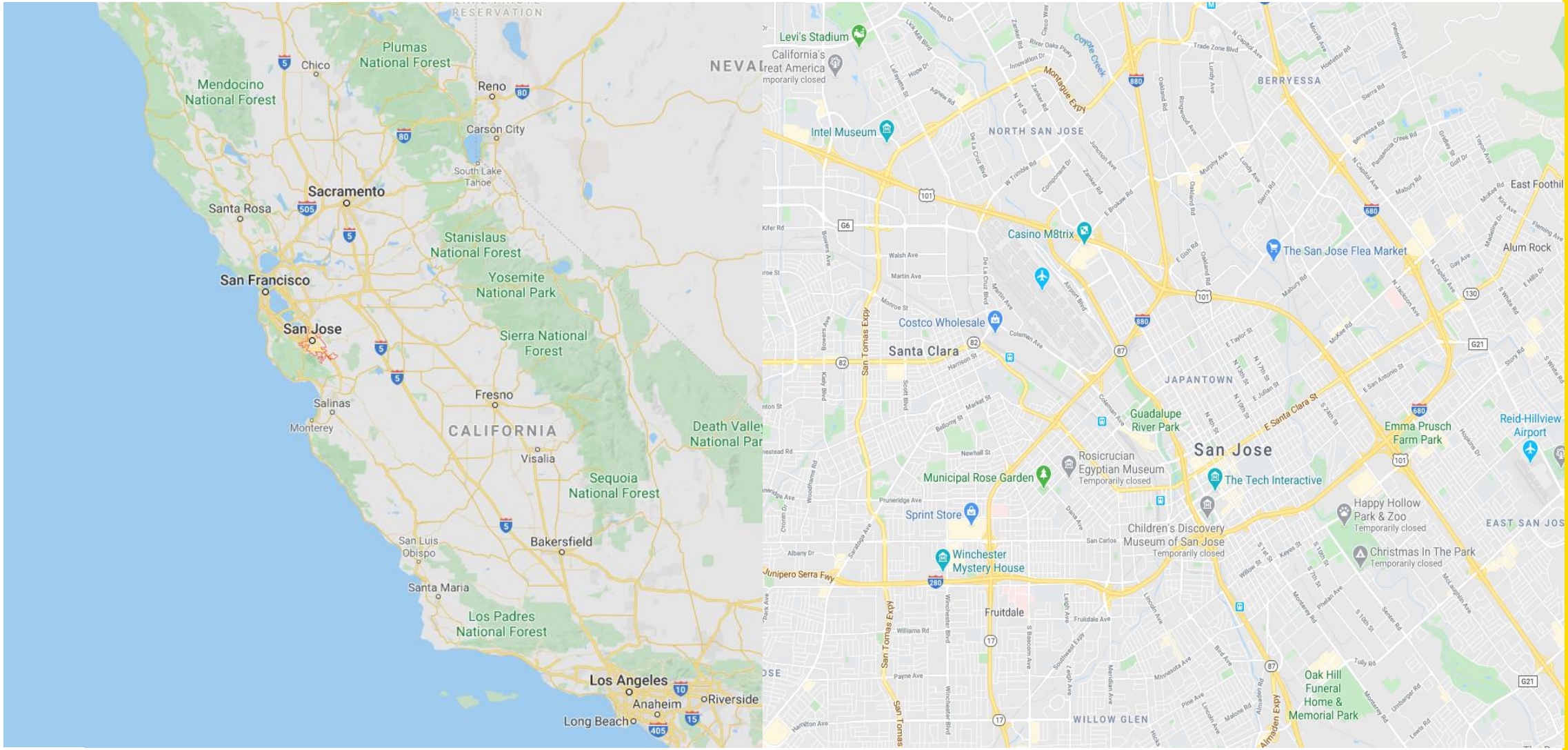
Summary

- Key idea: use value of urban amenities to estimate of changes in the cost of living.
- Differences in regional price levels in 2017 are used to proxy the differences in value of urban amenities.
- All regions are compared to the region with the lowest price level in 2017.
- Differences in price levels are weighted by regional total personal income and averaged to get the aggregate change in the cost of living induced by deprivation of amenities.
- Adjustment made for the length of stay-in-place restrictions.
- 2020 Q1 inflation estimated to be at least 2.8 percent higher than the published CPI.

Comments

- An interesting and thought-provoking paper.
- Points out the problems with the usual carry-forward price methodology.
- Dismisses the Hicksian reservation price approach as an option. (That is, trying to work out the prices that would drive demand to zero for the items that have disappeared.)
- Approach is to compare the price level for every region in 2017 to that which has the lowest price level, Beckley, WV.

San Jose, CA



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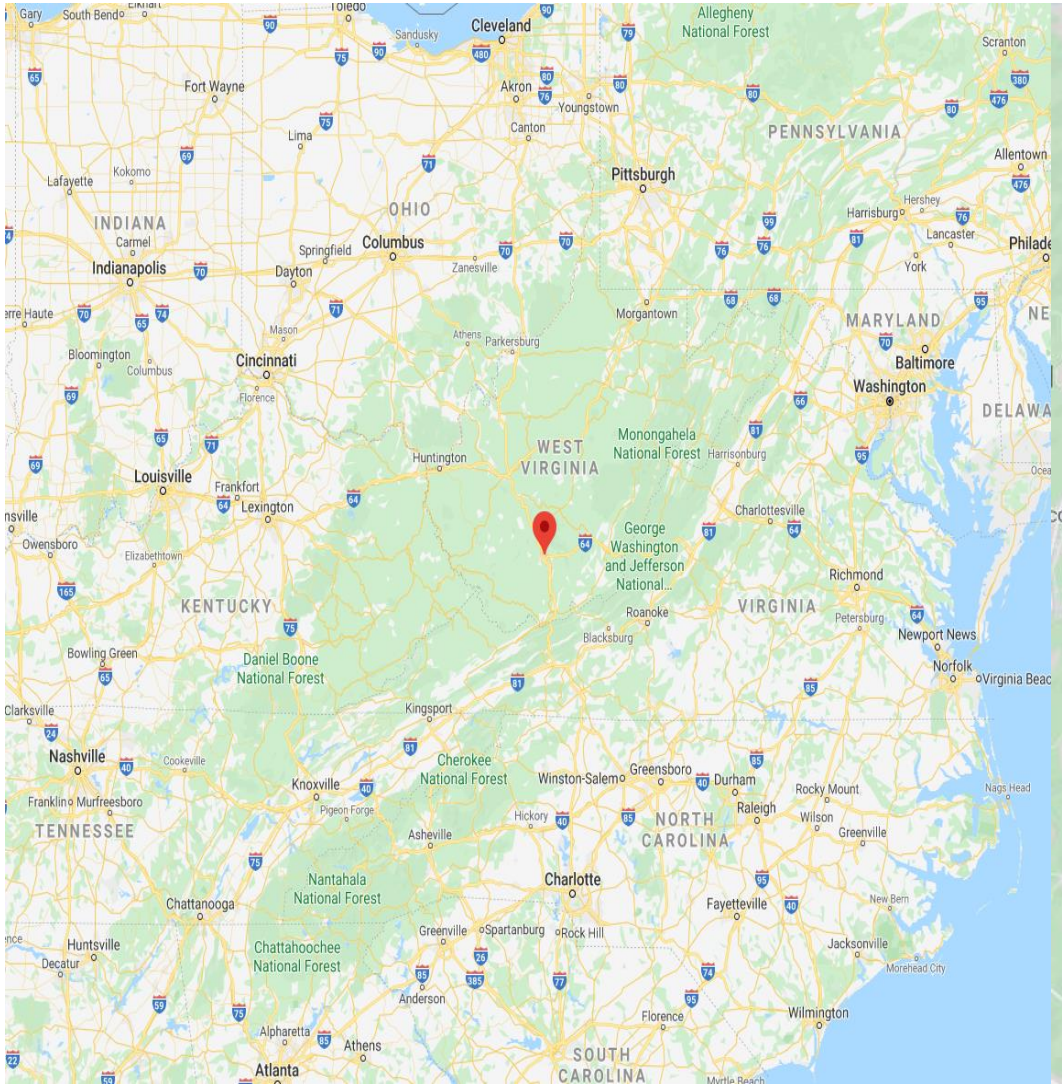
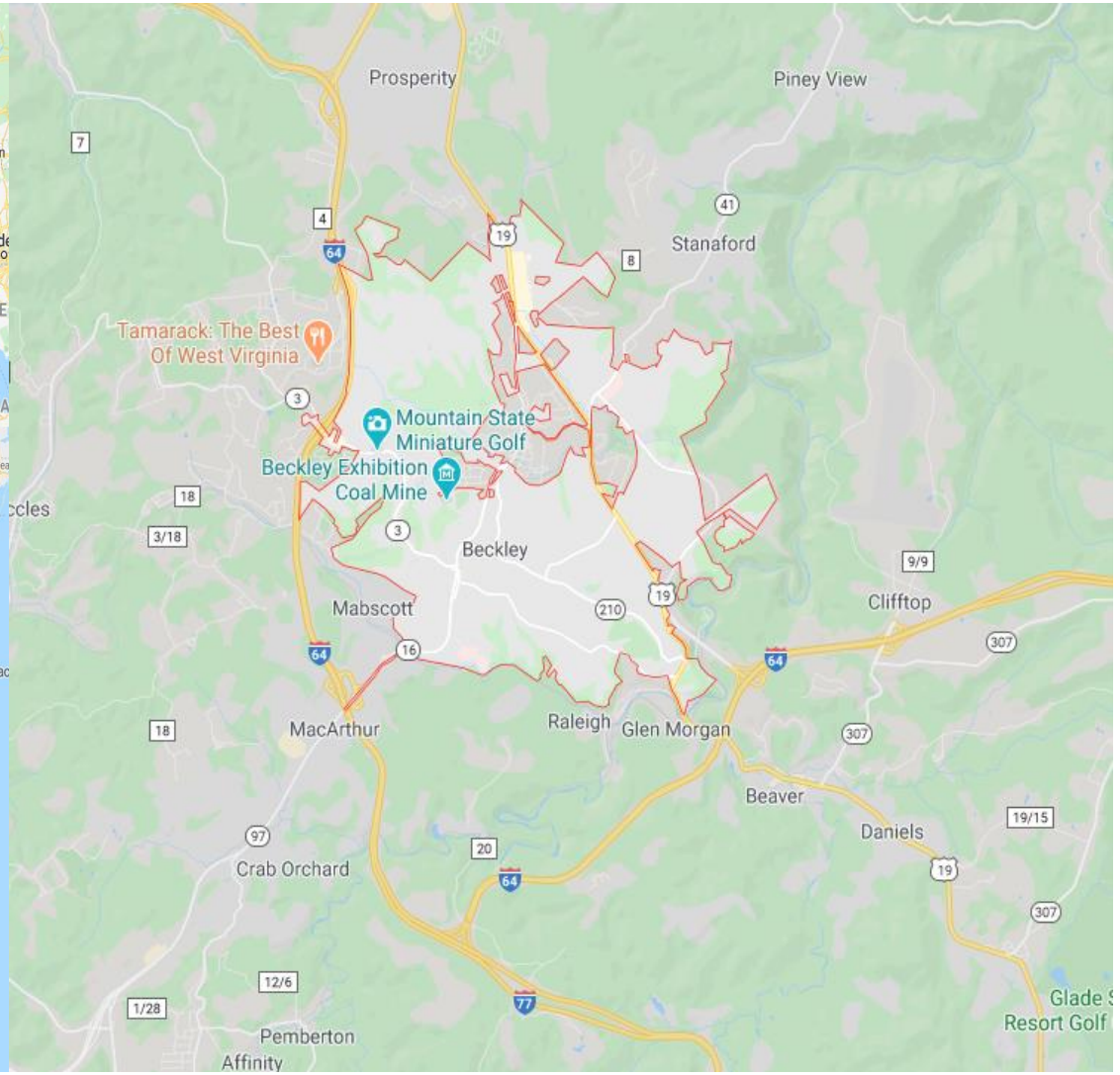
Beckley, WV





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Comments

- Example given in the presentation:
  - "Price levels in 2017 range from 75.3 (Beckley, WV) to 130.9 (San Jose).
  - Therefore, 'true' inflation in San Jose is at least 43 percent (1-75.3/130.9)."
- Let $P^S \equiv$ the price level in San Jose in 2017, and $P^B \equiv$ the price level in Beckley
- Then the 'true' inflation percentage is being calculated using $\frac{(P^S - P^B)}{(P^S)}$.
- How to think about this? Reference is made to the economic theory of the cost of living, but not explicitly set out.

Comments: Konüs Cost of Living Index

- Single consumer case:

Cost minimization problem for achieving utility level u^t:

$$C(u^t, p^t) \equiv \min_q \{p^t \cdot q : f(q) = u^t \equiv f(q^t)\} = p^t \cdot q^t$$

for quantity vector $q \equiv [q_1, \ldots, q_N]$ and corresponding price vector p.

Konüs family of true cost of living indexes, $P_K(p^0, p^1, q)$ is the ratio of the minimum costs of achieving the same level of utility in 0 or 1:

$$P_K(p^0, p^1, q) \equiv \frac{C(u, p^1)}{C(u, p^0)}$$

Can have various empirical approximations to this for a choice of reference utility u (e.g. Laspeyres, Paasche, Fisher etc.)

Comments: Multiple Household/Region Case

- Household or regional prices can be different.

Cost minimization:

$$C^r(u_r^t, e_r, p_r^t) \equiv \min_q \{p_r^t \cdot q : f^r(q, e_r^t) = u_r^t\} = p_r^t \cdot q_r^t$$

Where preferences for the region are represented by $f^r(q, e)$, where e is a vector of "environmental variables" which affect each region, and utility is increasing in e.

Conditional (on e_r) cost of living index:

$$P^* \equiv \frac{\sum_{r=1}^{R} C^r(u_r, e_r, p_r^1)}{\sum_{r=1}^{R} C^r(u_r, e_r, p_r^0)}$$

Comments

- Back to Rachel's problem: $S =$ San Jose, $B =$ Beckley. Regions are $r = S, B$.
- Argument is that amenity accessibility changes under lockdowns, reducing San Jose's "environmental" vector to that of Beckley's:

$$C^S(u, e_B, p_S) - C^S(u, e_S, p_S) \geq 0.$$

- If only e_B is available in San Jose, then the cost of achieving the reference utility level is higher. That is, the cost of living has gone up. This is how I interpret Rachel's argument.
- But in using $\mathrm{P}^{\mathrm{S}} - \mathrm{P}^{\mathrm{B}}$ Rachel seems to use:

$$C^S(u, e, p_S) - C^B(u, e, p_B)$$

- The BEA regional price level data are calculated to approximate relative price levels for a reference utility level and environmental vector.

Comments

What I think is intended to be approximated is:

$$\frac{C^S(u,e_B,p_S)-C^S(u,e_S,p_S)}{C^S(u,e_S,p_S)} = \frac{C^S(u,e_B,p_S)}{C^S(u,e_S,p_S)} - 1 \qquad (*)$$

What I think is approximated is:

$$\frac{C^S(u,e,p_S)-C^B(u,e,p_B)}{C^S(u,e\,p_S)} = 1 - \frac{C^B(u,e,p_B)}{C^S(u,e,p_S)} \qquad (**)$$

The difficulty with (*) is that $C^S(u,e_B,p_s)$ is unobserved. The question then is how good an approximation is $(\mathrm{P^S}-\mathrm{P^B})/\mathrm{P^S}$ to (*)?

Wrapping up

- A few equations would help clarify what calculations were done.
- Make a stronger connection to the theory of the cost of living; arguments used rely on this.
- Stated that “price index theory has not yet fully worked out a procedure to translate reported willingness-to-accept into empirical price indexes”. I think we’ve worked this out – WTA experiments a useful source of Hicksian reservation prices.
- All comparisons are made using 2017 relative price levels; relevance for 2020?
- BEA uses the Geary-Khamis multilateral index method used for getting the price levels. Assumes preferences are either linear (all commodities are perfect substitutes) or Leontief (no substitution). Might work OK in normal times (2017), perhaps doesn’t represent the substitution that has happened under pandemic conditions (2020).

Wrapping up

- Really need reservation prices and continuous consumer expenditure survey.