

IDE Research Bulletin

Research Summary based on papers prepared for publication
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Development of a Geographical Simulation Model (IDE-GSM) and Geo-economic Dataset: Population and Industrial Agglomeration in East Asia

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The Institute of Developing Economies (IDE) has been developing the Geographical Simulation Model (IDE-GSM) since 2007, which is 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.

In this year, we have expanded the model from two dimension. One is the sectoral expansion, i.e., mining sector is explicitly included in the model. Now our model comprises eight sectors, including agriculture, mining, services and five manufacturing sectors. The other is the geographical expansion to include Russia, Mongolia and 8 Central and Western Asian countries, i.e., Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Turkmenistan. Now the model covers more than 2,000 regions in 29 countries/economies in East Asia. The rest of East Asian countries/economies are

Bangladesh, Brunei Darussalam, Cambodia, China, Hong Kong, India, Sri Lanka, Indonesia, Japan, Korea, Lao PDR, Macao, Myanmar, Malaysia, Philippines, Singapore, Taiwan, Thailand, and Vietnam.

IDE-GSM enables us to predict the economic impacts of various TTFMs, such as lowering tariffs, customs facilitation measures, reduction in non-tariff barriers, and the development of transport infrastructure. In this project, we have carried out the analyses on various infrastructure development projects, economic corridors and FTA/RTAs. Recently, China's One Belt One Road (OBOR) initiative has been attracting attention and the interest to ASEAN-India connectivity is on the rise. IDE-GSM is suitable to analyse the economic impacts of these large-scale infrastructure development involving many countries.

TTFMs Analyses

In this year, we have conducted various analyses on TTFMs and two of them are summarized and compared in the papers below.

China-Kyrgyzstan railway meets IDE-GSM (DP630)

We examined the impact of connecting Kashgar, Troughart, Uzgen, and Karasuu and facilitating customs at the national border between China and Kyrgyzstan, using IDE-GSM. We found that the railway connection was projected to have a positive impact in southern Kyrgyzstan and a negative impact in regions of northern Kyrgyzstan, neither of which are the capital city of Kyrgyzstan. The contrast between the regions where the per capita GDP was found to increase and decrease became clear when customs facilitation were included in the analysis. Furthermore, we found that most countries in Central Asia, as well as China, almost all regions of Russia, and Mongolia would benefit from both a new railway and customs facilitation, although the scale of such benefits would be small. Since the region predicted to suffer from the new railway only included one region in Kyrgyzstan out of seven, transferring resources from the benefiting regions to the suffering region may be

sufficient to narrow regional gaps.

Geographical Simulation Analysis of the Development of Thilawa and Myanmar (DP 639)

By using the IDE-GSM, we compare the economic impacts of Special Economic Zone (SEZ) construction and other policy measures of Myanmar. In Myanmar, there remains a difficulty in conducting a quantitative analysis due to lack of quality data. However, it cannot be waited until precise data is available because of urgent policy needs in providing recommendations on the development strategy. Despite the difficulty, IDE-GSM has utilized night-time satellite image to estimate and construct regional economic data and conducted simulations. We compare the cases when we concentrate SEZ development in Thilawa/Yangon only and disperse the development into 15 districts in Myanmar. We find that concentrating the development gives much larger economic impact on Myanmar. Moreover, the economic impact will be larger when we assume domestic economic corridor development and regulatory reform in addition to the Thilawa development and it may reduce excessive inflow of the households into Yangon area.

Alongside the simulation analysis, we continue to compile the geo-economic data set for Asia in 2010, and have started the research utilizing a part of the data set, which is essential to improve the reliability of some parameters essential to IDE-GSM. We have also conducted the research to improve the reliability of trade-related data and parameters. In addition to that, we continue to develop some new methods on Geographical Information System (GIS) that can be used to compile geo-economic data as well as transport network data from satellite imagery. Some of these studies are in the following papers.

Studies on data compilation and parameter estimation

Checking the Validity of Simple Replicator Dynamics of Population for Selected Asian Countries (DP 635)

To conduct a realistic economic simulation analysis based on spatial economics like IDE-GSM, one of the issues that influence most to the nature of the model is the replicator dynamics that determine the migration of population. In DP 635, we try to check the validity of a typical replicator dynamics in which population movement only arises from the differences in regional income. Our analysis based on the population and regional GDP data in 2005 and 2010 for Japan and selected ASEAN countries revealed that this simple replicator dynamics is indeed robust enough to be used as a ‘core’ to determine the distribution of population in IDE-GSM. The speed of population movement is around 0.01 to 0.04, which means that a region with a 10% higher income compared with the national average gains 0.1% to 0.4% of population. The result is consistent with previous literatures, especially

Asymmetric Tariff Pass-Through to Trade Prices (DP 631)

This study examines asymmetry in tariff pass-through, that is, how differently import prices react to the rise and decline of most favored nation (MFN) rates. To do that, we analyze Indonesia’s imports because Indonesia suddenly not only reduced MFN rates in a significant number of products but also raised those rates in a larger number of products in 2010. As a result, we found asymmetric tariff pass-through: the trade prices decrease when MFN rates decline but do not change when those rise. Furthermore, examining the effects of MFN change on product quality and quality-adjusted prices separately, we found that the decrease of trade prices when MFN rates decline is led by the reduction of (average) product quality. In addition, we found that once controlling for the change of ad valorem-equivalent rates, the change of tariffs from ad valorem form to specific form does not have additional effects on import prices. These estimates will contribute to setting parameter values used in IDE-GSM.

References

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