

Interview Scripts

[Timeline for 5-min explanation of your JMP]

RQ

What to do

Why important

How I do & Findings

[Timeline for 15-min explanation of your research]

Research fields: 1

JMP: 10

Other papers: 2

Future: 2

Q. Can you explain your JMP? (5min)

- 2 min summary of your JMP: Q, Setting, Top level finding, ordered list of results, conclusion
- 2 min versions of your other papers
- Concrete idea for future research
- Concrete idea of what courses you could teach at a specific school
- Prepare Qs you will ask

Greeting

Thank you very much for having me. I'm Shunsuke, a Ph.D. candidate in economics at Brown University. (0:30)

Research agenda (+ other papers and future after JMP)

I have two strands of research agendas.

First, my broad agenda is to uncover the economic geography and market structure in developing countries, especially focusing on rural areas, and to derive policy implications for improving market efficiency and human welfare as well as reducing environmental costs.

(The shortest summary: I have several papers and ongoing projects on this agenda, including the impact of refugee inflows on host economies and farmers in rural Africa, which is a published paper, the conservation of tropical forests, which is my job market paper, and the caste-based spatial segregation and its efficiency and welfare consequences in Indian villages, which is an ongoing project. (1:00))

My job market paper is one example, and I also have several ongoing and future projects on this agenda at the intersection between development, environment, and spatial economics.

For example, I study the caste-based spatial segregation and its efficiency and welfare consequences in Indian villages, by developing a spatial rural model that explains the internal spatial structure of rural villages. We are going to collect detailed information on the caste identity, caste networks, commuting patterns of landless workers to agricultural fields, and the labor and water markets. We aim to evaluate counterfactual scenarios, such as removing caste discrimination if any, improving commuting technology, and place-based irrigation investments.

Related to my job market paper, I also plan to investigate the dynamic process and consequences of community formation, market evolution, and natural resource depletion in tropical forests with a dynamic spatial model and long-term data that we are constructing now.

In addition, I believe that the insight from my job market paper can also be widely applicable not only to other rainforest areas but also to other environmental problems. With my friends, I plan to start a new research project to study the relationship between population density and desertification in mobile pastoral communities in Mongolia.

My second research agenda is to uncover the roots of conflicts, violence, and criminal activities in fragile societies and to propose solutions.

For example, I have one ongoing project in Somalia. We are collecting information from imprisoned ex-combatants of a violent extremist organization in Somalia. We measure ex-combatants' expectations of their lives after their release from the prison and their willingness to make efforts, and we investigate how these outcomes are affected by a randomized intervention of providing role model information.

What courses are you willing to teach?

I'm happy to teach any courses you want me to teach, but if I could choose, I'm willing to teach any level of development economics, environmental economics, and urban and spatial economics, in which I can also include basic theories of international trade. In addition, I could also teach computation economics as I have been teaching it at Brown and you can find my teaching materials on my website, as well as applied econometrics with an emphasis on empirical applications.

Job Market Paper: Short summary

My job market paper studies the conservation of tropical forests, populated by indigenous people.

Policymakers face the inherent trade-off between conserving the rainforest and improving local populations' welfare. For example, restricting forest clearing may reduce deforestation, but it may also reduce agricultural income and thus undermine human welfare.

In addition, human adaptation through sectoral reallocation or spatial reallocation of economic activity may undermine conservation policy goals.

So, in this paper, to design a policy that balances human and ecological well-being, we take the following steps.

First, we build a spatial general equilibrium model that formalizes such human-nature interactions.

Second, we estimate the model using geo-referenced data from river basins in the Peruvian Amazon.

Finally, by counterfactual simulations, we demonstrate that protection policies and transport infrastructure are complementary to improving both human welfare and ecological conservation.

This is the outline of the paper. So, let me briefly describe the model and summarize empirical findings. *(1:30 outline)*

The spatial model includes three sectors, consisting of two rural sectors and one urban sector. We primarily focus on the rural sectors, agriculture, which is associated with deforestation, and extraction of natural resource products, such as fishing and hunting, which is associated with resource depletion and biodiversity loss.

The model considers trade of the three sectors' goods across multiple locations in a river basin where we consider general equilibrium.

Then, the model highlights the rainforest population's trade-off between spatial concentration and dispersion. Intuition is that natural resources and land endowments are more accessible in sparse areas. In contrast, dense areas have more agglomeration benefits as well as better access to market goods.

The balance between these concentration and dispersion forces determines the spatial distribution of economic activity in equilibrium. *(1:00)*

The model's key parameters are density externalities that explain how population density affects productivity in rural sectors: If population density increases (decreases) productivity, it's agglomeration (congestion).

We estimate these parameters by exploiting plausibly exogenous variation in the structure of river networks in the Peruvian Amazon where rivers almost solely constitute the transportation routes. *(30s)*.

In the presence of the density externalities that we estimated and that I will explain in detail soon, counterfactuals show that combining well-targeted place-based protection policies and transport infrastructure can simultaneously achieve higher welfare of local populations, lower deforestation, and less natural resource depletion, compared with those in the benchmark equilibrium.

Importantly, well-targeted means that spatial targeting matters for both types of policies.

For example, the location of transport infrastructure improvement within the river networks determines whether total deforestation increases or decreases. *(1:00; 4:00 in total; The shortest summary, DONE)*

To understand the mechanism behind these policy impacts, the sector-specific density externalities are important.

(So, can I get into the detail? Or, would you have any questions now? *No need to say this?*)

First, let's look at the agricultural sector and deforestation.

We find a strong agglomeration externality in agricultural production and marketing.

More importantly, this agglomeration outweighs dispersion forces in access to land, implying that higher concentration at a particular location leads to higher productivity with less deforestation per farmer.

Then, transport infrastructure that connects hinterlands to the central area of a river basin can reduce total deforestation by generating more medium-sized settlements and spreading the agglomeration benefits more evenly across the basin, rather than concentrating human settlements too much in the central area.

This transport infrastructure improvement can reallocate farmers from central areas to remote areas and agricultural productivity in remote areas increases due to the agglomeration externality.

At the same time, total deforestation decreases given the structure of congestion forces in access to land, which is a negative and convex relationship between the settlement size and deforestation per capita around the settlement.

This relationship implies that a mean-preserving reduction in the variance of settlement size can decrease total deforestation.

Therefore, transport infrastructure that integrates hinterlands and thus works to reallocate farmers to remote areas reduces the variance of the settlement size, and thus total deforestation decreases.

Next, let's look at natural resource extraction and depletion.

We find a strong congestion externality in natural resource extraction, with spatial spillovers from surrounding populations. This makes sense because, in contrast to the agricultural sector, people tend to travel for fishing or hunting wild animals and thus surrounding populations affect its productivity given finite resource endowments.

Then, protecting the rural frontier, which is defined as the maximum distance from the urban center to locations where human settlements are allowed, works primarily to mitigate natural resource depletion.

This is because, protecting the rural frontier increases the congestion force in extractive activities across the basin but within a more compact area for human settlements, as the surrounding population density increases in most areas for human settlements.

Finally, combining these two distinct types of policies, the transport infrastructure that integrates hinterlands and the rural frontier protection, simultaneously achieves higher human welfare, less deforestation, and less natural resource depletion, while any single policy cannot achieve this, so-called, win-win outcome.

That's why I said at the beginning that protection policies and transport infrastructure are complementary to improving human and ecological well-being. This is the main takeaway of the paper.

By the way, the intuition behind identification is that, to estimate the effect of population size on productivity in a particular location, we exploit the variation in river shapes *in locations far away from the own location*, which would be plausibly uncorrelated with unobservable productivity fundamentals in this location (of course after controlling for a rich set of geographical conditions), but could still affect the employment size through the trade mechanism.

Mechanisms (if asked or if time allows)

The agglomeration externality in agriculture may not be immediately obvious, in part because agglomeration has typically been discussed in urban settings.

We find that the primary mechanism behind the agglomeration is economies of scale in transport technology.

That is, the cost of transporting products from a community decreases with the community population by aggregating exports and using better quality transport modes. (For example, large-scale commercial river boats are more likely to stop by larger communities, or, populations in larger communities may cooperate to invest in fast motor boats.)

Indeed, the present model with the agglomeration externality in productivity is isomorphic to a model with endogenous transport costs that depend on the origin population size.

In addition, we also find that economies of scale in agricultural intensification with modern technologies are behind the agglomeration externality.

Contributions (if asked)

1. This paper is the first to uncover the presence of agglomeration externality in tropical forests. We believe that the mechanism could be applicable to many other rural settings in developing countries.
2. We incorporate general equilibrium forces in the conservation problem, while most prior studies have not considered them.
3. Many previous studies of tropical forests focus on the contexts of extensive commercial investments (e.g., soybeans in Brazil; palm oil plantations in Indonesia), which cannot be generalized to less developed areas where deforestation and other resource extractions are primarily practiced by local populations for their livelihood.

Study area (if asked)

The Peruvian Amazon, our study area, is an ideal setting to study fundamental human-nature interactions for two reasons. First, most of the populations engages in traditional ways of life in remote areas without modern technology and large-scale external investments. These features enable us to attribute resource extraction to small-scale farmers and hunter-gatherers and thus focus on density externalities that they cause. (Second, river networks almost solely constitute the transportation routes in this region. This feature allows us to identify key structural parameters.)

Estimation and identification of density externality parameters (if asked: a single plain sentence + detail)

In particular, to estimate the effect of population size on productivity, we construct a measure of “river network access”, which captures the distance-weighted sum of access to other locations via the river network, as an instrument for each location’s population. The structure of river networks is purely determined by nature.

The exclusion restriction is that the river network access, as a market potential shifter, affects productivity only through its effect on employment and thus through externalities that arise, rather than through productivity fundamentals.

The independence assumption is that, after controlling for a rich set of geographical conditions in the own location, unobservable productivity fundamentals are not correlated with the variation in river network access that can be generated by exogenous river shapes in locations far away from the own location.

Job Market Paper: Q&As

Q. Why do we have to think about the conservation problem in general equilibrium? (Toronto)

A.

Q. How are you thinking about the renewability of natural resources in rainforests? (Toronto)

A.

Q. What is the structure of the land market friction? (NUS)

A.

Q. What is the mechanism behind the agglomeration externality in agriculture? (NYUAD; Aalto; Toronto)

A. See above.

Q. What is the logic behind identification? (NYUAD; Glasgow; NUS)

A. See above.

Q. What is the role of logging? (Sciences Po; Delaware)

A.

Q. How about the mining sector, such as oil? (Toronto)

A.

Q. Doesn't building road cause more deforestation? (Fletcher)

A. We are not considering building roads. Specifically, we are considering improving river transport infrastructure.

Q. Why not agglomeration in the urban sector? Does that change results? (Sciences Po; NUS)

A. No

Q. How is the Peruvian Amazon different from the Brazilian Amazon? (Nottingham)

A. See above.

Q. Small-scale deforestation is important? What is the government's view? (Nottingham)

A.

Q. Doesn't deforestation for agriculture also affect other natural resource endowments? (Mark Rosenzweig)

A.

Q. What is the role of trade in natural resource depletion and protection policies? (Academia Sinica) (too broad)

A.

Q. How can transport infrastructure affect the protection status by improving the enforcement capacity? (Delaware)

A. (After paraphrasing the Q...) this is a very good point, but our model is not capturing this effect.

Q. Can transport infrastructure investments generate new associated employment, which affect the protection status by absorbing labor from natural resource extraction? (Nottingham)

A. (After paraphrasing the Q...) this is a very good point, but our model is not capturing this effect.

Q. Why free mobility? Migration cost? (Toronto)

A.

Q. Inflow and outflow? (Sciences Po)

A.

Q. What are the roles of you and your coauthors?

A.

Q. Please tell me about one of your weaknesses?

A. I occasionally focus too much on one task. I'm trying to have a better balance between multiple tasks.

I would also like to get better at time management. I tend to leave things to the last minute.

Q. Do you have any questions to us?

A. What kind of agglomeration benefits are you enjoying?

Job Market Paper (2nd OLDEST)

My job market paper studies the conservation of tropical forests, populated by indigenous people.

Policymakers face the inherent trade-off between conserving the rainforest and improving local populations' welfare. For example, restricting forest clearing may reduce deforestation but also reduce agricultural income and thus undermine human welfare.

In addition, human adaptation through sectoral reallocation or spatial reallocation of economic activity may undermine conservation policy goals.

So, in this paper, to design a policy that balances human and ecological well-being, we build a multi-sector spatial general equilibrium model that formalizes such human-nature interactions.

We estimate the model using high-resolution georeferenced data from river basins in the Peruvian Amazon where we

do not have road access and exploiting plausibly exogenous variation in the structure of river networks.

In the presence of externalities caused by population density, which are key parameters of the model, counterfactual policy simulations demonstrate that combining well-targeted place-based protection policies and transport infrastructure can simultaneously achieve higher welfare of local populations, lower deforestation, and less natural resource depletion.

Importantly, spatial targeting matters for both types of policies.

For example, the location of transport infrastructure improvement within the river networks determines whether total deforestation increases or decreases.

This is the shortest summary of my job market paper and I'd like to describe each step in more detail, but would you have any questions at this moment?

(The model includes two rural sectors and an urban sector.)

(The rural sectors include agriculture and extraction of natural resource products such as fishing and hunting.)

The model highlights the rainforest population's trade-off between concentration and dispersion.

Intuition is that natural resource and land endowments are more accessible in sparse areas.

In contrast, dense areas have better access of market goods and more agglomeration benefits.

The balance between these concentration and dispersion forces determines the spatial distribution of economic activity in equilibrium.

We estimate the model using high-resolution georeferenced data from river basins in the Peruvian Amazon where we do not have road access.

In particular, we estimate externality parameters that explain how population density affects productivity in different rural sectors by exploiting plausibly exogenous variation in the structure of river networks.

If population density increases productivity, it's agglomeration.

If population density decreases productivity, it's congestion.

We find a strong agglomeration externality in agricultural production and marketing.

More importantly, this agglomeration outweighs dispersion forces in access to land, implying that higher concentration leads to higher productivity with less deforestation per farmer.

In addition, we also find a strong congestion externality with spatial spillovers from surrounding populations in natural resource extraction.

However, in the presence of externalities, there should be an external intervention that

2 rural sectors + 1 urban sector: where to introduce?