# What will India look like in 2030?

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**EGROW Seminar**

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# An outline

- **India 2030 will be impacted by several trends—macroeconomic policies, entrepreneurship, environment, trade, digital revolution and much more.**
- **Rise of the middle class and demographic dividend.**
- **Global Talent Race.**
- **Urban Awakening.**
- **Digital economy.**
- **New Face of Globalization.**
- **Green Growth**
- **Gender as a new Growth Driver.**
- **Maximizing Development Finance**
- **Managing the Transition**

# Rise of the Middle Class and Demographic Dividend

- **India's middle class can reach more than a billion people by 2030.**
- **Economic growth and rise of the middle class are consequences of the demographic dividend.**
- **Demographic dividend will boost India's growth through many channels: increased ability to invest more in physical and human infrastructure and less on pensions (in OECD countries, a third of government expenditure, nearly $10 trillion annually is assigned to pensions) and working age also happens to cover the prime period in life for savings.**
- **Fate of the middle class and that of the Indian economy are in lockstep: rising incomes will fuel consumption, which will drive demand and productivity, leading to more employment and a further rise in incomes.**

# Global Talent Race

- **Since the end of World War II, trade and capital flows have been liberalized more. It is now the turn of global migration.**
- **Demographics and wage differentials have become a strong impetus for global migration**
- **Demographics play a key role in global migration trends. In India, there are four 20-year-olds for every 65-year-old; in Western Europe, that ratio is one to one. Average earnings in high-income countries are 70 times higher than in India..**
- **In the global knowledge economy, a global talent race has already started for high-skilled workers. Over 70% of software engineers in Silicon Valley are foreign-born.**
- **Most multinational corporations now insist that high-potential executives gain global experience. Some of the global economy's most familiar players–including Google, Microsoft, Alcoa, Clorox, Coca-Cola, McDonald's, Pepsi, and Pfizer – have immigrant CEOs.**

# Urban Awakening

- **India’s economic growth and job growth are strongly linked with urbanization.**
- **As the urbanization process continues, connectivity, proximity, and diversity will accelerate knowledge diffusion, spark further innovation, and enhance productivity and employment growth**
- **By 2030, India’s urban population will increase to more than 800 million people.**
- **Urbanziation promotes entrepreneurship and creates jobs . Pace of urbanziatioon and entreprepreneurship will match the size of India’s urban demographic dividend, with 12 million more people joining the labor force every year.**
- **Urbnaization promotes agglomeration economies through both traditional Marshallian economies like a suitable labor force and proximity to customers and through the Chinitz effect.**
- **Job growth is linked more with city diversification than city specialization.**
- **Government needs to focus on developing the secondary cities, leverage land assets, and modify financial regulations and incentives to increase investors’ risk appetite.**

# India will soon become the largest digital economy in the world

- **With more than half a billion internet users, twice the size of the USA, India will soon become the largest digital economy in the world.**
- **Return on investment in the digital infrastructure is much higher compared to the traditional infrastructure. Agglomeration economies and externalities are also much greater in the digital economy.**
- **The public sector has a bigger role to play in scaling up the digital infrastructure intermediate inputs, just like it did with the Golden Quadrilateral Highway that connected different regions, and promoted the manufacturing sector.**
- **Digital economy will spread from the megacities to secondary cities when investments in digital infrastructure increases.**
- **Information technology is now the new lifeblood of the economy, fueling ideas for new products and services, and advancing the transnational flow of ideas and knowledge**.

# Changing face of Globalization

- **India will benefit hugely from the changing landscape in globalization.**
- **Trade trends in services and manufacturing are now diverging, with former growing and latter declining,**
- **In the post-COVOID 19 world, the upward movement in services trade is likely to continue, and be even faster and remain resistant to political and economic forces that now threaten to reverse the global integration in manufacturing.**
- **India can easily expand its role in the growing global market for digital information-technology services--big data and analytics, digital legacy modernization, climate change agenda, and the Internet of Things.**
- **Unlike China, India's trade characteristics are well aligned with the new face of globalization. India's trade in services has grown at a much faster pace than trade in goods, and labor productivity growth in services is above that in industry. Productivity growth in services in India matches labor productivity growth in manufacturing sectors in China.**
- **India needs a new digital/economic/social contract to scale up investments in the digital infrastructure, change the data landscape to promote the use and reuse of digital data, foster trust that data will not be misused in harmful ways, and reduce the digital divide.**

# Green Growth

- **India has increased green growth by improving energy efficiency, especially in the urban areas.**
- **Spatial convergence in energy efficiency across states has increased.**
- **Convergence in energy efficiency at the industry level is also high.**
- **This convergence is as much through growth in consumption levels for some industries (e.g., office, accounting and computing machinery) than declines in other industries (e.g., textiles).**
- **On a per capita basis, measured as carbon emissions per person, India's emissions are very low and ranked 140th in the world, compared to the US which is ranked 14th. However, this will change in the next two decades.**

# Gender as a new Growth driver

- **Empowering half of the potential workforce has significant economic benefits beyond promoting gender equality.**
- **Growth will come in many forms: increased female labor force participation, improved access to land and bank loans, higher levels of political representation, and increased gender balance in entrepreneurship.**
- **Increasing the female participation rate to that of men will raise India's economic growth by as much as 5%. While achieving economic growth sometimes requires tough structural reforms and choices, the opposite is true for gender as a driver of growth.**
- **Gender reforms will likely be implemented in fiscal and financial reforms to eliminate gender gaps. Gender budgeting improves gender equality through well-structured fiscal policies and adequate and properly monitored spending on gender-related goals**
- **Globalization and trade policy reforms will also make a contribution towards convergence in gender equality.**
- **Policies targeting the domestic competitive environment have been more effective in mitigating gender discrimination in the labor market.**

# Huge Potential to Maximize Finance for Development

- **Infrastructure investments in traditional and digital infrastructure can be easily scaled up to more than 10% of GDP.**
- **India has the potential to meet the twin challenge—closing the infrastructure financing gap and changing the composition of financing.**
- **Changing the composition of capital flow has the potential to increase the efficiency and sustainability of public finance and infrastructure projects.**
- **While commercial banks will continue to be an important source of infrastructure finance, capital markets will play a bigger role in the future, given the increased demand for long-term sources of finance for infrastructure projects.**
- **Bond markets, especially local currency bond markets, will be critical to filling the infrastructure-investment gap.**
- **Maximizing finance for development, from billions to trillions, will be achieved by combining resources—international and domestic, public and private, corporate and philanthropic.**

# Managing the Transition

- **What will happen to India 2030, if policy makers do nothing to address structural and transformational challenges facing India?**
- **The most likely effect will be that a young working-age people will be unemployed or underemployed. Large numbers of unemployed workers can lead to increased internal conflict.**
- **In addition, unemployed young people will effectively increase the share of the population that is dependent on workers, slowing economic growth. And the economic insecurity of the elderly can increase, because there will be fewer productively employed workers to generate the wealth on which both governments and families rely to support the elderly.**
- **India will face many challenges in the future, including rising income inequality, and a failure to take measures to ensure that the population is productively employed. The ageing of a country's population is an inevitable consequence of the post-demographic transition period. The size and share of the elderly population in India--60+--population will grow significantly in the future, reaching nearly 316 million by 2050.**
- **The rise in share of elderly people will raise issues of retirement age and pensions. However, the effects of a higher old-age dependency ratio will be more than counteracted by a lower youth dependency ratio. This increase will be further augmented by greater participation of women in the labor force due to smaller family sizes.**
- **The net effect of this rise will be that India should be able to accelerate the pace of growth.**

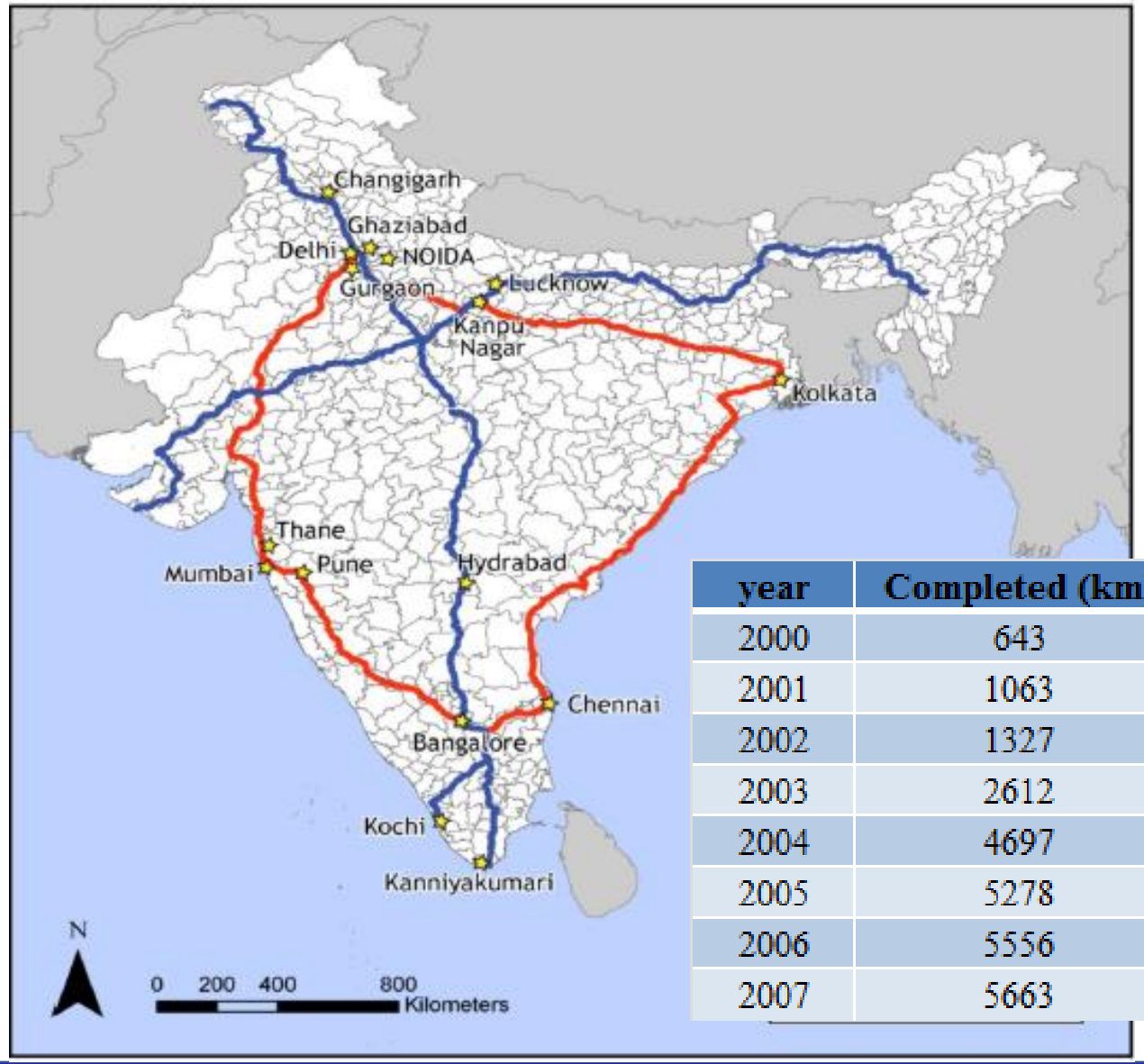
# Highway to Success: The Impact of Golden Quadrilateral Project for the Location and Performance of Indian Manufacturing

Ejaz Ghani

# Highways in India, 2000 Snapshot

# Highways in India, 2007 Snapshot

# Highways in India: GQ and NS-EW




| year | Completed (km) | % complete |
|---|---|---|
| 2000 | 643 | 11.0 |
| 2001 | 1063 | 18.2 |
| 2002 | 1327 | 22.7 |
| 2003 | 2612 | 44.7 |
| 2004 | 4697 | 80.3 |
| 2005 | 5278 | 90.3 |
| 2006 | 5556 | 95.0 |
| 2007 | 5663 | 96.9 |

# GQ and the Organization of Manufacturing

- We study how proximity to GQ in non-nodal districts affected the organization of manufacturing activity: 1994-2009

- Sources of variation
  - Distance from GQ (e.g., 0-10 vs 10-50 km from network)
  - Sequence in which districts were upgraded
  - Industry traits within the manufacturing sector
  - Non-nodal districts traits within 0-10 km

- Measures of economic activity:
  - Establishment counts, employment and output levels, average labor productivity and TFP
  - Industry-level allocative efficiency

# Our Contribution

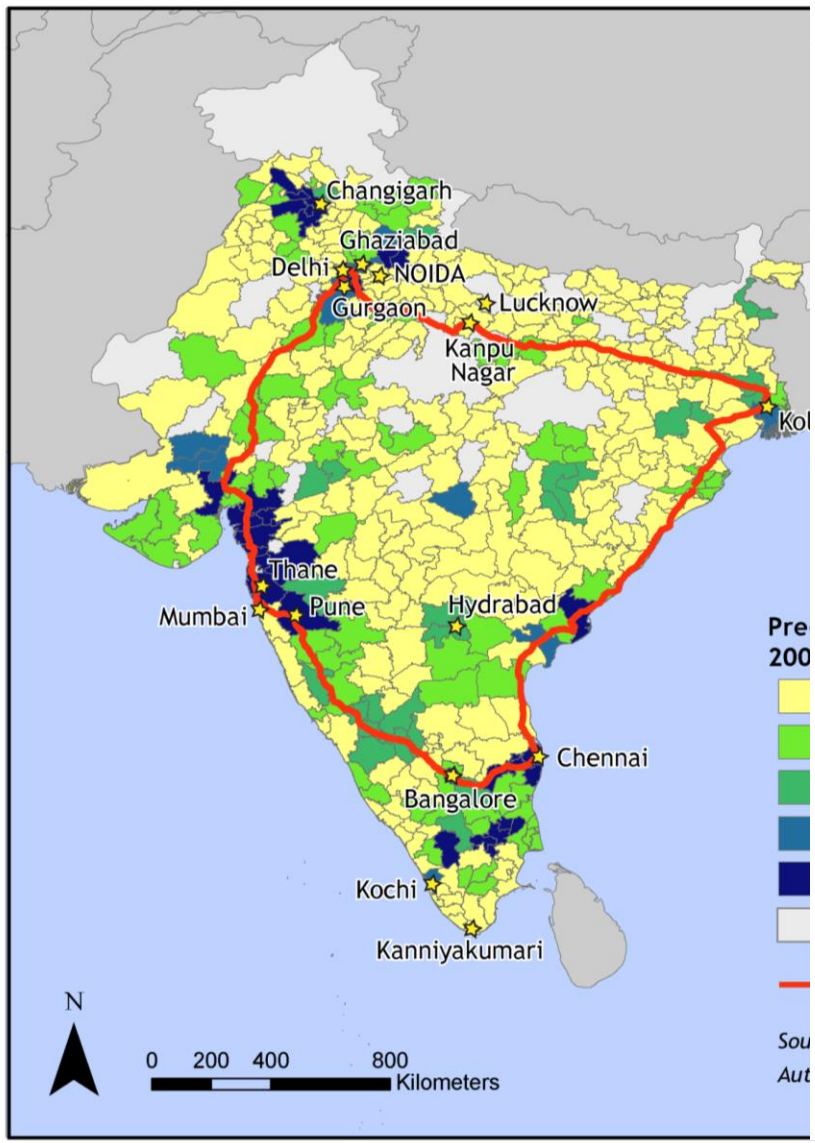
- Use plant-level data to analyze highway impact
  - Entry and exit outcomes
  - Productivity consequences
  - Entrant vs. incumbent growth
  - Allocative efficiency

- Quantify the impact from investments into improving networks
  - [vs. the existence of  transportation networks]
  - Comparison to the NS-EW placebo highway
  - Dynamics around upgrades

# Data Preparation

- Annual Survey of Industries (ASI)
  - Repeated cross-sectional surveys of organized sector
- Sample size: 311 districts
  - Reductions based upon ASI coverage
  - Consistent sample across 5 or 12 surveys
  - Accounts for >90% of activity during period of study
  - About twice the size of a US county
- Distance from GQ Highway: ArcMap GIS software
  - Focus on distance to district edge
  - Manual collection of segment-level details

# Output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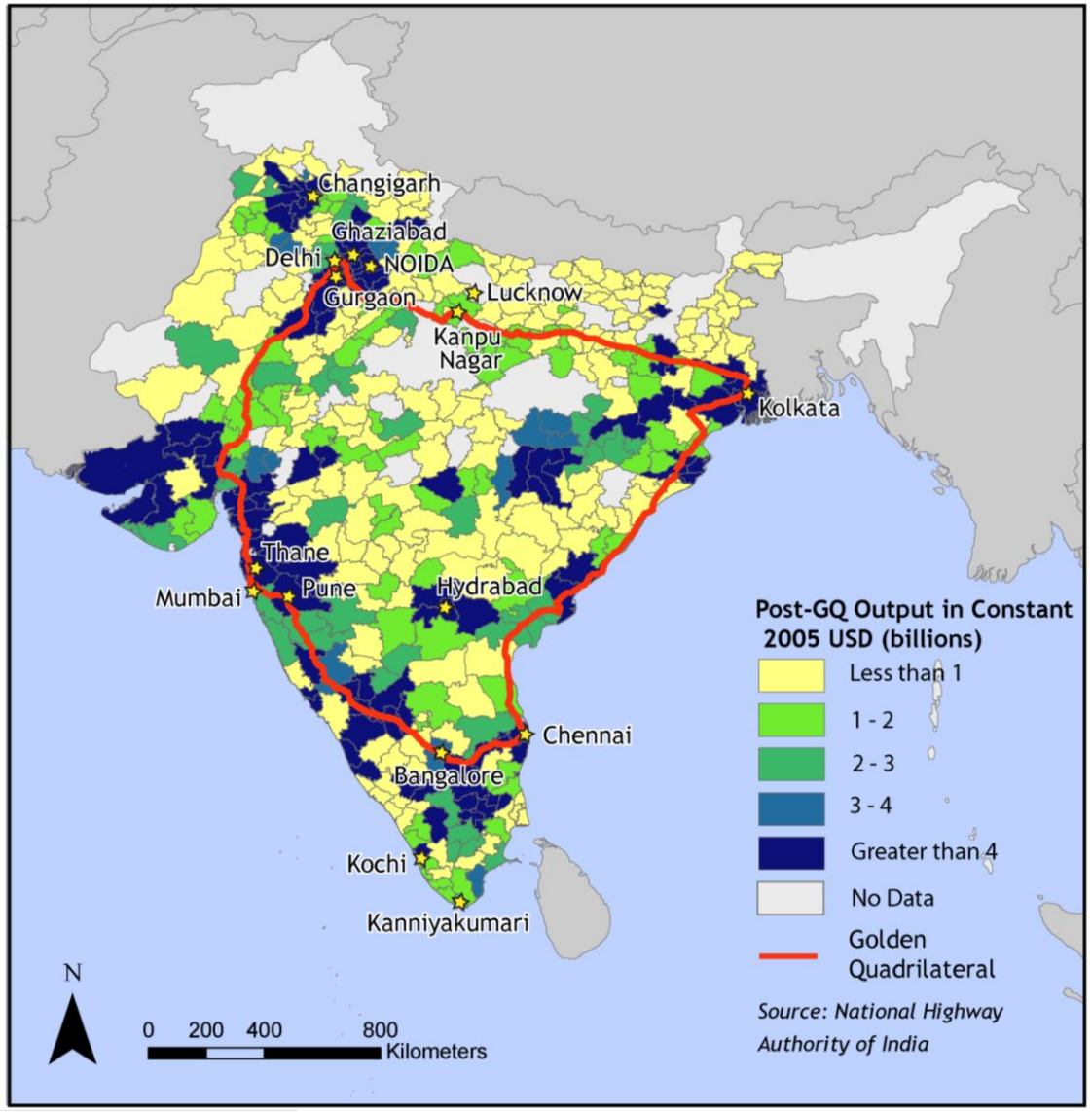
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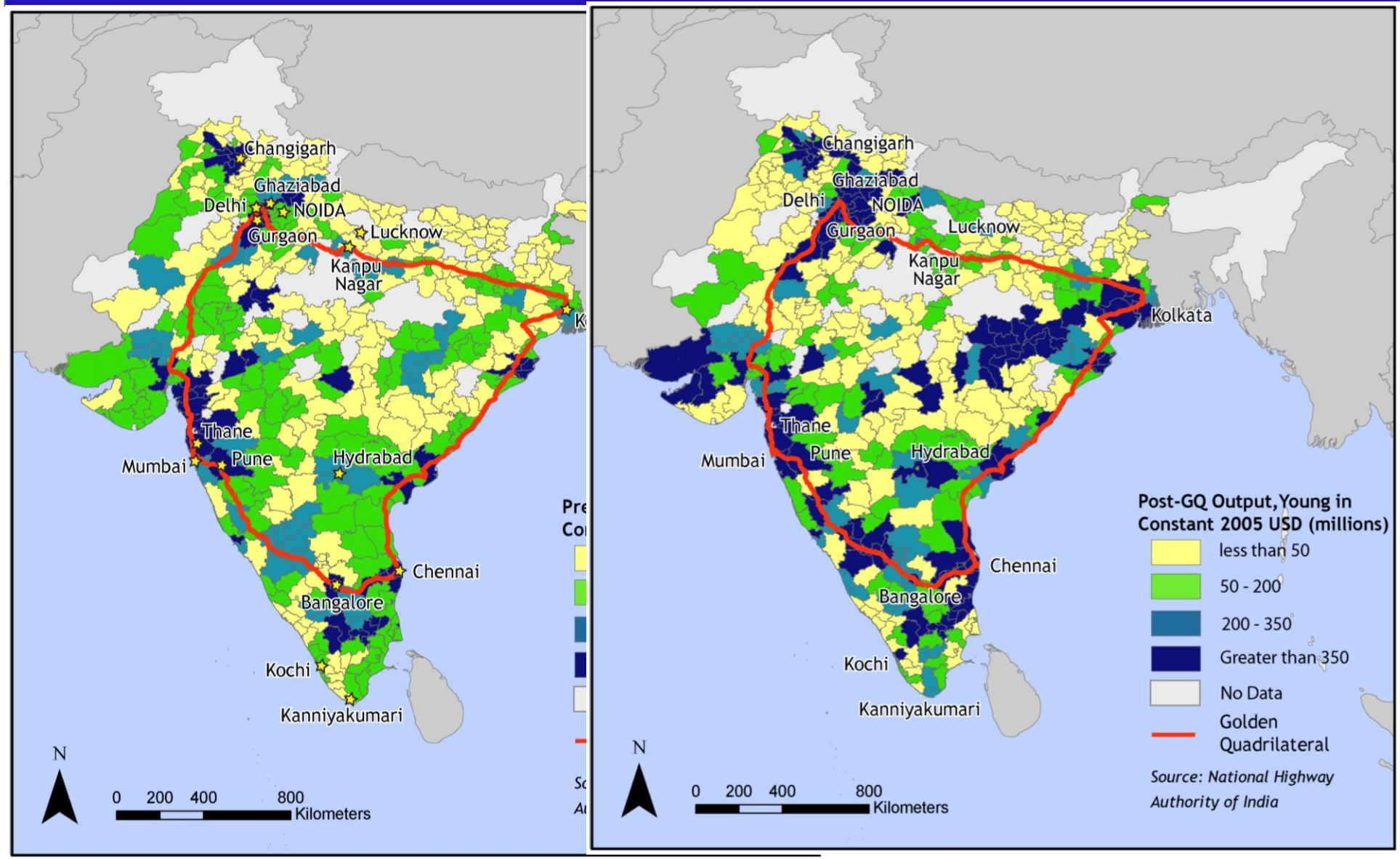
Bangalore
Kochi
Kanniyakumari
N
0 200 400 800
Kilometers
Post-GQ Output in Constant 2005 USD (billions)
Less than 1
1 - 2
2 - 3
3 - 4
Greater than 4
No Data
Golden Quadrilateral
Source: National Highway Authority of India

# Young Output



# Methodology

- Non-parametric approach using long-difference estimations

$$\Delta Y_i = \sum_{d \in D} \beta_d \cdot (0,1) GQDist_{i,d} + \gamma \cdot X_i + \varepsilon_i.$$

- Treatment:
  - Indicator variables for distance ranges to the GQ network, with focus on non-nodal districts
  - Comparisons to districts farther away, with excluded group typically being 50+ km from the GQ network

  - Counts: 9 nodal, 76 0-10 km, 42 10-50 km, 236 50 km+
  - The 0-10 km groups accounts for ~40% of activity

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$$\Delta Y_i = \sum_{d \in D} \beta_d \cdot (0,1) GQDist_{i,d} + \gamma \cdot X_i + \varepsilon_i.$$

- $X_i$ controls include:
  - Measures of initial levels $Y_i$
  - Access to national highway, state highway, or railroad in terms of log distance
  - Traits from 2000 Census: population, age profile, female-male ratio, urbanization rate, SC/ST rate, literacy, and within-district infrastructure measure

# T2: Main Results

Table 2: Long-differenced estimations of the impact of GQ improvements, comparing 2007-2009 to 2000

| DV: Change in manufacturing trait listed in column header | Log levels of total activity | | | Log levels of young firm activity | | | Log labor productivity | Total factor productivity | Log average wage | Log cost per employee |
|---|---|---|---|---|---|---|---|---|---|---|
| | Plants | Employmen | Output | Plants | Employmen | Output | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| A. Base spatial horizon measuring effects relative to districts 50+ km from the GQ network | | | | | | | | | | |
| (0,1) Nodal district | 1.467+++ | 1.255+++ | 1.413+++ | 1.640+++ | 2.004+++ | 2.468+++ | 0.138 | 1.971+++ | 0.382+++ | 0.393+++ |
| | (0.496) | (0.464) | (0.480) | (0.499) | (0.543) | (0.621) | (0.111) | (0.195) | (0.065) | (0.069) |
| (0,1) District 0-10 km from GQ | 0.364+++ | 0.235 | 0.443+++ | 0.815+++ | 0.882+++ | 1.069+++ | 0.199+++ | 0.163 | 0.121++ | 0.130++ |
| | (0.128) | (0.144) | (0.163) | (0.161) | (0.198) | (0.277) | (0.074) | (0.195) | (0.055) | (0.056) |
| (0,1) District 10-50 km from GQ | -0.199 | -0.325 | -0.175 | -0.238 | -0.087 | -0.281 | 0.157 | 0.286 | 0.098 | 0.095 |
| | (0.185) | (0.222) | (0.293) | (0.237) | (0.314) | (0.455) | (0.126) | (0.280) | (0.091) | (0.094) |
| B. Panel A including covariates for initial district conditions and additional road and railroad traits | | | | | | | | | | |
| (0,1) Nodal district | 0.541 | 0.468 | 0.493 | 0.831 | 0.964 | 0.927 | 0.004 | 1.367+++ | 0.239++ | 0.249++ |
| | (0.591) | (0.657) | (0.677) | (0.718) | (0.858) | (0.957) | (0.151) | (0.280) | (0.096) | (0.100) |
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| | (0.124) | (0.129) | (0.157) | (0.174) | (0.201) | (0.286) | (0.085) | (0.215) | (0.060) | (0.062) |
| (0,1) District 10-50 km from GQ | -0.117 | -0.202 | -0.024 | -0.115 | -0.025 | -0.194 | 0.177 | 0.403 | 0.151+ | 0.155+ |
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Sample counts by distance band: 9, 70, 42, and 196

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| B. Panel A including covariates for initial district conditions and additional road and railroad traits | | | | | | | | | | |
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| (0,1) District 0-10 km from GQ | 0.312++ | 0.233+ | 0.427+++ | 0.616+++ | 0.555+++ | 0.680++ | 0.241+++ | 0.112 | 0.169+++ | 0.185+++ |
| | (0.124) | (0.129) | (0.157) | (0.174) | (0.201) | (0.286) | (0.085) | (0.215) | (0.060) | (0.062) |
| (0,1) District 10-50 km from GQ | -0.117 | -0.202 | -0.024 | -0.115 | -0.025 | -0.194 | 0.177 | 0.403 | 0.151+ | 0.155+ |
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# Robustness Checks

- Consider distance bands, new segments vs. upgrades, etc.

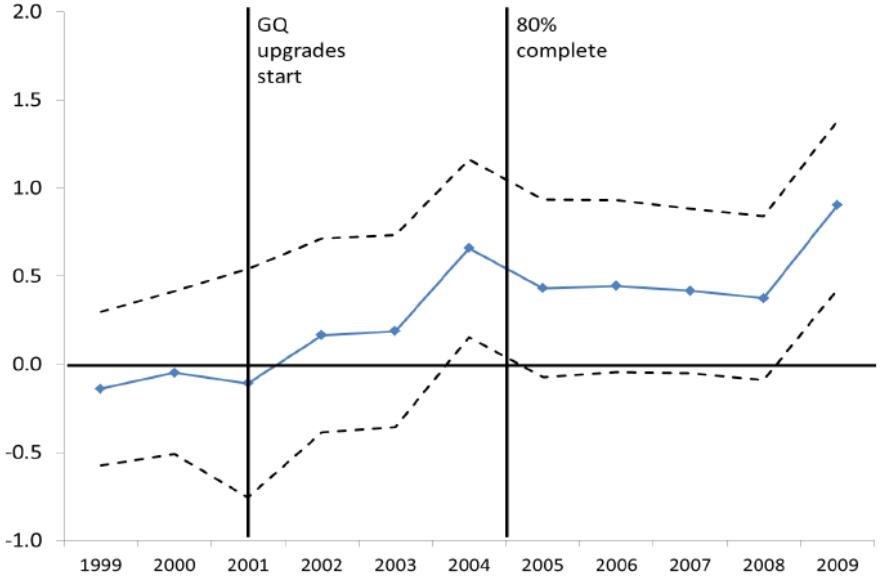
- Endogeneity can lead to an upwards or downwards bias
  - Infrastructure to growing places
  - Bridges to nowhere

- Approaches:
  - Placebo test: the portions of the NS-EW networks that were scheduled for Phase 1 upgrades but delayed
  - Straight line (with kink) IV based upon nodal districts
  - Dynamic estimations and completion dates

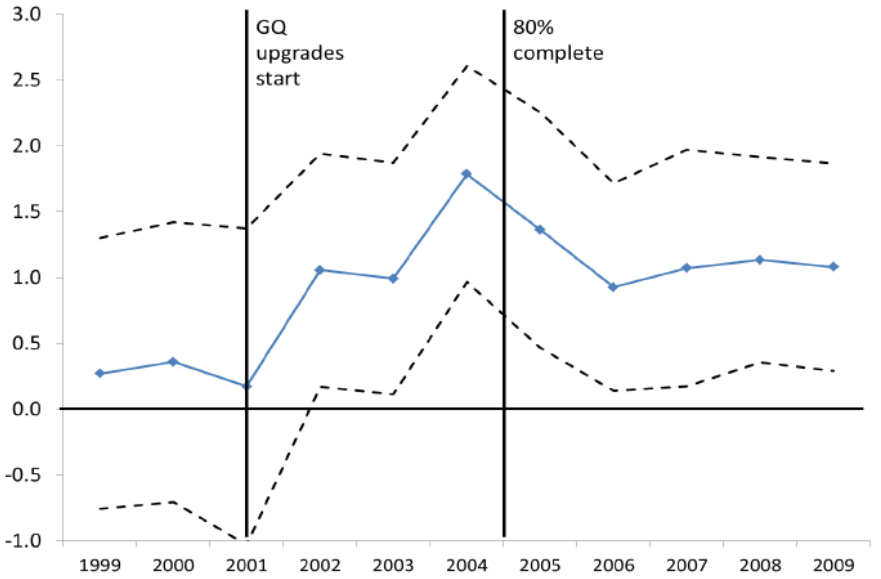
# Dynamic Specifications: Young Activity

Figure 2: Dynamics of plant count and output growth around the GQ upgrades

A. Dynamics of log new plant growth




B. Dynamics of log new output growth

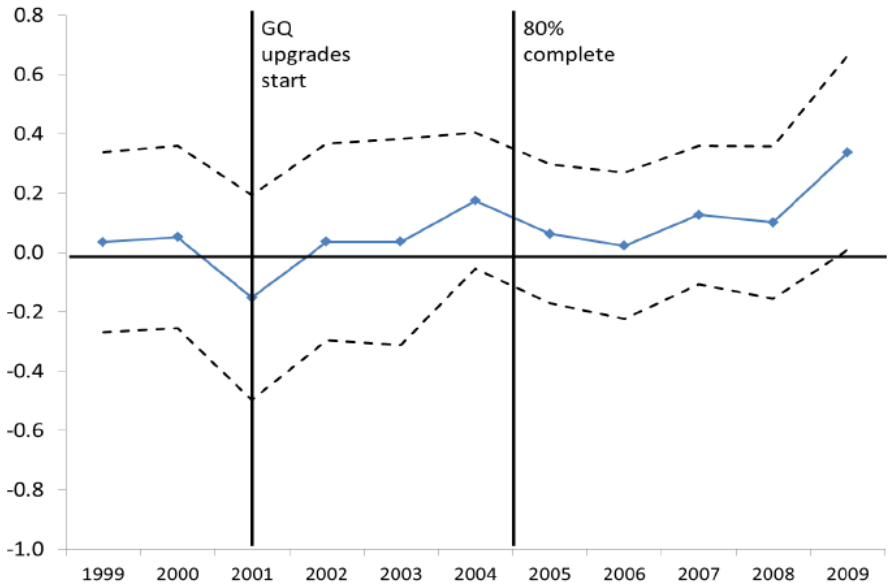



$$Y_{i,t} = \sum_{t \in T} \beta_t \cdot (0,1)GQDist_{i,d<10km} \cdot (0,1)Year_t + \phi_i + \eta_t + \varepsilon_{i,t}.$$

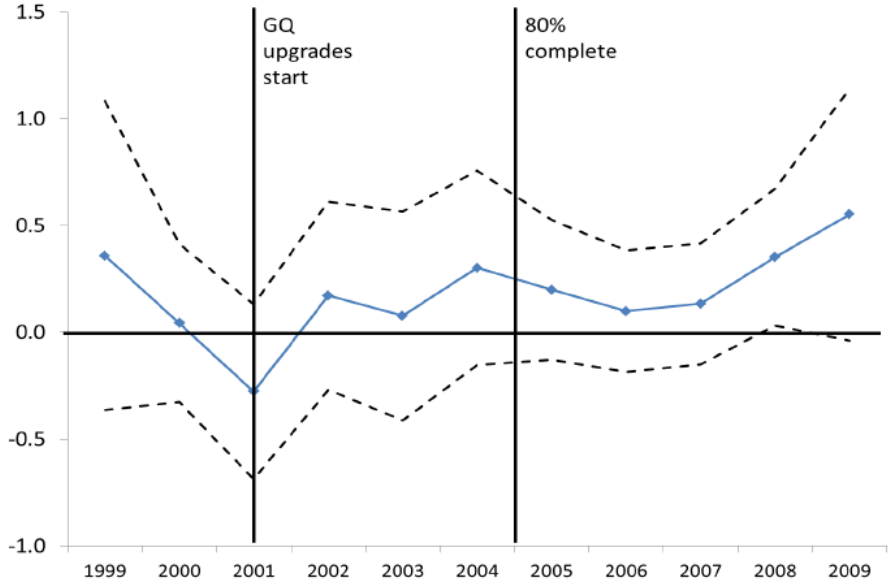
Parallel work with average spread in states of completion times is 6.4 years

# Dynamic Specifications: Total Activity

C. Dynamics of log total plant growth




D. Dynamics of log total output growth




$$Y_{i,t} = \sum_{t \in T} \beta_t \cdot (0,1)GQDist_{i,d<10km} \cdot (0,1)Year_t + \phi_i + \eta_t + \varepsilon_{i,t}.$$

# Entrants and Incumbents

- Growth in entrants & incumbents, with the former stronger
- Analyze differences in incumbent productivity adjustments
- Normalize each plant by industry-year weighted average
- Compare incumbents and entrants back to initial values

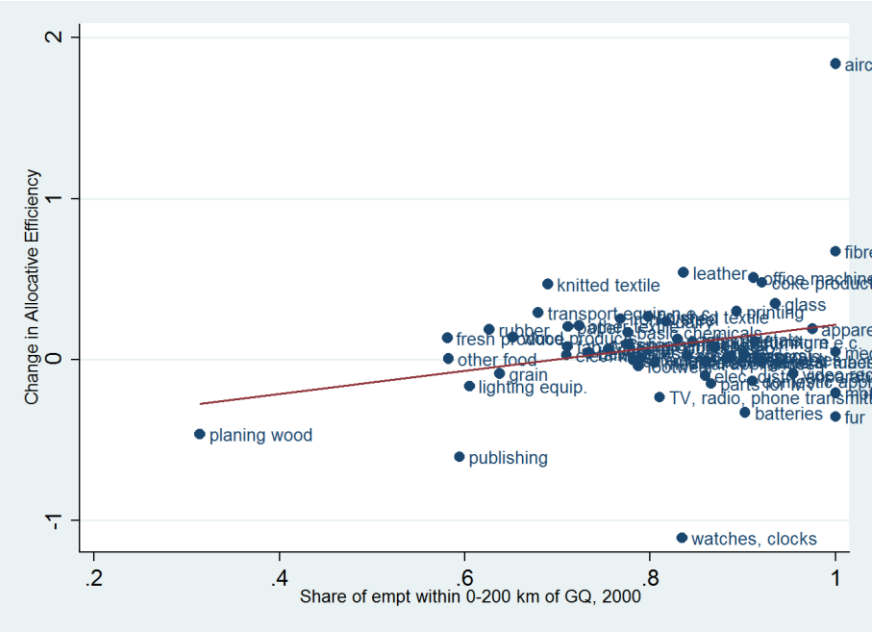
Table 7: Productivity distributions among incumbents and entrants

| | Average of normalized TFP metric in 2000 | Average of normalized TFP metric in 2007/9 | Average of normalized TFP metric in 2007/9, Plants 10+ years old | Average of normalized TFP metric in 2007/9, Plants less than 10 years |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Nodal district for GQ | 1.0349 | 1.0274, 99% | 1.0344, 100% | 1.0096, 98% |
| District 0-10 km from GQ | 0.9998 | 1.0011, 100% | 1.0068, 101% | 0.9797, 98% |
| District 10-50 km from GQ | 1.0044 | 1.0038, 100% | 1.0346, 103% | 0.9006, 90% |
| District 50+ km from GQ | 0.9915 | 0.9912, 100% | 0.9982, 101% | 0.9654, 97% |

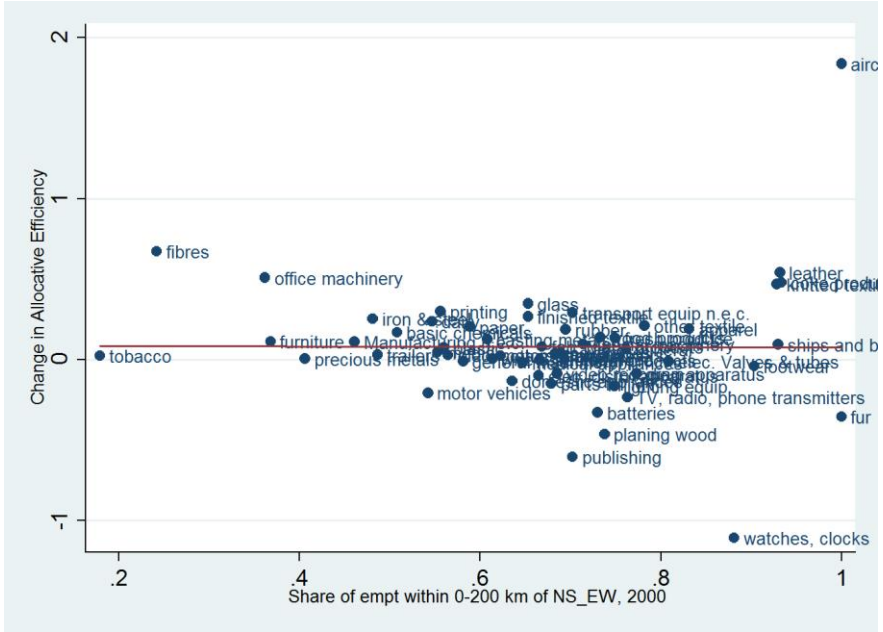
# Allocative Efficiency

- Evaluate district-level sorting around land intensity
- Compare overall changes in allocative efficiency by initial industry positioning along GQ network

A. Employment allocation, Proximity to GQ




B. Employment allocation, Proximity to NS-EW



# Conclusions

- GQ upgrades appear to have increased allocative efficiency, facilitated a more natural spatial sorting of industries, and encouraged decentralization to intermediate cities

- Ballpark calculations with many assumptions:
  - GQ increased manufacturing output by 15%-19%
  - A little less then a fifth of total organized sector growth
  - Almost all of it in immediately adjacent districts

- Stop short of a cost-benefit calculation, but the cost side was pretty small in this case

- The process also appears pretty capped at the levels estimated