

Module Summary

11. S945 Urbanizing China

Two questions

- How does Module 1 and 2 influence Module 3?
- How does Module 3 constrain or promote urbanization in China?

Modules 1 and 2 vs. 3

- Hukou
- Land
- Finance
- Migration
- HSR
- Cars
- Air Pollution
- Low carbon city
- Fuel efficiency
- Financing access
- Big Data



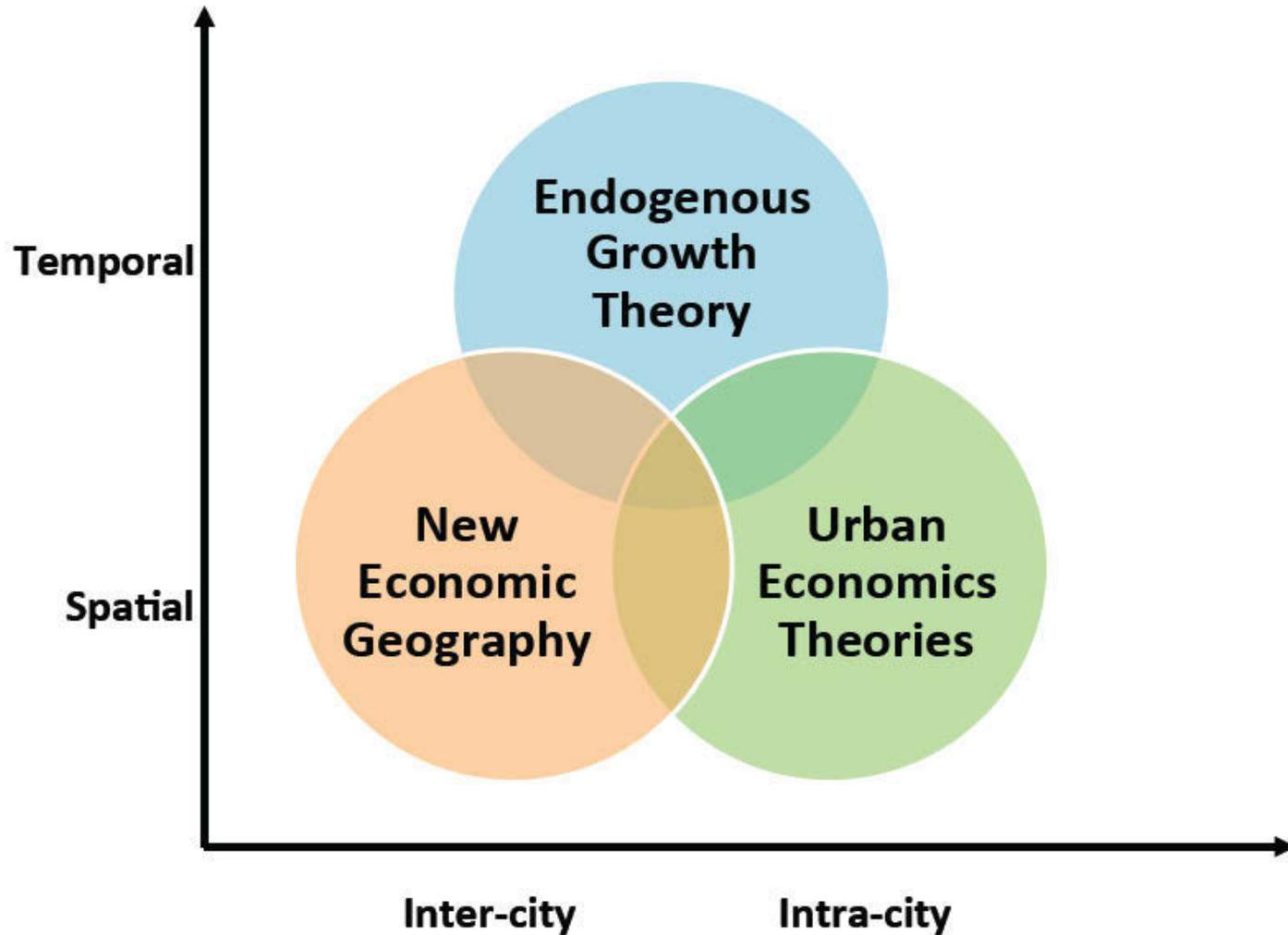
Dispersion of Agglomeration through Transport Infrastructure

A Case of China's High-speed Rail

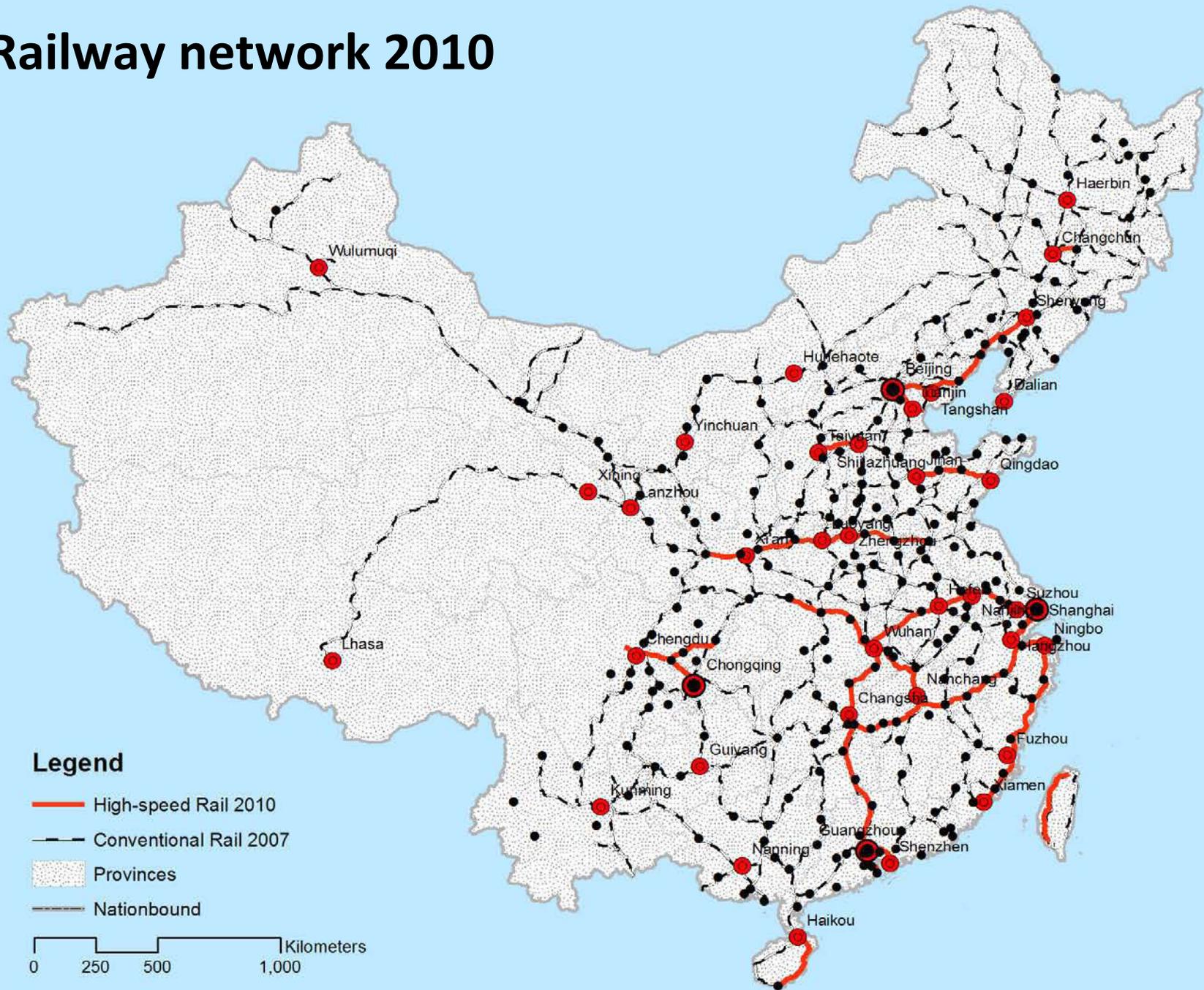


Wanli Fang
Ph.D. Candidate in DUSP, MIT
April 30, 2013

Theoretical foundations

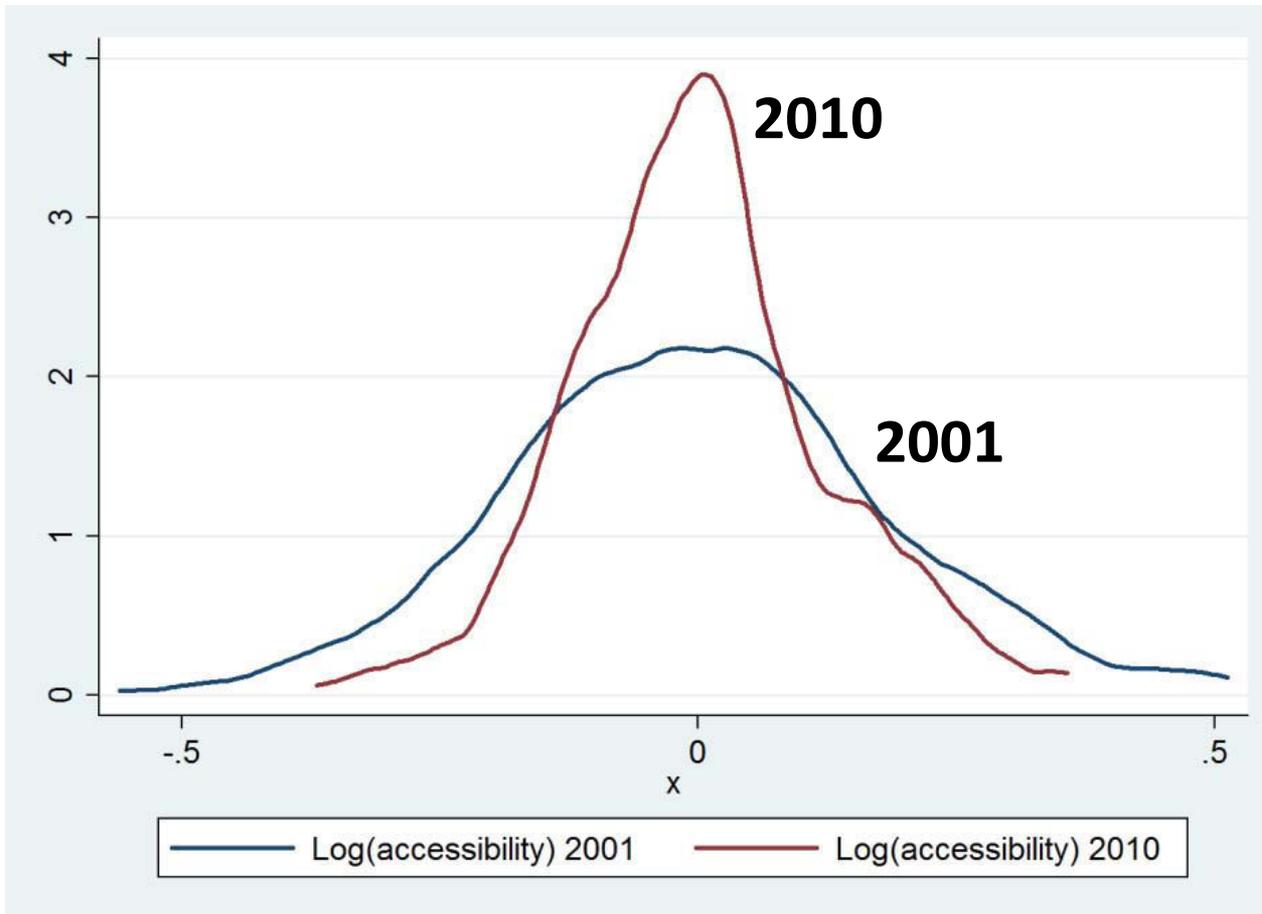


Railway network 2010



Summary

☐ Reduced disparities in accessibility



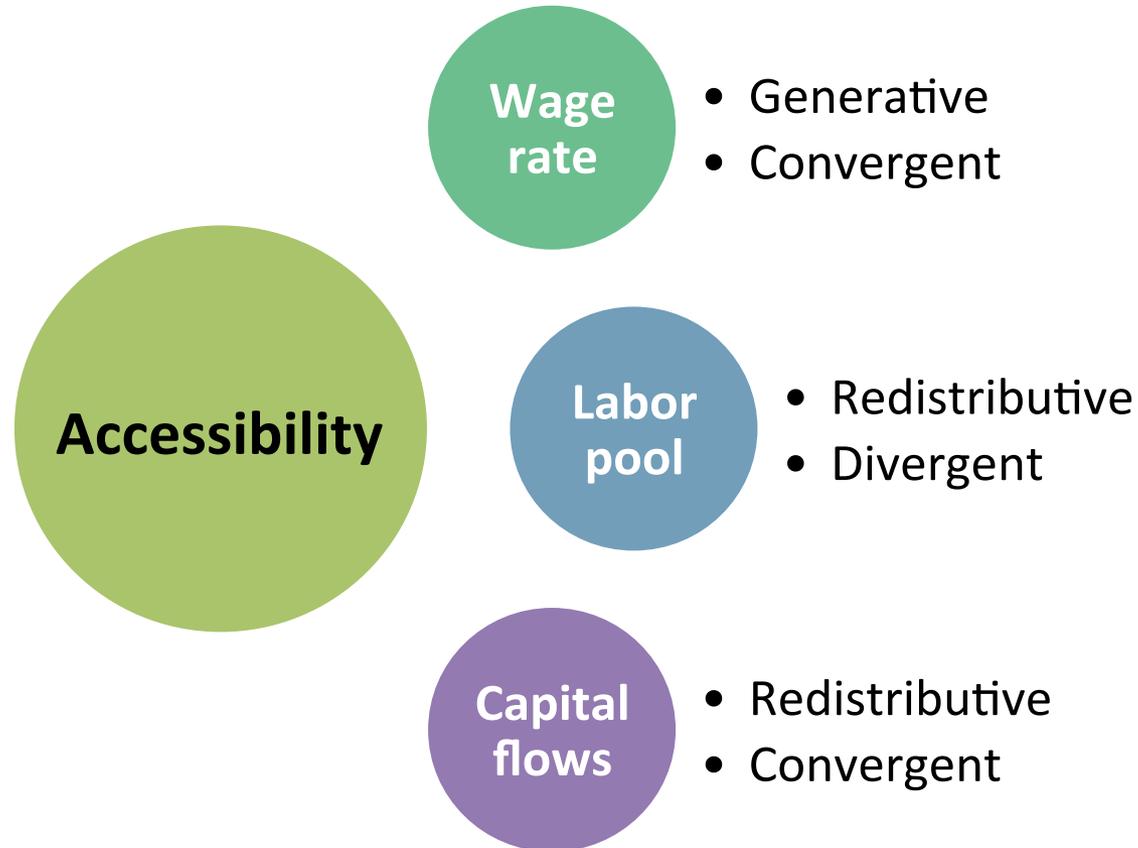
Coefficient of variation (CV) dropped by **50%**

□ Key inquiries

- How do accessibility influence urban economy:
 - 1) Beneficial or detrimental?
 - 2) Generative or distributive?
 - 3) Divergent or convergent?
 - 4) Decreasing return to accessibility ?

Summary

□ General economic performance



Urban Air Pollution and Carbon Emissions in China

Kyung-Min Nam

Prepared for:
11.S945 Urbanizing China
October 16, 2013
Massachusetts Institute of Technology



Beijing Skyline on Jan 14, 2013

Photograph removed due to copyright restrictions.
Refer to: Image 5 in "[China's Toxic Sky](#)," *7KH \$WDQMF*, Jan. 30, 2013.



Source: Photographs by Ed Jones (AFP).

Beijing Skyline on Feb 4, 2013

Photograph removed due to copyright restrictions.
Refer to: Image 5 in "[China's Toxic Sky](#)," *7KH \$10001F*, Jan. 30, 2013.



Source: Photographs by Ed Jones (AFP).

Comparison with World Bank Studies

Year of Interest	Cost Estimates	Note
1995	US\$34 bn (4.6% of GDP)	PM ₁₀ only, no threshold
2003	US\$55 bn (3.8% of GDP)	PM ₁₀ only, threshold

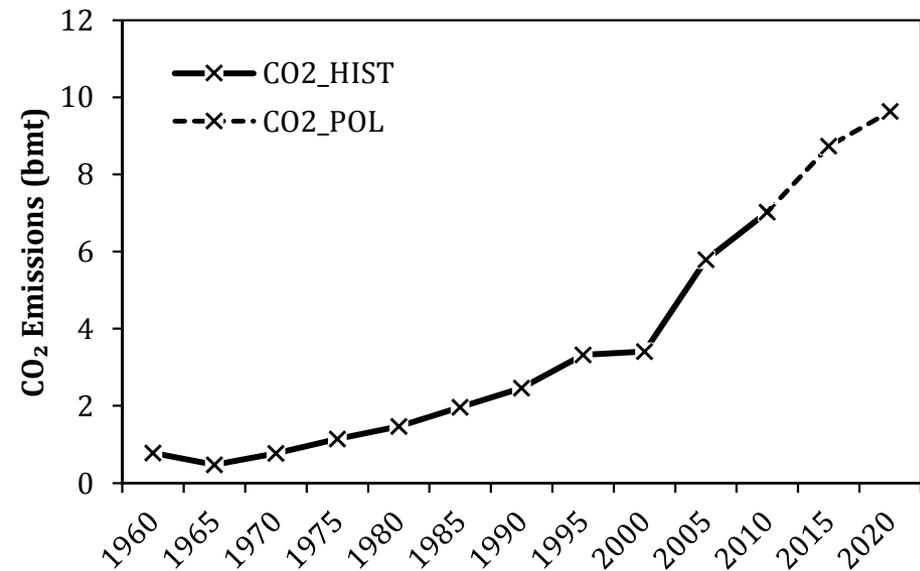
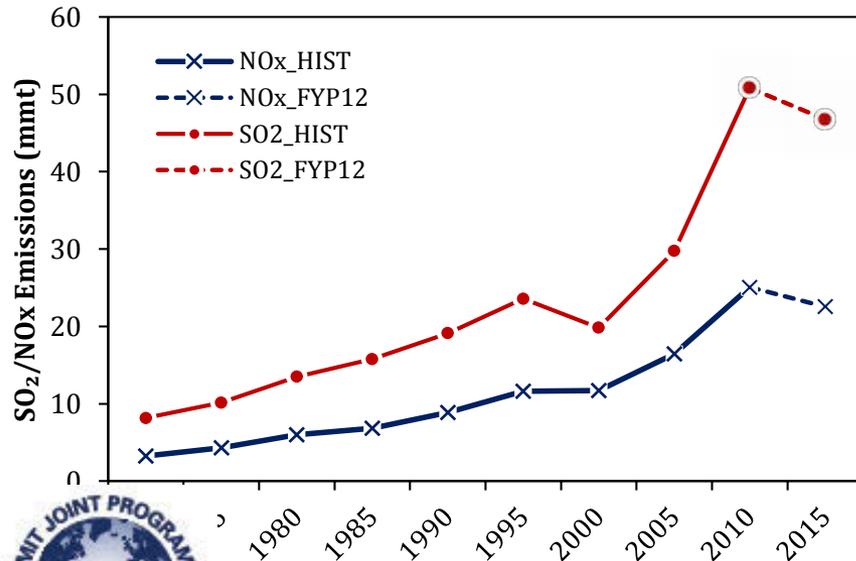
VS.

Year of Interest	Cost Estimates	Note
1995	US\$64 bn (8.7% of GDP)	PM ₁₀ only, no threshold
2005	US\$104 bn (5.9% of GDP)	PM ₁₀ only, no threshold

Source: Matus *et al.* (2012), p. 63.

China's Latest Policy Targets

	NO _x	SO ₂	CO ₂
FYP12	10% emissions reduction from the 2010 level by 2015	8% emissions reduction from the 2010 level by 2015	17% intensity reduction from the 2010 level by 2015
Copenhagen Accord			40-45% intensity reduction from the 2005 level by 2020

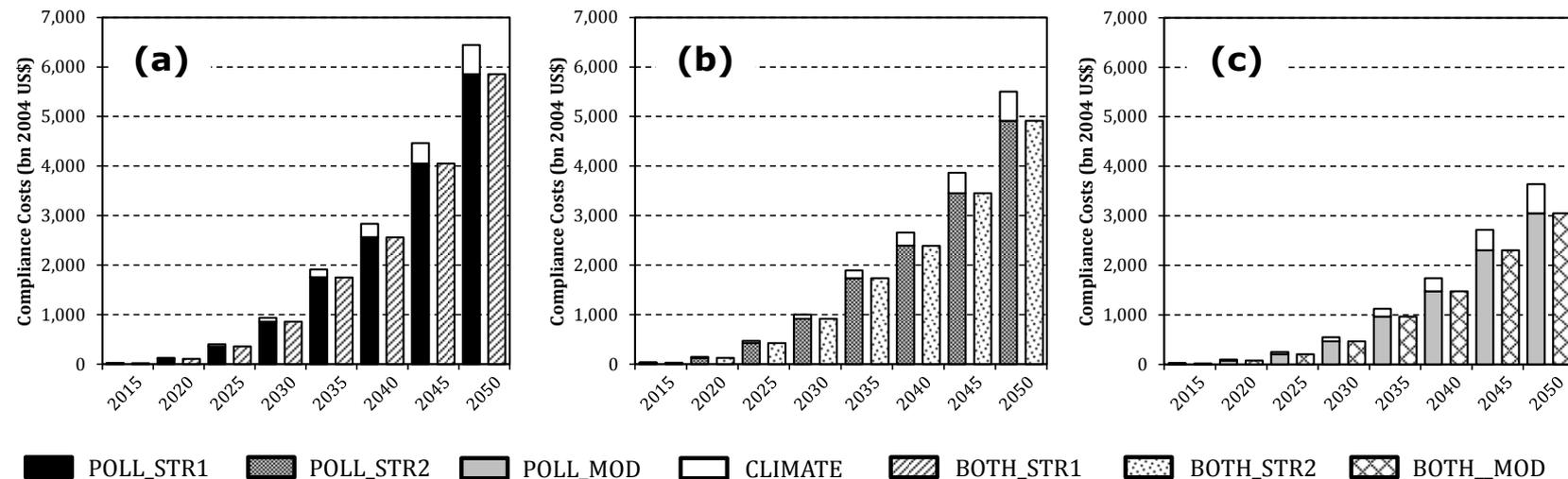


Source: Modified from Nam *et al.* (forthcoming).

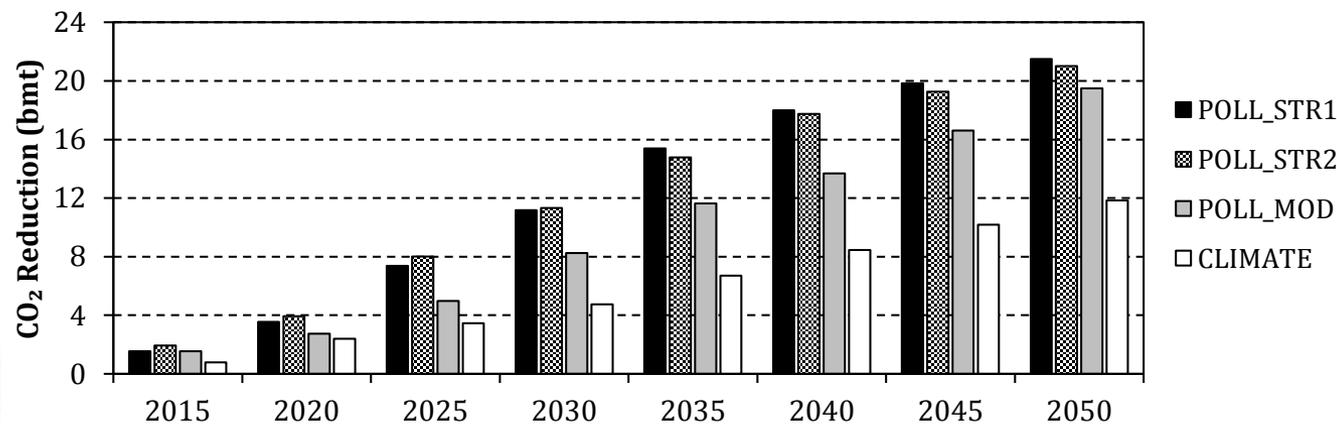


Results

Policy Compliance Costs



Carbon Emissions Reductions



Source:
Nam *et al.*
(forthcoming).

Advancing Low-Carbon Cities: Pathways through CERC

Lecture for MIT DUSP Urbanizing China

October 21, 2013

Shin-pei Tsay

TransitCenter //

Carnegie Endowment for International Peace

Image removed due to copyright restrictions. U.S. Secretary of State John Kerry's visit to China.
Source: unknown.

Image removed due to copyright restrictions. Illustration of a low-carbon eco-city.
Source: unknown.

Image removed due to copyright restrictions. Photograph of a power generator on top of an industrial building.
Source: unknown.

Image removed due to copyright restrictions. Photograph showing vehicles in a car sharing program.

Source: © Untapped Cities by Michelle Young.



Innovation of Chinese Automobile Market: A Consequence of China's Urbanization Process

Yang Yu

Department of Civil and Environmental Engineering

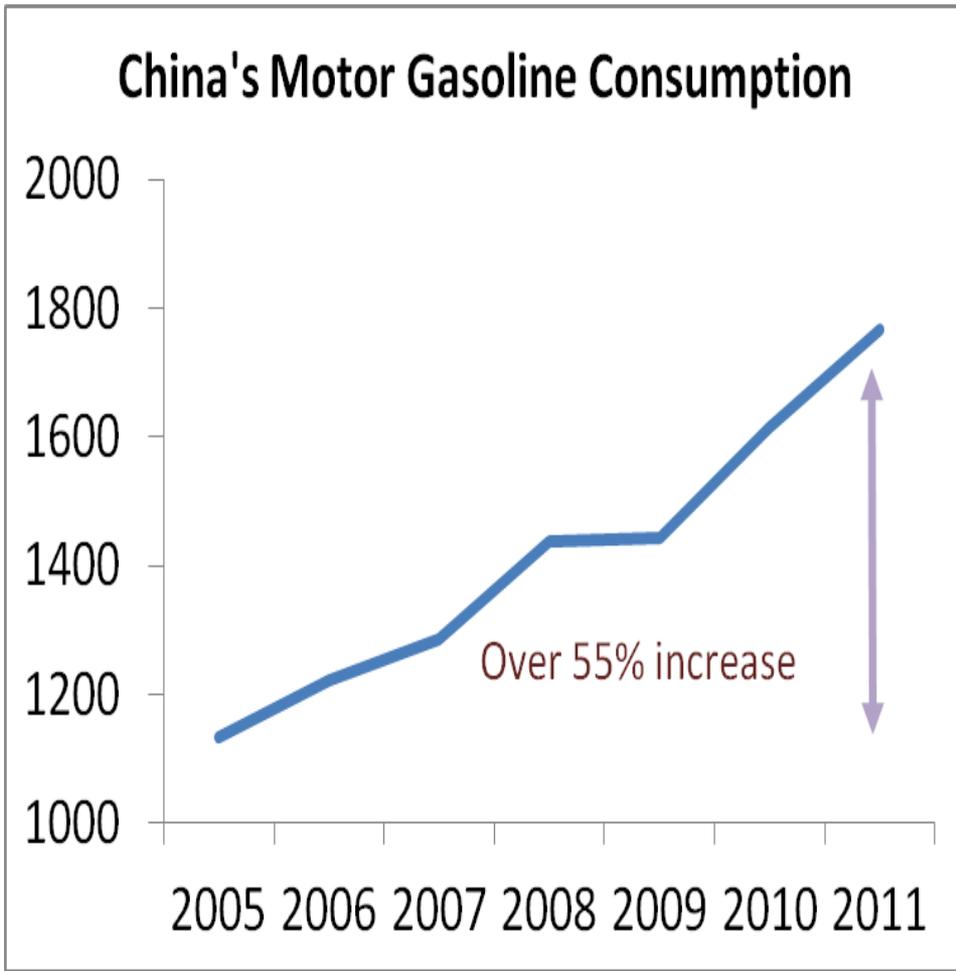
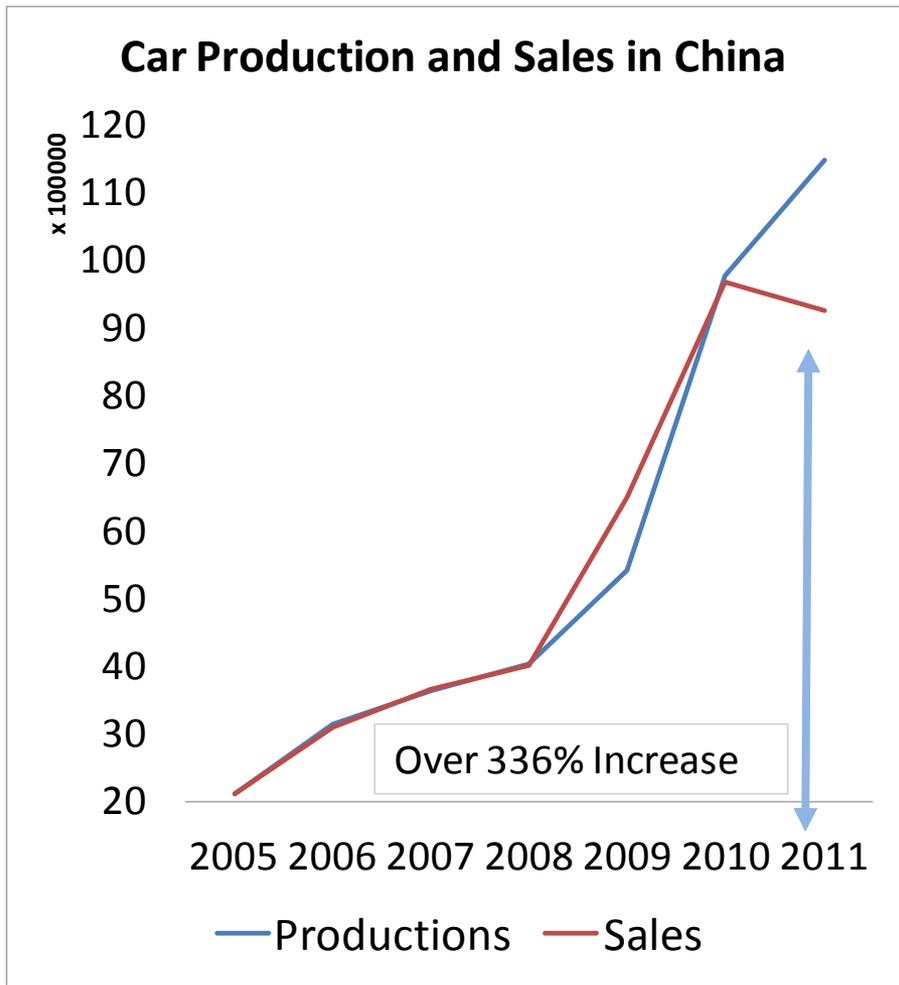
Department of Economics

Stanford University

(Working with Yang Shu and Yueming Lucy Qiu)



Dramatic Market Growing During Last Decades

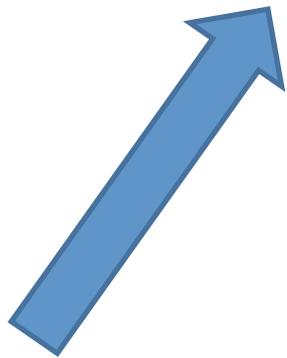


Data Source: CAAM Statistical yearbook of China automobile industry & EIA

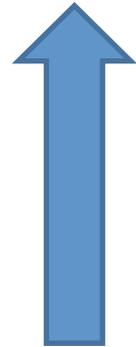


Decompose the Fuel Consumption

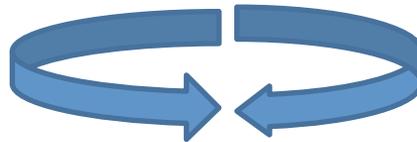
$$\text{Fuel Consumption} = \sum VMT_i \times \text{Fuel Efficiency} \times \text{Sales of Model } i$$



- Pro
Av
Te



- Tra

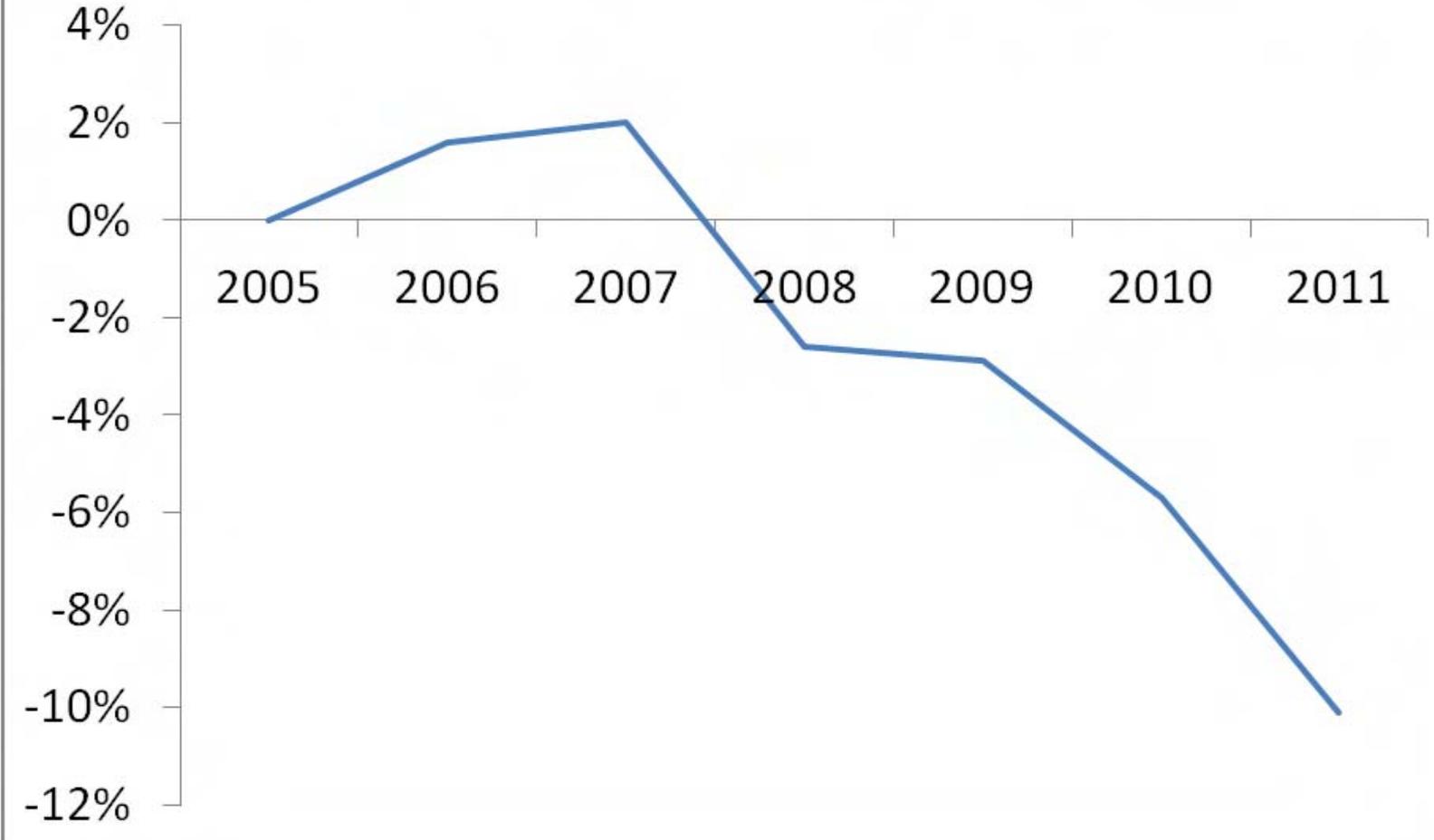


- Consumer Preference



Comparing to the car sold in 2005, how more energy the car sold in other years would use for 100 km

Technological Progress in Fuel Efficiency Controlling on other Technological Attributes



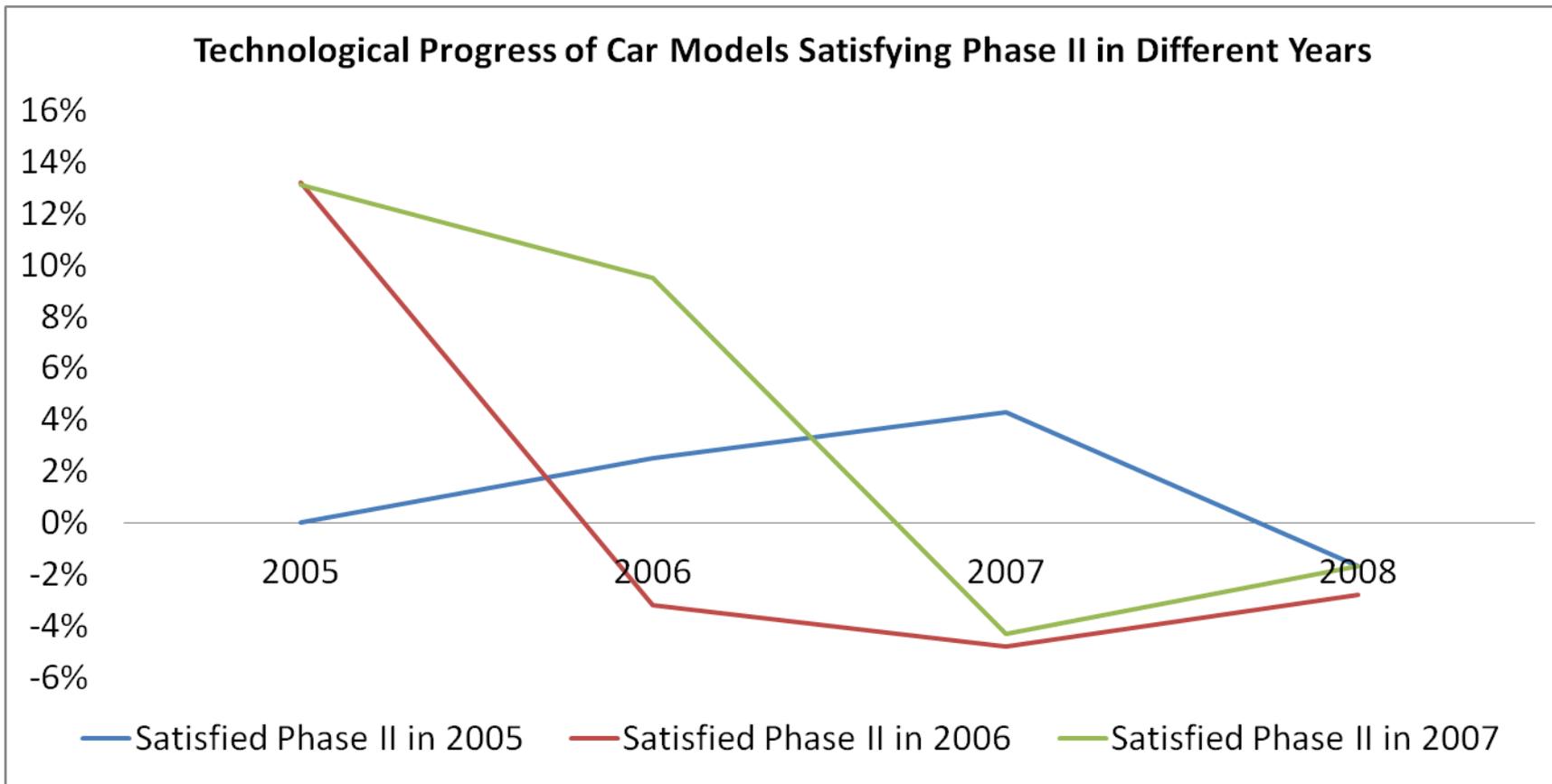
Less Efficient



More Efficient

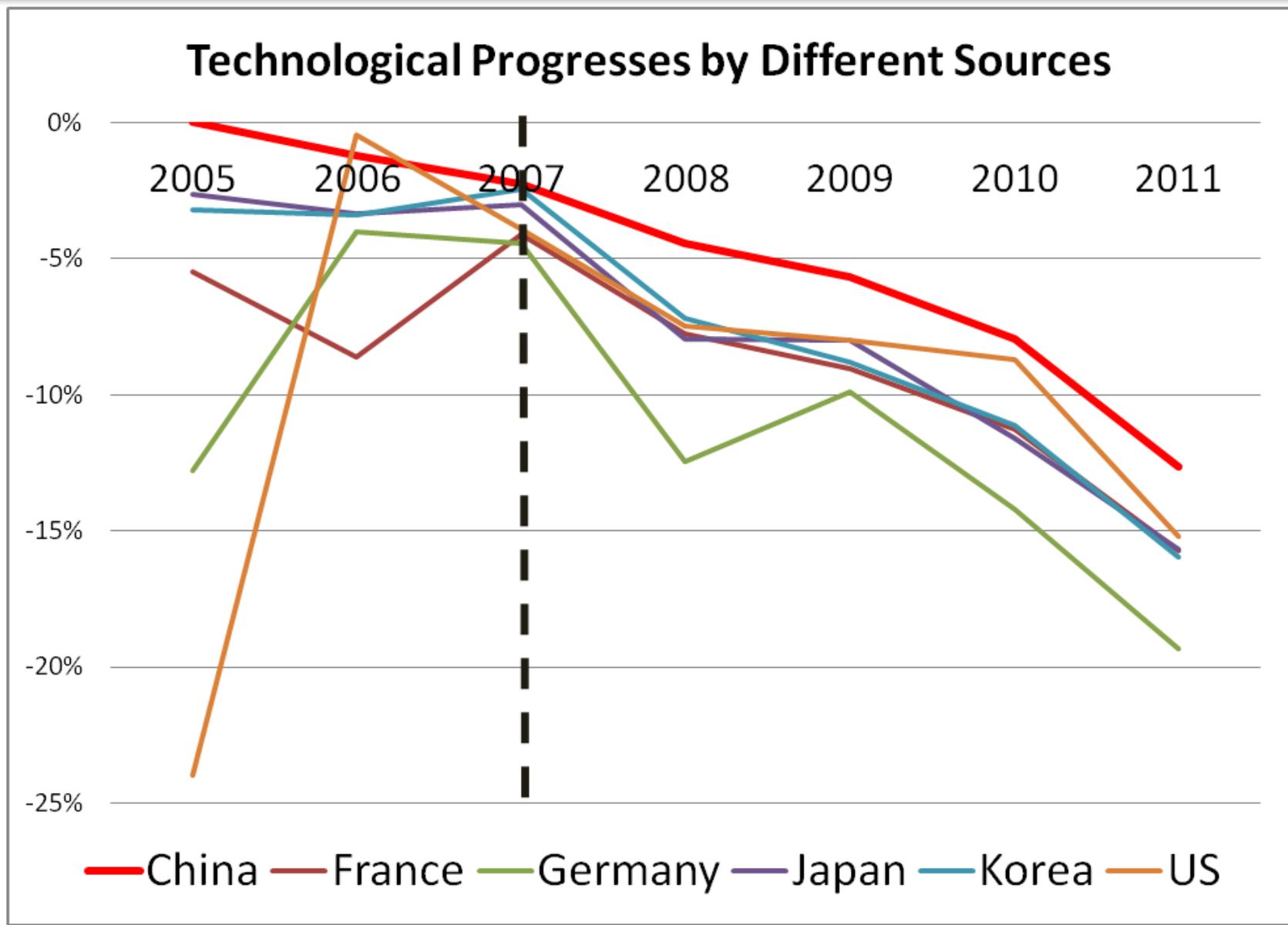


Technological Progresses of Car Models under Different Policy Pressures





Domestic Car Models versus Foreign Car Models





China's Fuel Efficiency Standard

- Announced in 2004
- Phase I is implemented in 2005 and 2006
- Phase II is implemented in 2008 and 2009 (Wagner et al. 2009)

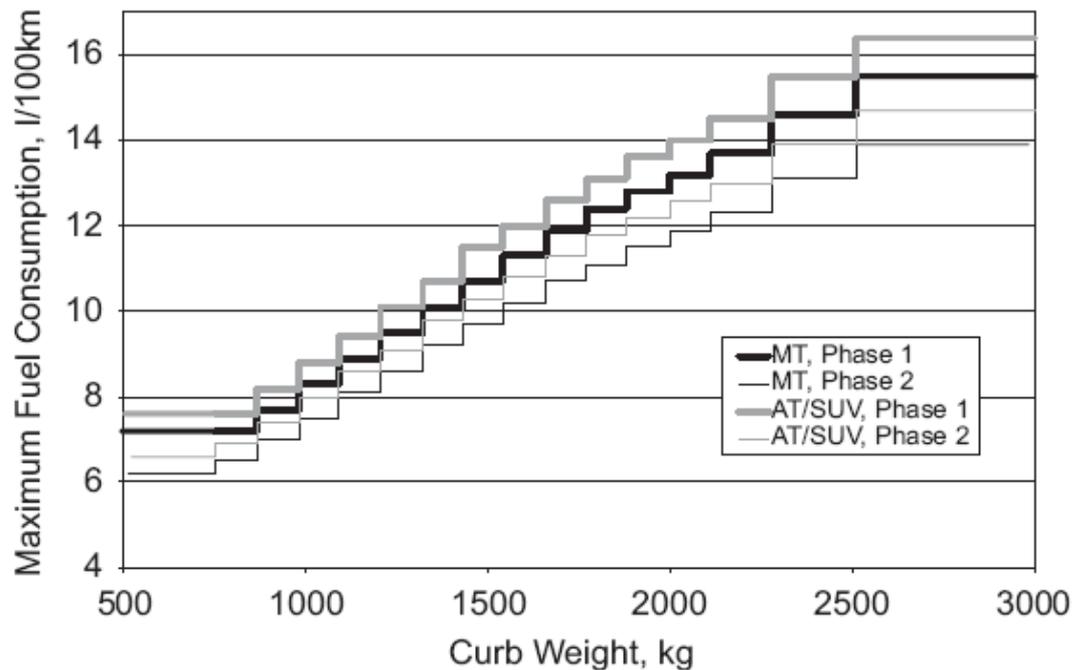


Fig. 7. Chinese passenger car fuel consumption limits.

Courtesy of Elsevier, Inc., <http://www.sciencedirect.com>. Use with permission.

Figure from Wagner et al. 2009

Behavioral Impact of the Financing Collection Mechanism on Accessibility: Two Cases from Chinese Cities

David Block-Schachter

Based on research w Jinhua Zhao & Drewry Wang

October 22, 2013

Plan

A dialogue: ASK QUESTIONS!

15 minutes: Framework of impacts of collection mechanism on accessibility

15 minutes: Vehicle ownership

- » Empirical work based on surveys in Beijing & Shanghai

- » Use information on location and travel behavior

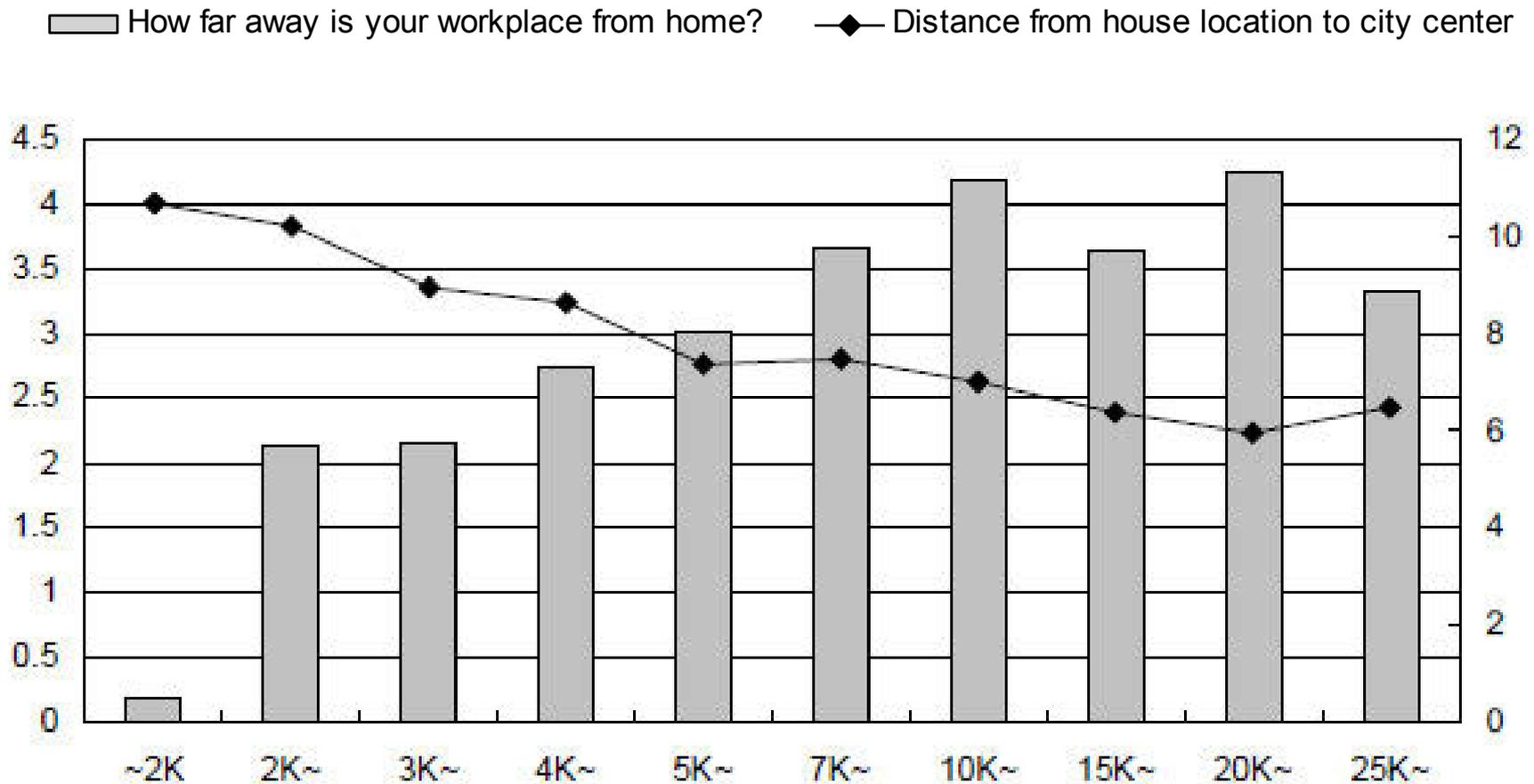
15 minutes: Land sales (land grabbing)

- » Examine data on where and when land grabbing took place in Shanghai for a single point in time

20 minutes: Distributive impacts by income, hukou, vehicle ownership

5 minutes: Wrap up

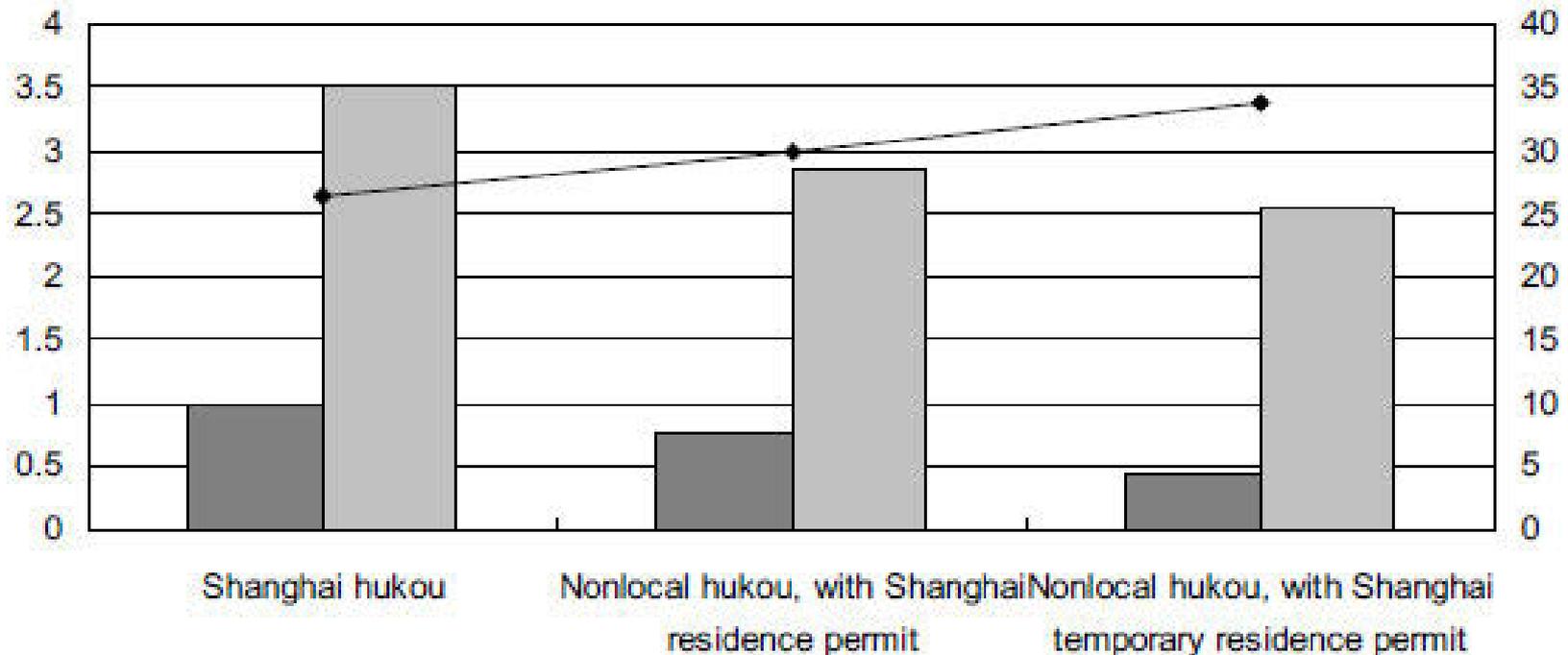
Housing and working location of people with different incomes



Note: the bar shows the distance from home to work place (km), and the line shows the distance from home to city center (1: within inner ring, 2: inner-middle ring, 3: middle-outer ring, 4: outside outer ring).

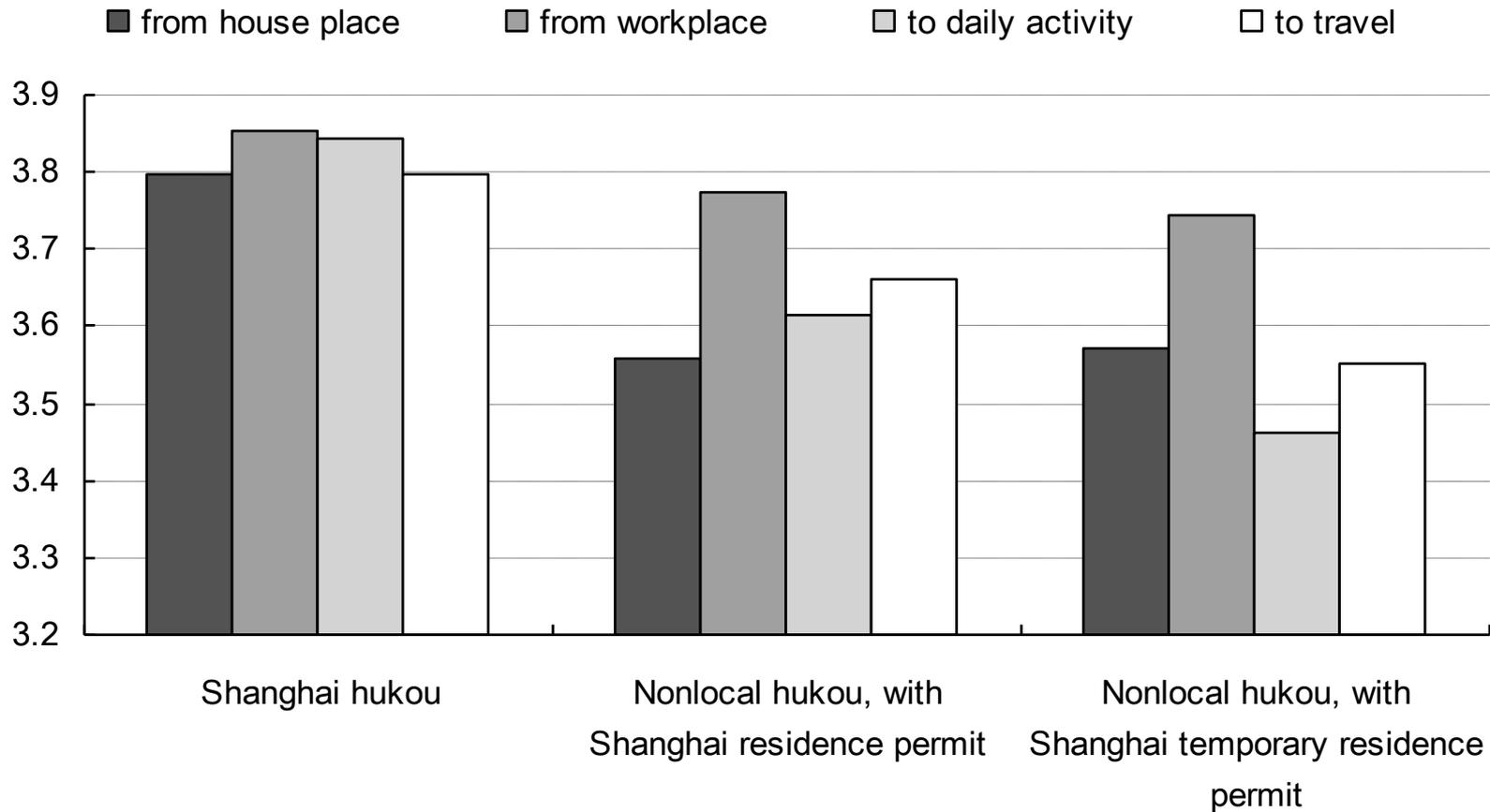
Housing and working decision of local citizens and migrants

- How far away is your workplace from home? (km)
- How long does it take you to your workplace from home? (single trip,min)
- ◆ Distance from house location to city center



Note: the bar shows the distance from home to work place (km), and the line shows the travel time from home to work place (min).

Accessibility to public transport of local citizens and migrants



Note: the plot shows different groups' attitudes towards availability of PT service (1: very low, 5: very high).

The impacts of emerging big data and social media on urban planning and management in Chinese cities

Yi Zhu and Shan Jiang

Department of Urban Studies and Planning

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Nov. 4, 2013

National Support on ICT in China

- **12th Five Year Plan (2011-2015) (09/2011)**

Information and Communication Technology (ICT) industry: one of the seven emerging strategic industries (State Council, 07/2012)

- Internet of Things, Cloud Computing, Intelligent Transportation System, Wireless City, Information service platforms covering (social security, education, health service, employment etc.), Smart Grid, ...
- Digitalization and informatization of urban services

- **Several Opinions on Promoting Information Consumption and Boosting Domestic Demand** (State Council, 08/2013)

- Facilitate the sharing, using and development of public data
- Improve information services related to people's lives
- Accelerate building smart cities

Image removed due to copyright restrictions. Screenshots from the Chinese Central Government's Official Website. Source: www.GOV.cn.

Features of "Big" Data – Where do they come from?

- **(Government oriented) Urban sensing and monitoring**
 - Environment monitoring system (air quality, water quality, ...)
 - Intelligent transportation system (smart card transaction, vehicle AVL, parking availability, ...)
 - Infrastructure usage (electronic payment, loop detector, ...)
 - Remote sensing (Lidar)
 - ...
- **Enterprise collected information**
 - Credit card transaction data
 - Cell phone data
 - Point of interest (POI)
 - Housing rent and transaction information
 - ...
- **User contributed (Web or Mobile -based applications)**
 - Social Media (microblog, rating and review, ...)
 - Crowd-sourcing (building directory, document share, openstreetmap, etc)
 - Crowd sensing (traffic, air quality, temperature, etc)

Emerging "Big" Data - Similarity and Dissimilarity

- **Similarity**

- Size of data is big
- Disaggregated
- Temporally registered
- longitudinal as opposed to cross-sectional
- Anonymous
- ...

Image removed due to copyright restrictions. Electronics & data tree diagram.
Source: unknown.

- **Dissimilarity**

- Quality of data
- Sample size and representation
- Spatially registered
- Information (attributes)
- ...

Social Media in China

Image removed due to copyright restrictions. Infographic of Social Media landscape @China 2012.
Source: <http://www.seeisee.com/sam/2013/04/02/p3682>.

Air Quality Crowd Sensing

Images removed due to copyright restrictions. Measuring air quality on smartphones.
Source: unknown.

Impact on Information Transparency and Accountability

- Usually difficult to access to official information and data related to urban planning and management
- Data manipulation is common and reliability is always an issue
- Social media like microblog as a platform can increase the public awareness and ignite the debate over controversial topics that of the interest to the most (Air Quality 36,937,163 records, Air pollution 10,446,038 records)
- User-contributed data from crowd-sourcing or crowd-sensing press government to be more transparent and accountable in distributing public information.

Impact on Urban Management and Public Service

- Real-time data facilitate a more timely and responsive way of providing public service
- Spatial-temporal detailed information helps to further the understanding on spatio-temporal distribution of demand of certain types of public services.
- helps to optimize the supply (the allocation of resources) proactively
- Provides information storage and insights for future plan

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11.S945 Urbanizing China: A Reflective Dialogue
Fall 2013

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