Our Spatial Paper

Your Name

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Abstract

Please be concise.

1 Introduction

What is the question or policy you want to examine? Although we encourage creativity, our main goal is to make you more familiar with quantitative spatial models and give you some practice. If you have hard time coming up with an implementable idea, you can choose from the following list of topics

paste in jeffrey's motivation from erh meeting We are going to examine the impact of the introduction of autonomous vehicles (AVs) on the spatial distribution of economic activity.

While AVs have not been widely adopted yet, they are no longer a speculative technology. Several cities currently permit their use via rideshare. Several states are currently making decisions about how to regulate AVs (citation XYZ). We are specifically interested in how AVs will differentially affect places with large amounts of high-skill vs. low-skill workers, as AVs will likely be complementary I am not sure complement is exactly the right word to the labor of high-skill people, but more likely ot be a substitute for low-skill labor.

2 Background and Diagnostic

Prompt: (a) Why is the question or policy you want to examine important? (b) Why is a quantitative spatial model the right tool to answer the question? (c) Are there any particular features of the policy/economic environment that are impor- tant for the analysis? Feel free to focus on one or a few aspects that you want to study in depth and identify the underlying mechanisms, which will inform you about the key elements to be included in your model.

The key question we have is: how the reduction in commute costs will differentially affect employment, economic activity and rents, across the country, based on their skill levels. need to sharpen this up a little bit. what's the exact outcome we're interested in?

The widespread adoption of AVs will likely have large effects on the spatial distribution of economic activity. People will be able to work while they commute, and engage in types of leisure that are currently difficult to do while (e.g. watching television). This will permit people to live further from work. Furthermore, there is substantive uncertainty as to how states will regulate AVs. We hope our exercise will inform these regulations.

Our setting lends itself well to quantitative spatial models in the style of [Redding and Rossi-Hansberg, 2017]. The key economic change in our model is a change in the cost of commuting. A lack of detailed data on AVs precludes a reduced-form analysis. And even with such data, without explicitly modeling the movement of goods and people, we risk being subject to the Lucas Critique by not factoring in certain margins of adjustment. Our focus on commuting means we will not richly model the choices of, e.g., the housing sector or goods firms This motivates us to begin with the model of [Monte et al., 2018].

The key novel feature of the economic environment we hope to study and shed light on is that AVs will serve as a complementI am not sure complement is exactly the right word for high-skill labor, but as a substitute for low-skill labor. A full treatment of this question will require a model with at least two types of agents, and endogenous wages. In this draft, for tractability, we capture the AVs-as-substitute intuition in a reduced-form way, by modeling the introduction of AVs as reducing bilateral commute costs more for county-pairs with higher skill levels.

3 Model

We begin with the model of [Monte et al., 2018].

3.0.1 Simplifications and Tweaks

In a future draft, we may consider the following simplifications:

1. removing trade (insert Jeffrey's theory stuff here)

In a future draft, we may consider the following extensions:

1. (i) heterogeneity: explicitly model high and low skill types
2. (ii) endogenize low-types' wages.
3. (iii) consider the forward-looking decision of a household to purchase an A.V.
4. (iv) an optimal tax on AVs to incorporate its labor-replacing externality (?)
5. (v) incorporate AVs for *goods* transport!
6. (vi) choices by firms?..

4 Data and Estimation

We use data on wages (based on place of work), commuting flows, distances, etc.

Estimating ψ
Estimating ϕ
Estimating ϵ
Calculating productivity vector A_i

We do not need to invert the bilateral amenities matrix $\mathcal{B}_{in}$. Instead we can use exact hat algebra for our counterfactuals of interest.

5 Counterfactual

We take as our base economy the one with no AV adoption, and commuting costs are calibrated using existing flows.

We then shock the economy by introducing varied adoption, based on the aggregate skill-level of the county pair.

We model the percent change in bilateral commute costs, $\hat{B}_{ni}$ as follows: We define the skill level of county i, s_i as the share of the population above 25, who are college-educated. Define the population-weighted college share of county pair ni as

Probably want to use residents then. We don't have data on education level based on place of work.

$s_{ni} = \frac{R_i s_n + R_i s_i}{R_i + R_n}$

Where we use the ACS 2006-2010 $\hat{B}_{ni} =$

Justify what we do a little better here and connect it to the distributional effects "story" earlier in the paper

Under what assumptions does this simple exercise capture the intuition above?

Note, we are shocking transit costs, so immobile features of the location pair, not wages themselves.

6 Appendix

Painful proofs go here.

References

Ferdinando Monte, Stephen J Redding, and Esteban Rossi-Hansberg. Commuting, migration, and local employment elasticities. *American Economic Review*, 108(12):3855–3890, 2018. doi: 10.1257/aer.20151507.

Stephen J Redding and Esteban Rossi-Hansberg. Quantitative spatial economics. *Annual Review of Economics*, 9:21–58, 2017. doi: 10.1146/annurev-economics-063016-103713. URL https://doi.org/10.1146/annurev-economics-063016-103713.