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Essays on Transportation Infrastructure, Urbanisation and Economic Growth: Evidence from China

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ABSTRACT

China's spectacular economic growth during the reform era from 1978 to 2008 has captivated much attention both in academia and in the policy arena. This thesis looks at this period of Chinese economic reforms and the consequences for China's economic growth, urbanisation, and income inequality, in which transportation infrastructure plays a pivotal role.

Among many contributors to the economic growth in China, as measured by GDP per capita growth, recent studies shed light on the importance of transportation infrastructure. Therefore, a comprehensive understanding of the function of transportation infrastructure in the context of China and an accurate quantification of its contribution are desired. Accompanying the GDP per capita growth, China also experienced a rapid process of urbanisation during 1978–2008. However, whether the GDP per capita growth causes urbanisation is not yet clear.

After the accession to the WTO in 2001, China became an important player in world trade. For example, China's exports increased from USD 0.27 trillion in 2001 to USD 1.43 trillion in 2008, which has resulted in massive income growth nation-wide. However, the income has been unequally distributed among wage earners. Since urban wage earners are more likely to work in exporting sectors, it is important to analyse the impact of accessibility to international markets, as measured by length of current transport routes from origin city to its nearest major seaport, on income inequality in urban China.

This thesis explores three major areas and improves upon existing methodology. First, it delineates the effect of changes in the density of transportation infrastructure, as measured by length of highways and railroads per square kilometre, on short-run and long-run GDP per capita

growth. Second, it explores the causal impact of annual GDP per capita growth on urbanisation. Third, it quantifies the impact of market access on urban income inequality. Methodologically, this thesis contributes to the literature in terms of providing several identification strategies to pin down endogeneity issues, for instance, reverse causality, measurement errors, and omitted variable bias.

This thesis estimates the short-run (annual) causal effects of changes in the density of transportation infrastructure on economic growth. Using province-level data (1985–2008), this thesis finds that improvement of transportation infrastructure has been statistically significant in raising annual GDP growth per capita. During 1985–2008, on average, a one standard deviation increase in the density of transportation infrastructure accounted for a 6–8.3 percentage point increase in annual GDP per capita growth. This short-run effect is highly robust to a battery of sensitivity tests in magnitude and statistical significance, which confirms previous findings in the literature.

This thesis further quantifies the causal impact of changes in the density of transportation infrastructure on long-run GDP per capita growth, i.e. over a 15-year period. Based on provincial data (1978–2008), the estimates show that a one standard deviation increase in the initial level of transportation infrastructure stock is associated with a 1.54 to 2.44 percentage point increase in GDP per capita growth in the long run. This long-run effect is not reduced by the inclusion of additional control variables. Quantifying this causal impact is crucial, since little work has been done to date about how the initial level of infrastructure drives long-run economic growth.

This thesis also studies whether China's rapid GDP per capita growth has affected urbanisation, since the causal link between these two variables cannot be easily identified. Based on provincial data (1985–2008), this thesis finds that the increase in annual growth in GDP per capita has had a positive causal effect on the urbanisation rate. The effect is strongly robust to a battery of sensitivity tests that bring into the regression different sets of covariates potentially relevant to urbanisation. Thus, the thesis contributes to the literature by confirming the causal impact of economic

growth on urbanisation in China as it transforms from a centrally-planned to a decentralised economy.

Finally, this thesis looks at the influence of accessibility to international markets on urban wage earners. Using a cross-sectional individual income dataset (2002), the estimates show that every 1 percent increase in length of current transport routes from the origin city to the international markets (i.e. the nearest seaport), *ceteris paribus*, has a negative impact on individual wages of 0.086 percent. This causal effect remains robust to the inclusion of various additional controls. The finding emphasises that the heterogeneous accessibility to international markets has led to income disparities among urban wage earners following China's accession to the WTO in 2001.

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DECLARATION

I, XIAOBO HE certify that this work contains no material which has been accepted for the award of any other degree or diploma at any university or tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

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[1] Xiaobo He and Nicholas C.S. Sim (2012). The Effect of Transportation Infrastructure on Growth: The Case of China.

[2] Xiaobo He and Nicholas C.S. Sim (2012). Long-Run Impact of Transportation Infrastructure on Growth: Evidence from China.

[3] Xiaobo He and Nicholas C.S. Sim (2012). Does Economic Growth affect Urbanization? New Evidence from China and the Chinese National Congress.

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0. STATEMENTS OF CONTRIBUTIONS

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The Effect of Transportation Infrastructure on Growth: The Case of China
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Contributed to methodology and data collection, performed empirical analysis, interpreted results and wrote manuscript (Contribution: 50%)

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Long-Run Impact of Transportation Infrastructure on Growth: Evidence from China
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