



Towards a system of open cities in China: Home prices, FDI flows and air quality in 35 major cities

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ABSTRACT

Over the last 30 years, China's major cities have experienced significant income and population growth. Much of this growth has been fueled by urban production spurred by world demand. Using a unique cross-city panel data set, we test several hypotheses concerning the relationship between home prices, wages, foreign direct investment and ambient air pollution across major Chinese cities. Home prices are lower in cities with higher ambient pollution levels, and the marginal valuation for green amenities is rising over time. Cities featuring higher per-capita FDI flows have lower pollution levels. These findings may indicate that major Chinese cities are making the transition from "producer cities" to "consumer cities", which raises the prospects of sustainable economic development in China.

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1. Introduction

Chinese cities have experienced dramatic income and population growth over the last 30 years, spurred by the inflow of foreign direct investment (FDI) and privatization of state-owned enterprises. The annual real income of an average urban resident in 2006 was four times higher than in 1990. China has become the third largest exporter in the world with a trade surplus of \$177.5 billion in 2006. In terms of FDI, by 2005 Chinese inward FDI flows had reached \$72 billion, up from an average of \$30 billion between 1990 and 2000. The stock of FDI has increased similarly, rising from \$20 billion in 1990 to \$317 billion in 2005 (Cole et al., 2008).

The liberalization of the labor and land markets has encouraged urban growth (Zheng et al., 2006). The share of the population living in cities in China has increased from 28% in 1990 to 45% in 2007. In 2007, there were 36 cities with a population of 2 million or greater. Rural to urban migration is responsible for roughly 70% of China's urban population growth (Zhang and Song, 2003). Today, there are still hundreds of millions of rural people in China who are soon expected to move to cities. The central and local governments are planning ahead to provide the necessary infrastructure to accommodate this expected

growth. The governments are also engaged in implementing the urban welfare system reforms to improve the living standard and quality of life of new migrants (especially rural migrants) in cities.

Increasing labor mobility in urban China is pushing Chinese cities towards a system of open cities.¹ They are differentiated with respect to their industrial specialization and their spatially tied amenities. China's economic growth is fueled by urban production spurred by world demand. For example, Shenzhen is a leading exporter of toys. In 2008, it produced 28% of the world's toys.² At the same time, Chinese cities are also ranked among the most polluted places in the world.³

¹ By 1998 the gradual reform of the urban housing welfare system had led to the end of the work-unit based state provision of urban housing and full liberalization of the private housing market in Chinese cities. In 1990s, urban labor market was liberalized as private sector jobs grew significantly. The liberalization both in urban housing and labor markets significantly lowered labor mobility barriers and afforded Chinese people unprecedented freedom in choosing urban locations to live and work. The binding force of the "Hukou" (household residential registration) system on labor mobility has also weakened over time. Migrants without Hukou are allowed to work in cities (with the exception of some occupation restrictions in the largest cities). There is no Hukou restriction on buying housing units in the housing market. We acknowledge that the Hukou system remains an impediment to efficient urban agglomeration (Au and Henderson, 2006). Migrants without Hukou are credit constrained and lack the access to urban social security benefits such as education, public housing and health services in their current residence city.

² <http://www.chinairn.com/doc/4080/267398.html>.

³ See http://www.nap.edu/catalog.php?record_id=11192 and http://www.china-daily.com.cn/china/2007-11/19/content_6264621.htm.

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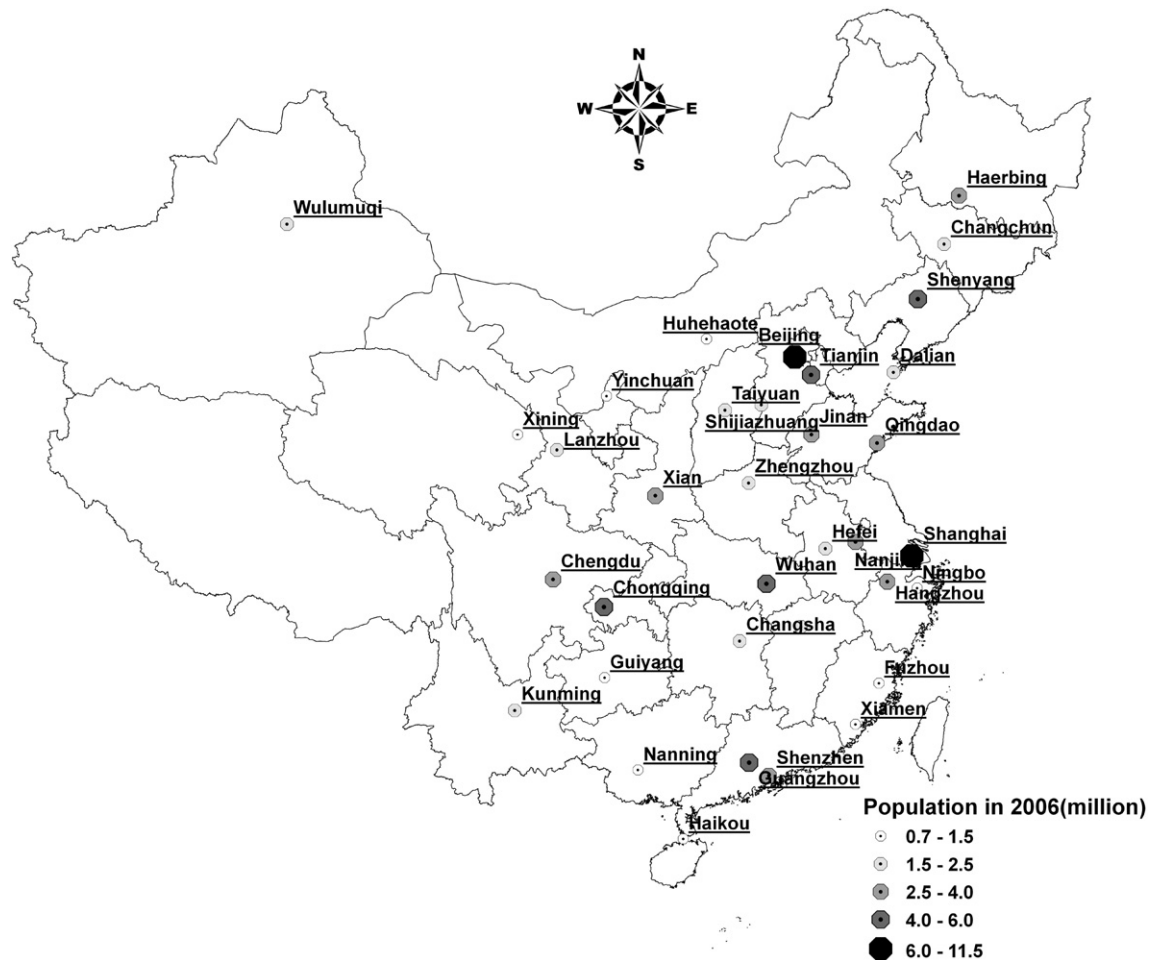


Fig. 1. 35 major cities in China.

China is the largest emitter of sulfur dioxide in the world today. The World Bank estimates that the total health cost of air pollution in China equals 3.8% of GDP (World Bank, 2007). In 2006, Beijing's ambient air pollution (as measured by small particulate matter, PM_{10}) was roughly four times higher than it was in Los Angeles. This suggests that Chinese cities are intentionally or unintentionally positioning themselves as "producer cities" rather than as high amenity "consumer cities" (Glaeser et al., 2001).

In an open system of cities, the labor market and the land market clear simultaneously. People will "vote with their feet" and migrate to cities offering higher real wages (productivity advantages) and/or higher quality of life. Urban Chinese households are more educated and richer than in the past. More and more of them will be seeking out locations that offer high non-market quality of life. In equilibrium, cross-city prices of real estate and wages will adjust to reflect spatially tied attributes. The growth and integration of China's major cities raises a set of basic urban and regional research questions. Using a unique panel data set covering the years 1997 to 2006 for 35 "superstar" cities in China (Fig. 1 shows the location of these cities) that includes information on home prices, amenities, city-specific labor demand shifts, and FDI, we revisit classic urban and regional economics questions based on the recent Chinese experience.⁴

We investigate three main empirical questions. First, based on pooled cross-sectional regression analysis, we measure the size of home price compensating differentials for urban productivity inputs and urban environmental and climate amenities. Second, by exploit-

ing within major city variation over time, we test for how home prices respond to local labor demand shifts and influxes of FDI. We also test for whether real estate prices are more responsive to local demand shifts in cities with a more inelastic housing supply. Finally, this paper presents novel results in explaining cross Chinese city variation in ambient pollution levels. We test whether FDI inflow into a city improves or degrades a city's local air quality.

Our first empirical contribution is to present a new set of compensating differential estimates for local public goods that vary across Chinese cities. One robust finding is that cities with higher particulate levels, all else equal, have lower home prices. We report evidence that this capitalization effect has grown over time. In contrast to the U.S. compensating differential literature on climate (Costa and Kahn, 2003) and human capital (Rauch, 1993), we find little evidence of climate or human capital capitalization effects.

Our within-city dynamics results reveal that home prices in Chinese cities do rise in response to local labor demand increases and FDI inflows. We classify our 35 cities by their housing supply elasticity using the earlier work by Zheng et al. (2008). These price responses in the face of rising local demand are even larger for cities featuring an inelastic housing supply. Our findings are consistent with the results from the United States literature (Glaeser et al., 2005).

FDI is the main source of production technology transfer driving the phenomenal growth of China's manufacturing exports over the last 30 years. In the final section of the paper, we explore the cross-city relationship between ambient urban air pollution and FDI flows. China's cities provide a unique opportunity here because the pollution levels and the FDI flows are both so large. Ex-ante, there are two different possible outcomes associated with urban FDI flows. One

⁴ The 35 major Chinese cities represent all municipalities directly under the central government, provincial capital cities, and quasi provincial capital cities in China.

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