Highway to Success: The Impact of Golden Quadrilateral Project on Indian Manufacturing

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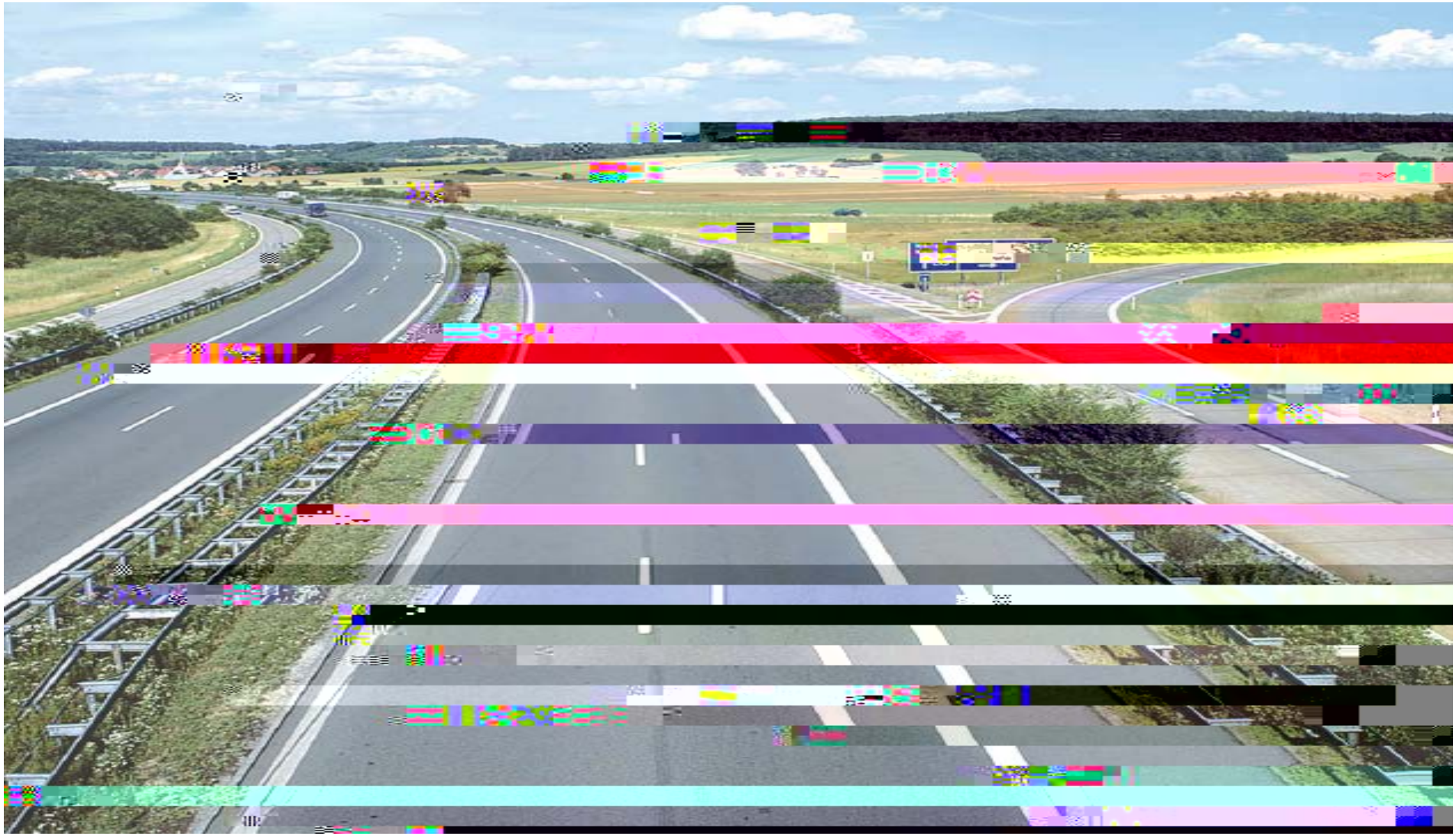
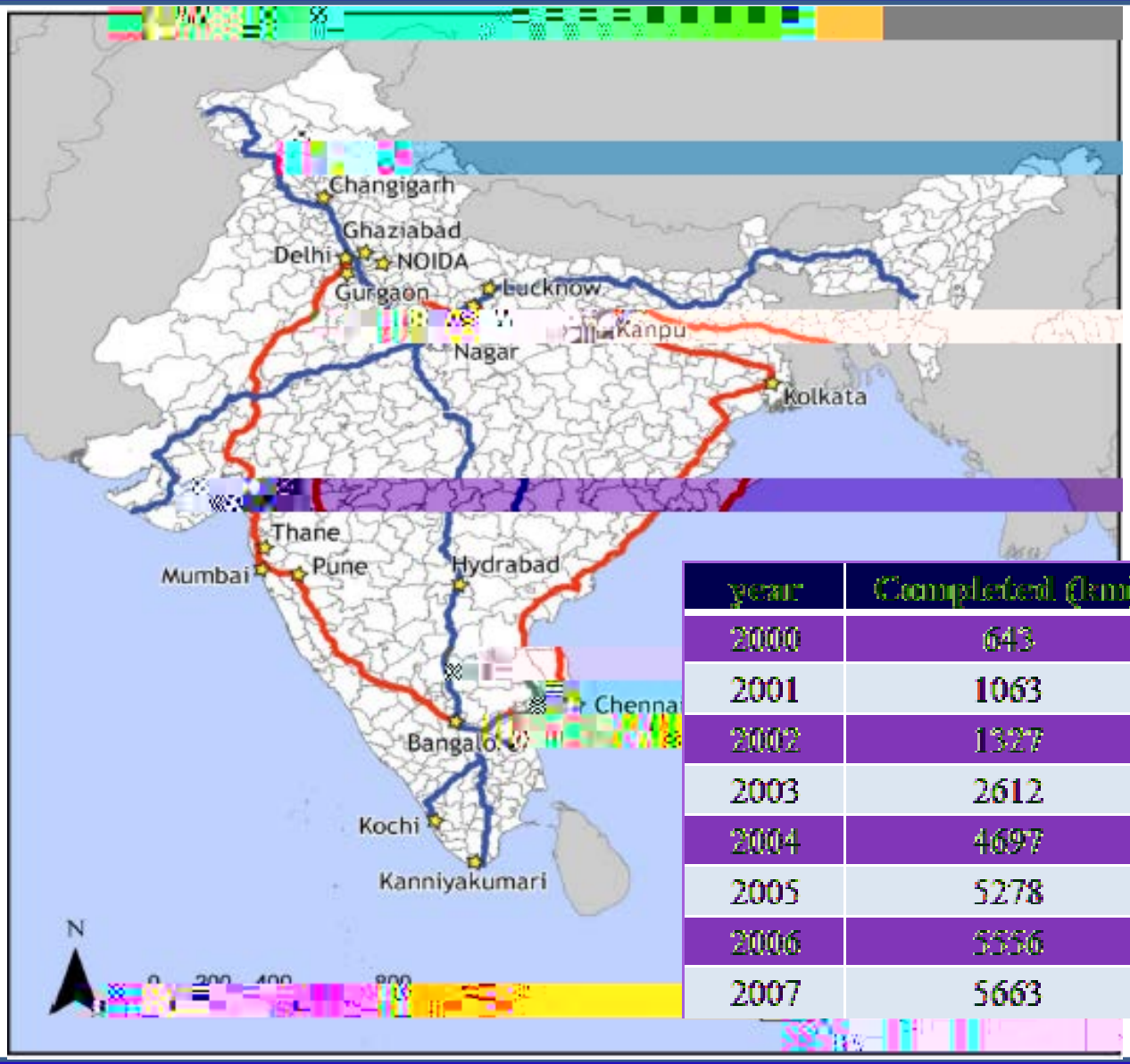
Highways in India, 2000 Snapshot

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

Our Contribution

- Use plant-level data to analyze the impact of highways on:
  - Entry and exit outcomes
  - Productivity consequences
  - Entrant vs. incumbent growth
  - Allocative efficiency
  - Contribution to urbanization/de-urbanization

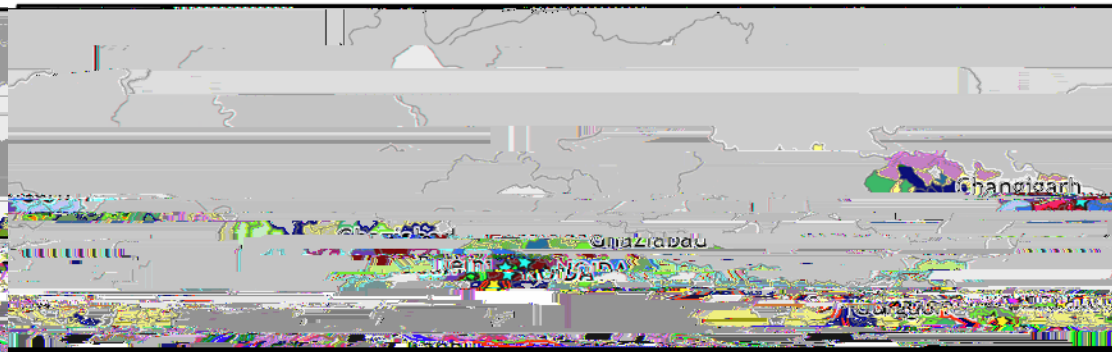
- Quantify the impact from investments into improving networks
  - [vs. the existence of transportation networks]
  - Comparison to the NS-EW placebo highway
  - Dynamics around upgrades
  - Comparison across urban and rural locations

Data

- Annual Survey of Industries (ASI) for organized manufacturing

Output


Chandigarh
Gurgaon
Lucknow
Kanpur
Nagar


Chandigarh
Ghaziabad

Young Output

Diff in Diff estimations: Entry Rates

	Total GQ organized sector effect,			Columns 1-3 in urban areas			Columns 1-3 in rural areas		
	Plants	Employment	Output	Plants	Employment	Output	Plants	Employment	Output
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
A. Base spatial horizon measuring effects relative to districts 50+ km from the GQ network									
Post GQ upgrades *	0.702	1.167	1.647+	0.388	0.631	0.383	-0.165	0.203	0.723
	(0.723)	(0.692)	(0.804)	(1.215)	Nodal district		(0.662)	(0.814)	(0.951)	(0.433)	(0.566)
	0.031	0.443	0.497++	0.597++	1.059+++	Post GQ upgrades *	0.436++	0.471++	0.928+++	0.319+
	(0.176)	(0.252)	(0.280)	(0.183)	(0.260)	(0.389)	District 0-10 km from GQ	(0.172)	(0.239)	(0.346)
	-0.056	-0.263	-0.009	-0.056	-0.351	-0.015	0.006	-0.126	Post GQ upgrades *	-0.01
	Yes	Yes	Yes	District and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Y
	1164	1164	1164	Observations	1248	1248	1248	1112	1112	1112	1

Sample counts by distance band: 9, 70, 42, and 196

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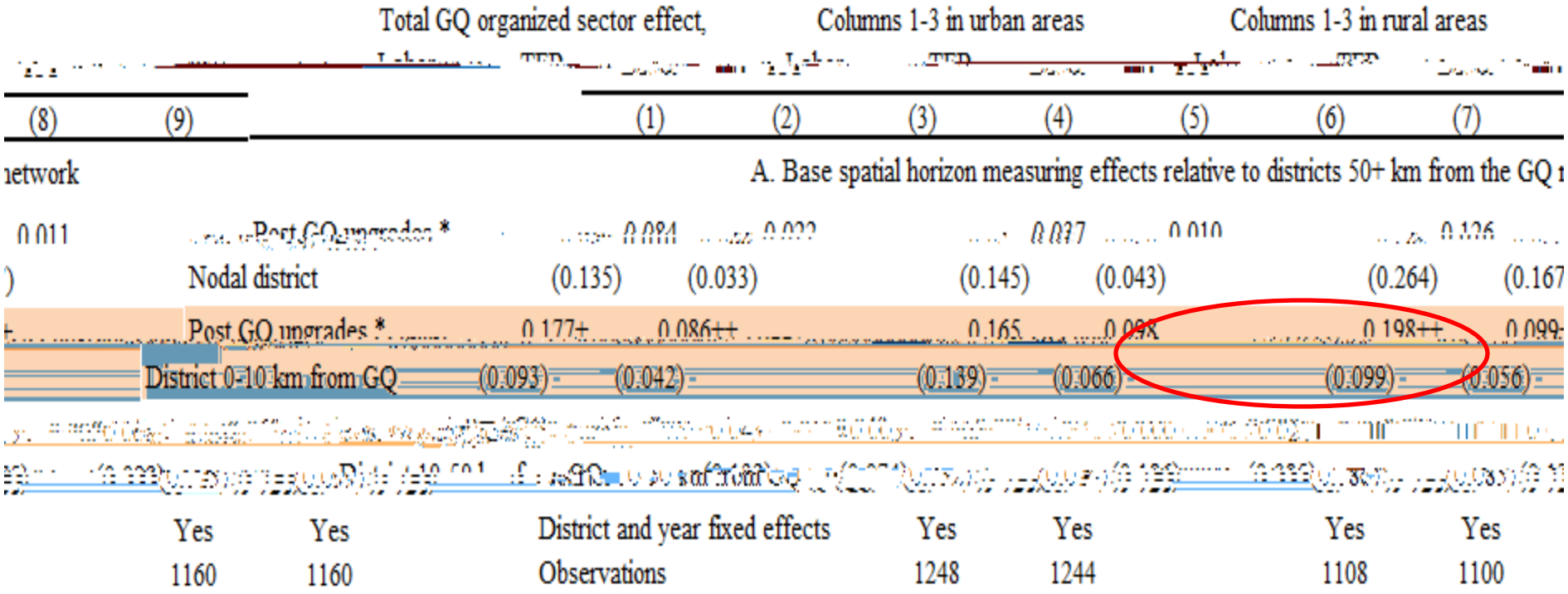

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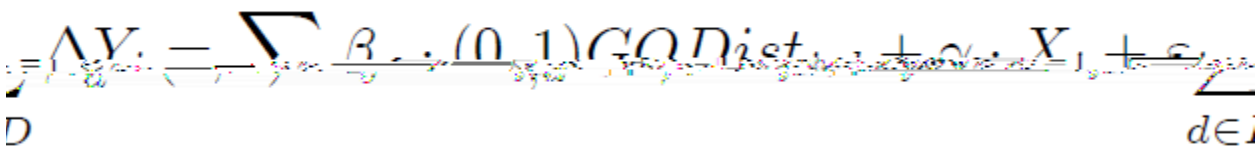
Methodology: Long differences

- Non-parametric approach using long-difference estimations

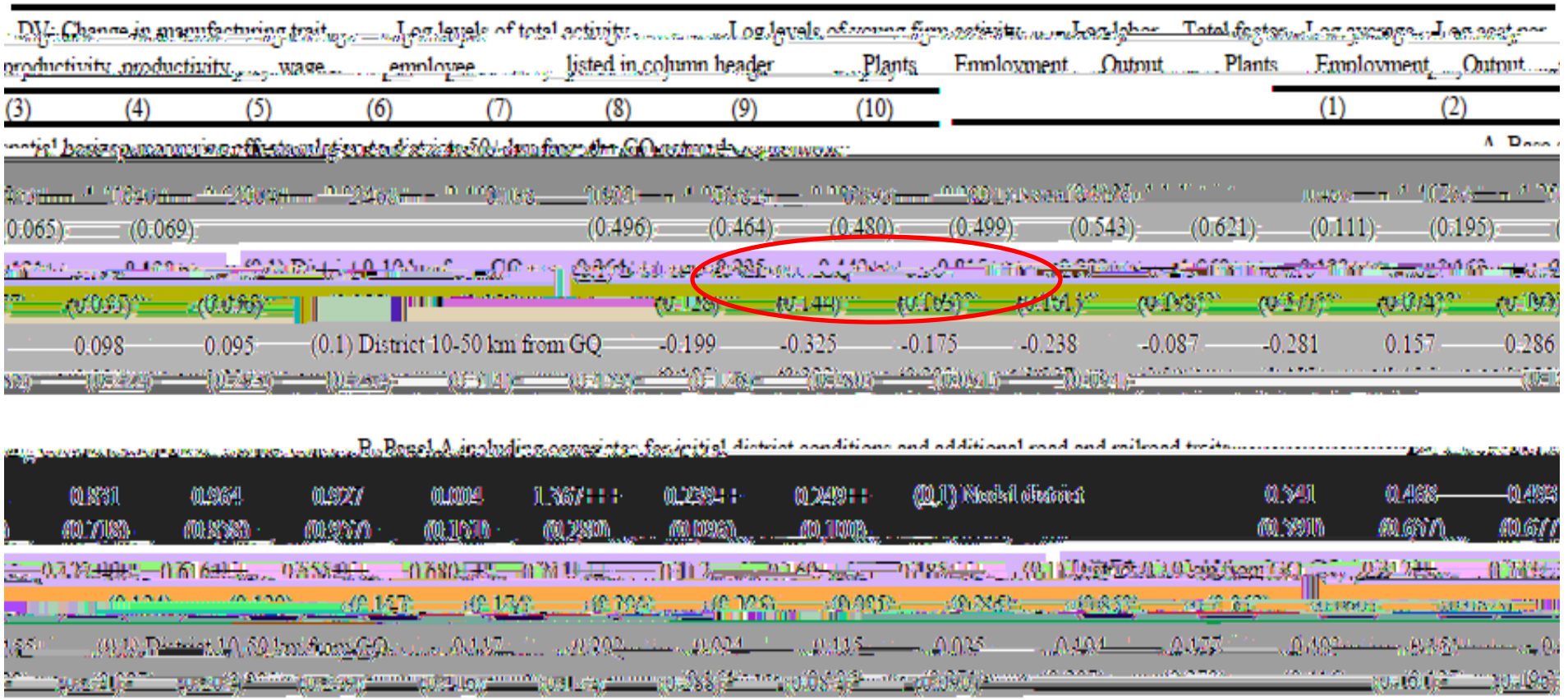


- X_i controls include:
  - Measures of initial levels Y_i
  - Access to national highway, state highway, or railroad in terms of log distance
  - Traits from 2000 Census: population, age profile, female-male ratio, urbanization rate, SC/ST rate, literacy, and within-district infrastructure measure

Long Differences

Sample counts by distance band: 9 0 3 5g

Long Differences



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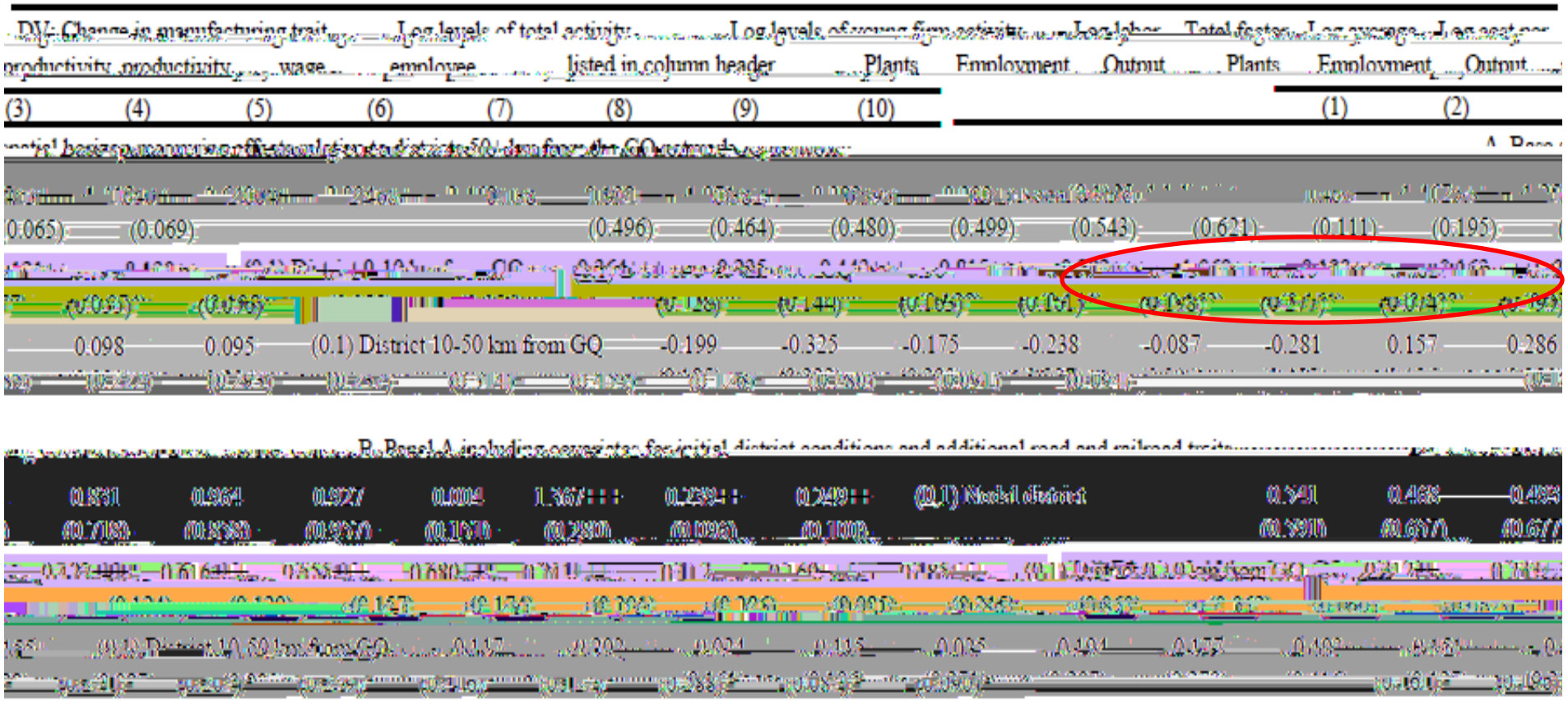

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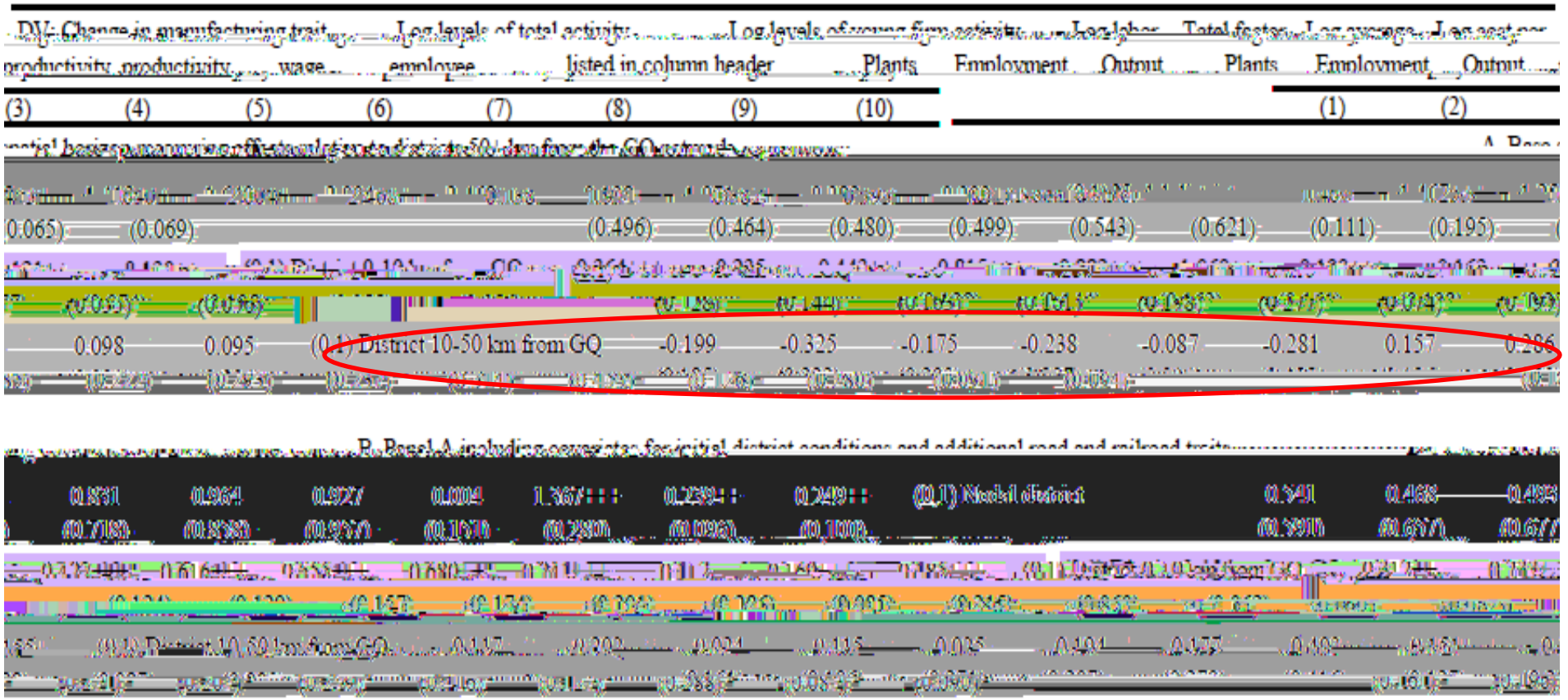

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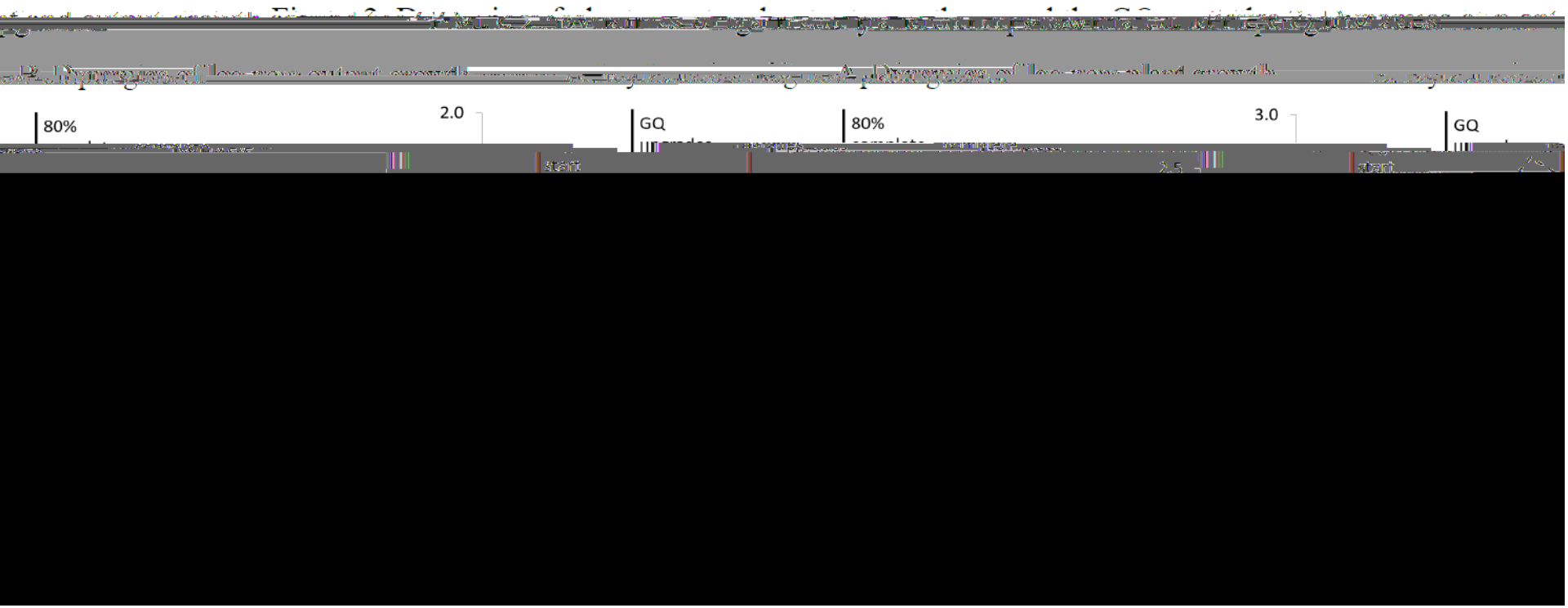
Dynamic Specifications: Young Activity



$$t \in T$$

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

Diff in Diff: Unorganized Sector

GQ and Urban Rural transformation for Unorganized Sector

- Diff in diff for unorganized: non-nodal districts close to the GQ system behave similarly to those located farther away

- Diff in diff on urban shares: GQ accelerated spatial shift for organized sector but observe no changes in the urbanization

Conclusions

- GQ upgrades connected to enhancements in organized sector activity
- Additionally, GQ helped increase allocative efficiency, facilitated a more natural spatial sorting of industries, and encouraged decentralization to intermediate cities
- Impact on organized sector is balanced between urban/rural settings, with the exception being that rural areas receive relatively more stimulus in terms of net output growth.
- Unorganized sector of manufacturing is not closely linked to the GQ developments in either location