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# Railway network design and regional labour markets in Sweden

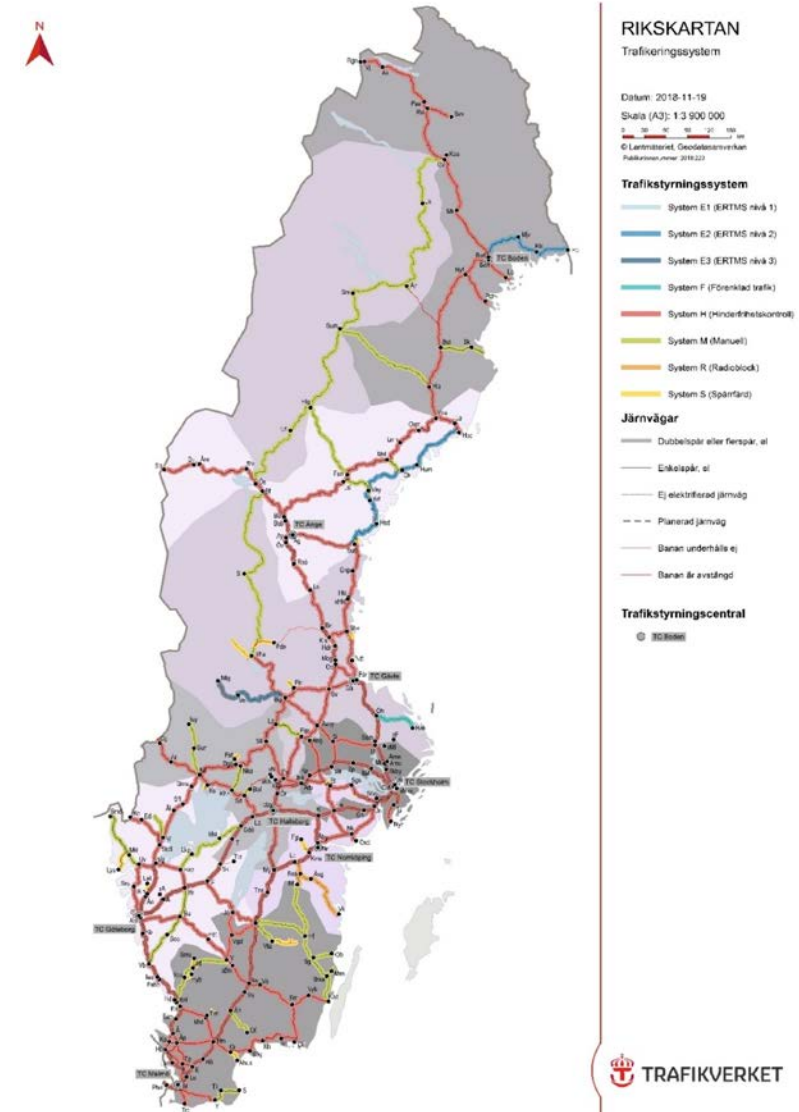
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# Background

- Political ambitions to improve commuting possibilities
  - Thicker labour markets
- This study:
  - Combine a dataset of all train movements with census data
  - Examine the association between job accessibility and annual wages



# Method

Based on the train data:

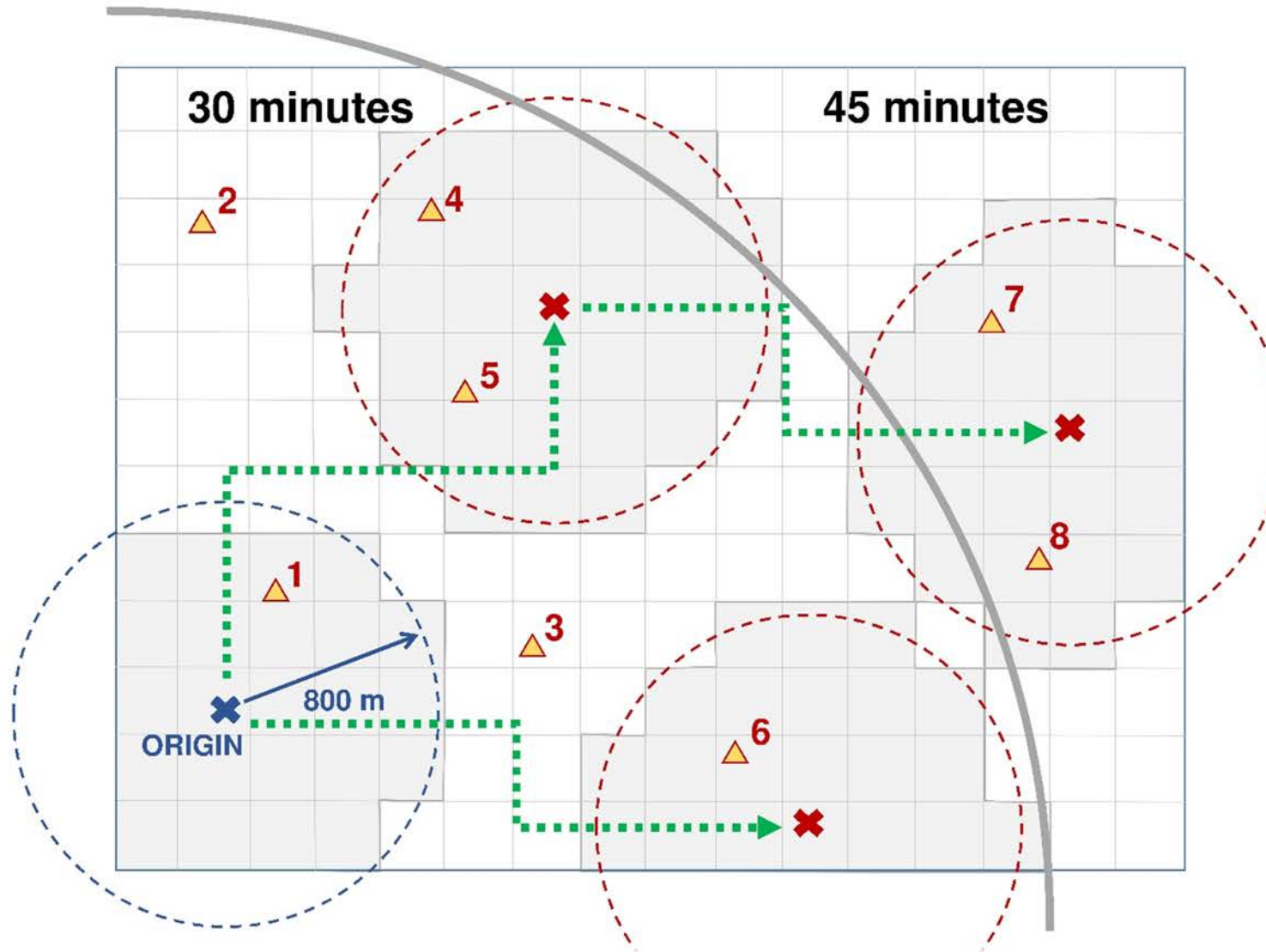
- Identify all trips possible to make within a specific travel time bands and one transfer, during morning peak hours
  - Commuter trains, regional trains and long distance trains
- Time bands: 30, 45 and 60 minutes
  - Including one transfer of minimum 5 minutes

# Method

Based on the census data:

- Identify areas within 800 meters from each train station (with regular passenger traffic)
  - At least 30 inhabitants
- Calculate accessible jobs
  - within reach by the rail network (Destination jobs)
  - at the origin (Origin jobs)

# Cumulative accessibility



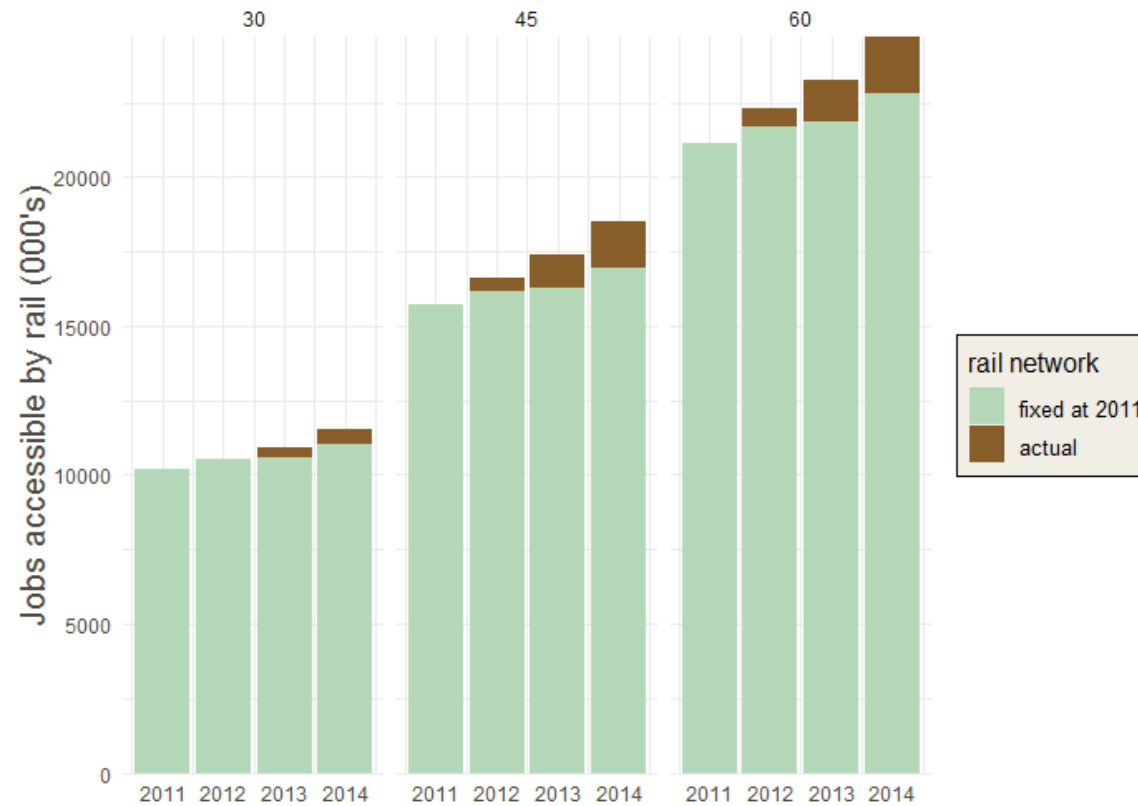
# Empirical approaches

- Fixed effects, panel data
  - Repeated observations on station area
- OLS, cross-section
  - Year by year
- Two different accessibility data:
  - the real network as it developed
  - a hypothetical fixed network

# Descriptives

Year	Variable	N	Mean	Std. Dev	Min	Max
2011	Annual wage (hundreds of SEK)	420	2558	334	1713	4019
	Origin jobs (thousands)	420	2	6	0.01	97
	Dest. jobs (thousands)	420	37	62	0	261
	Pop	420	716	1363.5	34	17598
2014	Annual wage (hundreds of SEK)	439	2944	362	1889	4770
	Origin jobs (thousands)	439	2	6	0.01	102
	Dest. jobs (thousands)	439	42	68	0	290
	Pop	439	661	1303.7	32	17246

# Total number of jobs accessible by rail



Response: Log(Wage)	Changed network	Unchanged network	Interpretation of estimates in terms of wage levels
Time threshold: 30 min, N = 468, T = 4			
Origin jobs	0.005**	0.005**	0.5 % per 1000 jobs
Dest. jobs	0.000	0.000	
Edu	0.287***	0.287***	33 % of a one unit increase
Emp	-0.061	-0.061	
Pop	-0.097***	-0.097***	-9.7 % per 1000 inhabitants
Year Dummies	Yes	Yes	
Time threshold: 60 min, N = 471, T = 4			
Origin jobs	0.005**	0.005**	0.5 % per 1000 jobs
Dest. jobs	-0.000	-0.000	
Edu	0.284***	0.284***	32.8 % of a one unit increase
Emp	-0.060	-0.060	
Pop	-0.096***	-0.096***	-9.6 % per 1000 inhabitants
Year Dummies	Yes	Yes	

Response: Log(Wage)	Changed network	Unchanged network	Interpretation of estimates in terms of wage levels
2014, N = 439			
Origin jobs	0.002***	0.002***	0.2 % per 1000 jobs
Dest. jobs	0.001***	0.001***	0.1 % per 1000 jobs
Edu	0.479***	0.45***	≈ 60 % of a one unit increase
Emp	0.4***	0.424***	≈ 50 % of a one unit increase
Pop	-0.002	-0.002	

# Conclusions

- Association between accessible jobs and local wage levels
- Improvements in the railway network were marginal, in terms of job accessibility
- The study can be improved in several ways
  - Weight the jobs based on time distance
  - Other station catchment areas



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