IDE Research Bulletin

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DEVELOPMENT OF A GEOGRAPHICAL SIMULATION MODEL(IDE-GSM) AND GEO-ECONOMIC DATASET

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Development of a Geographical Simulation Model (IDE-GSM) and geo-economic dataset

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Since 2007, the Institute of Developing Economies (IDE) has been developing a Geographical Simulation Model (IDE-GSM), a unique, numerical, general equilibrium simulation model based on spatial economics. IDE-GSM has two objectives, namely (1) to simulate the dynamics of locations of populations and industries in East Asia in the long term and (2) to analyze the impact of trade and transport facilitation measures (TTFMs) on the regional economy at the subnational level.

This year, we have continued the research in two directions, namely, data compilation/parameter estimates and applications to TTFMs analyses. For the former, we compiled a geo-economic dataset for Africa, Europe, and the United States. For Africa, we use satellite imagery, land cover data and population data, and the number of mines to divide sectoral GDP at the national level to each subnational region. For Europe and the US, we used official statistics and compiled the dataset at NUTS2 level for the EU and the state level for the US. As of January 31st, 2019, the IDE-GSM dataset covers more than 3,000 regions in 98 countries.

For the second direction, we conducted three related research projects. The first is an analysis of the US-China trade war that began in 2018. The analysis by IDE-GSM revealed that the US-China trade war harms the economies of both countries, while other countries benefit somewhat from substitution of demand from the US and China. The second research is estimating the economic impacts from an international expressway between Vientiane, Laos, and Hanoi, Vietnam. The study revealed that the benefit to Vietnam and Thailand would be more or less the same, regardless of whether Laos' section of the expressway is the current

official candidate route or the NR8 or the N12, while the benefit for Laos depends strongly on the distance from the expressway to its capital city. The third research is an empirical analysis to estimate the relationship between transport costs and a price index in Indonesia. Our analysis reveals that maritime transportation is costlier than land transportation. This research will contribute to the refinement of the core model and parameters of IDE-GSM in the future. The details of the research are as follows.

Economic Impacts of US and China Trade War to the Asian Economy: An Applied Analysis of IDE-GSM

In this paper, we try to estimate the economic impacts of the US–China trade war that began in 2018. We used IDE-GSM, a computational general equilibrium simulation model, to estimate the economic impacts of a "full-confrontation" scenario wherein both countries impose 25% additional tariffs on all goods imported from each other for three years 2019 onwards. In our calculation, the economic impact for the US is -0.4% and -0.6% for China. Some Asian countries actually benefit from the trade war. As far as it remains bilateral, the trade war is only an issue for the concerned parties. We also ran the US–world trade war scenario, wherein the US and all other countries impose a 25% additional tariff on all goods. The negative impact on the global economy is 1.7%, much greater than the 0.1% impact from the US–China trade war. Thus, it is clear that the world cannot afford to engage in a multilateral trade war.

A Geographical Simulation Analysis of Impacts of Vientiane-Hanoi Expressway

In this paper, we estimated the economic impacts of the proposed and some alternative routes of Vientiane-Hanoi Expressway (VHE), using a computational general equilibrium model based on spatial economics. The estimation results show that overall international positive impact depends more on whether it forms a cross-border expressway connection between the capitals of Vietnam and Thailand. The proximity of the expressway to Laos's capital is nevertheless critical to economic benefits expected within Laos.

Transportation Costs in Archipelagos: Evidence from Indonesia

In this paper, we empirically examine the effects of domestic transportation costs on product prices in an archipelagic country, namely, Indonesia. Specifically, we investigate the province-level price of televisions. Our analysis reveals that maritime transportation is more costly than land transportation. For example, a 1% increase in distance in maritime and land transportation increases a product price by 0.08% and 0.02%, respectively. This result implies that the geographical concentration or agglomeration of industries is much costlier in archipelagic countries. In other words, enjoying agglomeration effects is more difficult for archipelagic countries compared with single-island countries; in this sense, archipelagic countries have a topographical disadvantage.