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Measuring Connectivity Within and Among Cities in ASEAN

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Preface

Theoretically, cities are understood to generate higher growth, but the optimal degree of urbanization exists, beyond which the gain slows (Henderson, 2003; Duranton, 2009). The optimal degree of urban concentration in terms of maximizing productivity varies with the level of development and a country's size (Henderson, 2003). Many studies also have found that rapid urbanization and rapid growth do not always coincide temporally (Henderson, 2003; Bloom et al., 2008). Keola (2017) suggests that quantification of urbanness based on data collected with varied definitions relies heavily on figures provided by rarely impartial responders, whose knowledge of the requested information is hardly verifiable is a major reason behind such variation. Keola (2017) proposes making use of remote sensing data to consistently measure urban extent. Specifically, it demonstrates how to use spatially high-definition global population grid data sets (LandScan) and nighttime light intensity (DMSP-OLS) to quantify the level of accumulation of human and non-human factors based on consistent sets of thresholds, including spatial units of analysis. Nonetheless, connectivity is clearly an equally important economic metric of urbannnes. Most urban positive externalities assume firm-firm, firm-people, and people-people interaction (Van der Panne, 2004). Consequently, infrastructure, and transport in particular, that facilitate the flow factors are very important for urban areas that strive to gain from the positive externalities of urbanness. Although the importance of connectivity was mentioned in Keola (2017), it was only evaluated briefly using reachable distances from online routing API. Although online routing API, especially that utilizing live traffic data, offers a great potential to quantify connectivity within and among urban areas, most do not provide suitable data needed to evaluate volume, origin, and the destination of traffic. Amindarbari and Sevtsuk (2012) excellently summarize the urban metrics that identify such flows as an important indicator. Flow data is even more difficult to obtain. This paper is a collection of papers that investigate further on potential flow data to evaluate connectivity.

In brief, this report demonstrates how to use vehicles' probe data to evaluate connectivity within and among urban areas. The rest of this report is structured as follows. Keola and Ambashi summarize literature relating to evaluating connectivity using the location data of moving objects and describe data sets collected for this report in Chapter 1. Miyazaki then demonstrates how to measure connectivity within and among urban areas with a major source of Thailand's probe data in Chapters 2. Using the same data set, Keola quantitatively analyzes cross-border connectivity between

Thailand and its neighbors in continental ASEAN. In chapter 4, Hayakawa empirically examines the effect of improved cross-border connectivity in cross-border trade between Thailand and Laos.