

# Research Statement

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My primary research fields are development economics, spatial economics, and environmental economics. In particular, I have strong interests in agriculture, natural resources, forest conservation, biodiversity, rural livelihoods, subsistence economy, market transaction costs, caste discrimination and segregation, economies of density, economic geography, and trade. My professional mission is to derive rich policy implications for improving human welfare and mitigating environmental costs in developing economies.

My secondary research fields are political economy and conflict. For example, I am currently studying conflicts that involve violent extremist organizations from spatial, historical, and behavioral perspectives. My professional mission is to uncover the roots of conflicts, criminal activities, and violence in fragile societies and to propose solutions.

My empirical methods, data, and study areas are diverse. As an applied microeconomist, I implement standard causal inferences with non-experimental data, lab experiments and randomized controlled trials, and structural modeling and estimation. I use publicly available censuses and surveys, historical maps and records, satellite images, and field data. As a development economist, I have a balanced geographic emphasis on Africa, India, and Latin America. Below I summarize my research papers, ongoing projects, and future research.

## *Research Papers*

### **“Human and Nature: Economies of Density and Conservation in the Amazon Rainforests”**

In my job market paper, coauthored with Yoshito Takasaki and Mari Tanaka, we explore human-ecological well-being in rainforests. While the conservation of tropical forests is a key element of global efforts to slow climate change and preserve biodiversity, its impact on the material standard of living of local populations is unclear. Moreover, human adaptation through sectoral or spatial reallocation of economic activity may undermine conservation policy goals. We argue that these questions turn on the direction and magnitude of agglomeration economies in agricultural production, forest clearing, and natural resource extraction. In particular, this paper estimates a multi-sector spatial model that formalizes human-nature interactions using high-resolution georeferenced data from roadless river basins in the Peruvian Amazon and plausibly exogenous variation in the structure of river networks. We find that the agglomeration externality in agricultural production outweighs dispersion forces in access to land, implying that higher concentration leads to higher productivity with smaller deforestation per farmer. We also find a strong congestion externality with spatial spillovers in natural resource extraction. The estimated agglomeration externality, primarily driven by economies of scale in transport technology and agricultural intensification, has large impacts on improving welfare and reducing deforestation but leads to natural resource depletion through general equilibrium effects. Counterfactuals demonstrate that well-targeted river infrastructure investments and place-based protection policies are complementary to improving welfare and conservation. While protecting the rural frontier mitigates natural resource depletion, transport infrastructure that integrates hinterlands can reduce deforestation by generating moderate-sized but dispersed settlements and spreading the agglomeration benefits more evenly across the basin.

### **“Refugee Inflows, Surplus Farm Labor, and Crop Marketization in Rural Africa”**

In this paper, published in the *Journal of Development Economics* in 2022, I shed light on the structure of factor and output market frictions to investigate long-term effect of refugee inflows on host farmers. Combining a canonical agricultural household model, the natural experimental setting of mass refugee inflows into Tanzania in the early 1990s, and longitudinal panel data

from the host economy, I show that refugee inflows cause market-specific gains and losses. In particular, the refugee inflows have increased labor market transaction costs and decreased crop market transaction costs. In both markets, fixed transaction costs play a dominant role. The impact of hosting refugees lasts long even after refugees have left camps.

### **“The Golden City on the Edge: Economic Geography and Jihad over Centuries”**

In this paper, coauthored with Masahiro Kubo, we attempt to uncover the evolution of cities and Islamist insurgencies, so called *jihad*, in the process of the reversal of fortune over the centuries. In West Africa, water access in ancient periods predicts the locations of the core cities of inland trade routes—the trans-Saharan caravan routes—founded up to the 1800s, when historical Islamic states played significant economic roles before European colonization. In contrast, ancient water access does not have a persistent influence on contemporary city formation and economic activities. After European colonization and the invention of modern trading technologies, along with the constant shrinking of water sources, landlocked pre-colonial core cities contracted or became extinct. Employing an instrumental variable strategy, we show that these deserted locations have today been replaced by battlefields for jihadist organizations. We argue that the power relations between Islamic states and the European military during the 19th century colonial era shaped the persistence of jihadist ideology as a legacy of colonization. Investigations into religious ideology related to jihadism, using individual-level surveys from Muslims, support this mechanism. Moreover, the concentration of jihadist violence in “past-core-and-present-periphery” areas in West Africa is consistent with a global-scale phenomenon.

## ***Ongoing Projects***

### **“Caste Segregation and Spatial Misallocation in Village India”**

In this project, with Kazuki Motohashi and Mike Neubauer, we study the efficiency consequence of mitigating caste discrimination and commuting constraints that stem from caste-based spatial segregation in Indian villages. We are collecting data from all households and agricultural fields in six villages in rural Bihar province. Baseline data from the 2021 winter show a stark caste-based residential segregation. We will collect more detailed information on caste statuses, within- and across-caste networks, commuting patterns and the labor market, and irrigation facilities and the water market. We develop a quantitative spatial model to rationalize the internal spatial structure of a rural Indian village. The model incorporates multiple caste groups of landless workers and land owners, commuting from a residential location to an agricultural field, caste-specific residential amenities, and productivity spillovers across neighboring fields. We will use the model and data to evaluate three distinct, contextually-relevant, counterfactual scenarios: eliminating caste-based discrimination (in the labor or water market), introducing a new commuting technology, and place-based investments in irrigation facilities.

### **“The Economics of Subsistence in Africa”**

In this project, I attempt to uncover the geography of widespread subsistence behavior in rural Africa through the lens of economies of density in a general equilibrium framework. Representative household surveys from the wide Niger river basin show that the relationship between farmers’ market access and crop subsistence is not universal. I construct a linear geography model of self-employed agricultural households with varying population densities across different market accesses. Seemingly puzzling spatial patterns of crop trade and subsistence from the data are rationalized by the interaction between market access, fixed land endowments, population distribution, and the structure of crop and labor market transaction costs.

### **“De-Radicalization and Reintegration from Violent Islamic Extremism”**

In this project, with Rob Blair, Jun Goto, and Yosuke Nagai, we attempt to measure key pre-conditions for de-radicalization and reintegration from violent Islamic extremism. We will collect 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, their willingness to make efforts, and how these outcomes are affected by a randomized intervention of providing role model information. The role model information is from ex-combatants who successfully reintegrated into the civil society after they surrendered or were imprisoned. Since the sampled ex-combatants are in the prison, we can investigate the impact of new information in the environment where there are no other ways to obtain information. We employ a standard visual method to measure their expectations in terms of working conditions after their release, such as expected income, expected frequency of having a job, and expected occupation. Their willingness to make efforts are measured by an optional goal-setting training. We will then disentangle mechanisms behind the role model effect with particular focuses on self-motivation and overconfidence to investigate under what conditions the effort toward successful reintegration is enhanced. This research also has a methodological contribution that we can collect all the data for analysis by a one-shot tablet-based survey. This increases the possibility of conducting research in an environment where it is extremely difficult to approach research subjects.

### **“Building Ethnic Coexistence and Market Opportunities for High-Risk Populations”**

In this project, with Tomohiro Hara and Yosuke Nagai, we attempt to uncover the simultaneous process of building coexistence between ethnic groups in tension and improving market efficiency through market and non-market forces. We focus on a geographically-concentrated Somali community and its surrounding non-Somali communities, which exhibit some tension, in Nairobi, Kenya. Targeting a high-risk population in these fragile communities, we create two experimental variations through a skill-specific vocational training: (i) the variation in market opportunities inside and outside each community and (ii) the variation in opportunities for intergroup contacts. We are also developing ways to approach and target high-risk populations.

### ***Future Works***

I plan to continue to pursue my current line of research and aim to further advance the frontier.

First, I plan to explore topics surrounding my job market paper. In this paper, the counterfactual spatial distribution of human settlements is studied in a static sense. I plan to investigate the dynamic process and consequences of community formation, resource depletion, policy responses, and the entry of external investments in tropical forests. In another setting, I plan to investigate the depletion of common pool resources in pastoral societies in spatial equilibrium.

Second, I plan to apply spatial economics to granular settings in rural developing economies. In addition to studying the economic geography in rural areas as in my job market paper, I also aim to develop a “spatial rural model” to study the internal structure of rural communities. This goes beyond the analogue of quantitative urban models that study the internal city structure, due to the various market imperfections inherent in rural developing economies. Moreover, in the absence of large-scale intra-village spatial data, new field data collection is necessary to pursue this agenda. The aforementioned ongoing project in India aims to be the starting point.

Third, I plan to combine two seemingly unrelated research agendas from spatial economics and political economy. For example, I am attempting to incorporate political factors into a spatial model to explain the spatial distribution of conflict and to assess the effects of place-based policies and individual-level de-radicalization on reducing conflict and violence. I also plan to study general equilibrium effects of integrating high-risk populations into society.