# Discussion of, Baum-Snow, Brandt, Henderson, Turner and Zhang (2015) *"Transport Infrastructure, Urban Growth and Market Access in China"*

Samuel Marden

London School of Economics
Department of Economics & STICERD

IGC Cities, LSE, 2015

# Paper "quantifies the causal effects of ... investments in road networks" on local economic growth in China

Empirical IV strategy:

- ✶ instrument expansion of domestic or external market potential/access (potacc) using 1962 road network.

Results:

- ✶ Large effects on GDP growth: 1 s.d. improvement in domestic market potacc in 2010 $\approx 15 - 20\%$ more growth (1/3 of a s.d)
- ✶ Access to foreign markets (distance to ports) drives population
- ✶ Similar effects on prefecture cities and prefectures as a whole
- ✶ Effects (especially population) concentrated in largest cities

Results very different to Banerjee, Duflo, Qian (2012) and Faber (2014).

- ✶ Includes urban and rural areas.
- ✶ Allows for the network structure of infrastructure

# Two main comments

1. Instrument for changes in market potacc may be endogenous
2. Measure of changes in potacc might not be the ideal measure

# 1. Endogeneity of instruments

Main estimating equation is

$$\Delta_{1990-2010} y_i = \alpha_0 + \alpha_1 R_{i,2010} + \beta_1 A_{i,2010} + \beta_2 E_{i,2010} + CX_i + \epsilon \qquad (1)$$

Instrument for:

- ✷ Internal Infrastructure $R$
  - Instruments as in Baum-Snow et al. (2014)
- ✷ Internal Market Access $A$, External Market Access (time to port) $E$
  - using historical road network at highway speed.

Assumption of no market potacc by road in 1990 and constant mkt potacc by other transport.

# 1. Focus on Market Potential in 2010

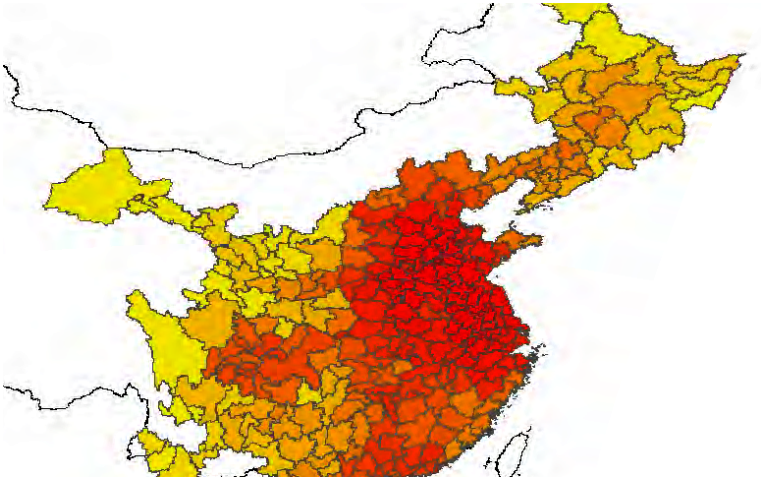

Figure: Baum Snow et al. Market Potential (Employment within 6 hours)

1. Instrument by Calculating Market Potential using the 1962 highway network travelling at 85km/ph

Figure: Baum Snow et al. 1962 Road Network

1. I tried to calculate what the instrument would look like

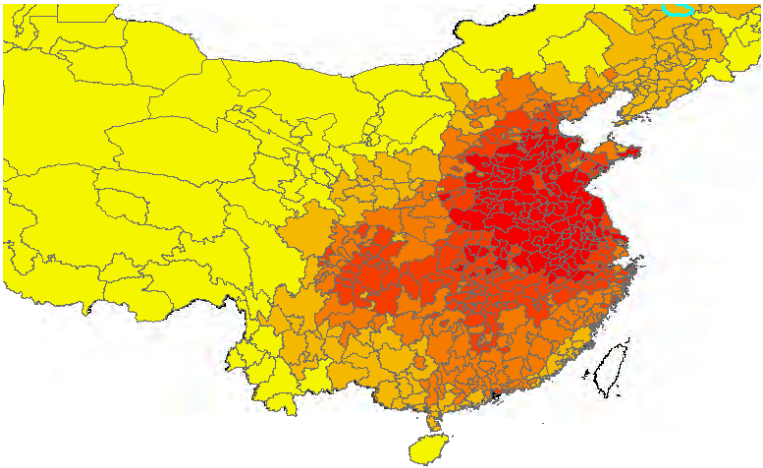

Figure: Pseudo Instrument: Market Potential 350km straight line from centroid

1. This also looks a lot like 1982 prefectural population density

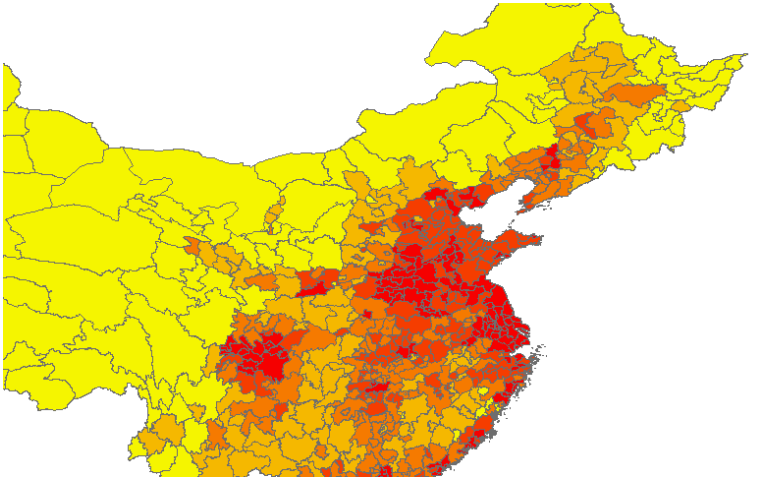

Figure: 1982 Population Census

# 1. Unlikely that exclusion restriction holds

Exclusion restriction: conditional on controls, the instrument *only increases growth through changes in market potacc due to the expansion of the road network.*

- Economic liberalisation mayy have increased the value of being central
  - Even in absence of road investment, core China likely to have been more central
    - Better rail, denser population, maybe even more roads
- Unwinding of socialist era policies which may have supported economic activity in non-core China
  - Self-sufficiency policies
  - Provincial barriers to trade
  - Third Front program

Controls for initial population, manufacturing share, education, elevation and slope are unlikely to be sufficient.

# 2. Changes in market potacc (MPA) mismeasured

Empirical specification assumes

$$\begin{aligned}\Delta MPA &= MPA_{2010}(Roads) - MPA_{1990}(Roads) + MPA_{2010}(Other) - MPA_{1990}(\\ &= MPA_{2010}(UsingOnlyRoads)\end{aligned}$$

With $MPA_{2010}(Other) - MPA_{1990}(Other) = 0,\ MPA_{1990}(Roads)$.

- Assumption of additive separability of different types of market potacc seems undesirable
- Better roads less valuable to prefectures with good rail/waterway connections?

Authors already have fantastic data on the rail network. Use as instrument for changes in total market potacc under the assumption that the 1962 road network is upgraded to highways (Donaldson & Hornbeck and waterways)?

- Also allow for controls for initial market access
- Provide greater within region variation (allowing for richer controls)

# 3. Other things

- Does using 2010 prefectural city boundaries bias city growth upwards compared to their hinterland? (Also applies to Baum-Snow et al. 2014)
- How long Mkt Access has been improved for ought to matter as population and GDP adjust gradually.
- I imagine you are planning to use the structure of the model to generate counterfactuals