

Place-Based Industrial Policies and Local Agglomeration in the Long Run

Lorenzo Incoronato
University of Naples Federico II

Salvatore Lattanzio
Bank of Italy

European Commission Annual Research Conference 2024

Ispira – November 21-22, 2024

The “New Era” of Industrial Policy

- Increasing regional inequalities in advanced economies
 - “Left-behind” industrial districts

The “New Era” of Industrial Policy

- Increasing regional inequalities in advanced economies
 - “Left-behind” industrial districts
- Rise in **place-based industrial policy** (PBIP)
 - Establish clusters by supporting local manufacturing
 - US industrial policy in 2022 “*potentially the most significant place-based policy funding in US history*”
(Bartik et al., 2022)

The “New Era” of Industrial Policy

- Increasing regional inequalities in advanced economies
 - “Left-behind” industrial districts
- Rise in **place-based industrial policy** (PBIP)
 - Establish clusters by supporting local manufacturing
 - US industrial policy in 2022 “*potentially the most significant place-based policy funding in US history*”
(Bartik et al., 2022)
- Key question: Does PBIP benefit targeted areas in the **long run**?

The “New Era” of Industrial Policy

- Increasing regional inequalities in advanced economies
 - “Left-behind” industrial districts
- Rise in **place-based industrial policy** (PBIP)
 - Establish clusters by supporting local manufacturing
 - US industrial policy in 2022 “*potentially the most significant place-based policy funding in US history*”
(Bartik et al., 2022)
- Key question: Does PBIP benefit targeted areas in the **long run**?
 - Rationale: **agglomeration economies**
(Kline & Moretti, 2014; Rodrik, 2019)

The “New Era” of Industrial Policy

- Increasing regional inequalities in advanced economies
 - “Left-behind” industrial districts
- Rise in **place-based industrial policy** (PBIP)
 - Establish clusters by supporting local manufacturing
 - US industrial policy in 2022 “*potentially the most significant place-based policy funding in US history*”
(Bartik et al., 2022)
- Key question: Does PBIP benefit targeted areas in the **long run**?
 - Rationale: **agglomeration economies**
(Kline & Moretti, 2014; Rodrik, 2019)
 - Might lead to inefficiencies, misallocation
(Glaeser & Gottlieb, 2008; Heblich et al., 2022)

The “New Era” of Industrial Policy

- Increasing regional inequalities in advanced economies
 - “Left-behind” industrial districts
- Rise in **place-based industrial policy** (PBIP)
 - Establish clusters by supporting local manufacturing
 - US industrial policy in 2022 “*potentially the most significant place-based policy funding in US history*”
(Bartik et al., 2022)
- Key question: Does PBIP benefit targeted areas in the **long run**?
 - Rationale: **agglomeration economies**
(Kline & Moretti, 2014; Rodrik, 2019)
 - Might lead to inefficiencies, misallocation
(Glaeser & Gottlieb, 2008; Heblich et al., 2022)
- Still **scarce evidence** on long-run effects of PBIP
(Juhasz et al., 2023)
 - Data limitations, identification

This Paper

Does PBIP foster long-run agglomeration?

What are the sources of persistence?

WHAT

HOW

PREVIEW

This Paper

Does PBIP foster long-run agglomeration?

What are the sources of persistence?

WHAT

- **Unique historical setting**
- PBIP in Italy (1960s-70s)
- Create clusters, subsidies to manufacturing firms

HOW

PREVIEW

This Paper

Does PBIP foster long-run agglomeration?

What are the sources of persistence?

WHAT

- **Unique historical setting**
- PBIP in Italy (1960s-70s)
- Create clusters, subsidies to manufacturing firms

HOW

- **One century** of census data + social security (Bank of Italy)
- **Exogenous spatial variation**
- Assignment mechanism set in 1950s

PREVIEW

This Paper

Does PBIP foster long-run agglomeration?

What are the sources of persistence?

WHAT

- **Unique historical setting**
- PBIP in Italy (1960s-70s)
- Create clusters, subsidies to manufacturing firms

HOW

- **One century** of census data + social security (Bank of Italy)
- **Exogenous spatial variation**
- Assignment mechanism set in 1950s

PREVIEW

- **Positive effect** on employment density while policy is in place

This Paper

Does PBIP foster long-run agglomeration?

What are the sources of persistence?

WHAT

- **Unique historical setting**
- PBIP in Italy (1960s-70s)
- Create clusters, subsidies to manufacturing firms

HOW

- **One century** of census data + social security (Bank of Italy)
- **Exogenous spatial variation**
- Assignment mechanism set in 1950s

PREVIEW

- **Positive effect** on employment density while policy is in place
- **Persistence** beyond the end of the policy
 - Not driven by spatial displacement

This Paper

Does PBIP foster long-run agglomeration?

What are the sources of persistence?

WHAT

- **Unique historical setting**
- PBIP in Italy (1960s-70s)
- Create clusters, subsidies to manufacturing firms

HOW

- **One century** of census data + social security (Bank of Italy)
- **Exogenous spatial variation**
- Assignment mechanism set in 1950s

PREVIEW

- **Positive effect** on employment density while policy is in place
- **Persistence** beyond the end of the policy
 - Not driven by spatial displacement
- Spillover to **non-targeted** sectors: **services (knowledge-intensive)**

This Paper

Does PBIP foster long-run agglomeration?

What are the sources of persistence?

WHAT

- **Unique historical setting**
- PBIP in Italy (1960s-70s)
- Create clusters, subsidies to manufacturing firms

HOW

- **One century** of census data + social security (Bank of Italy)
- **Exogenous spatial variation**
- Assignment mechanism set in 1950s

PREVIEW

- **Positive effect** on employment density while policy is in place
- **Persistence** beyond the end of the policy
 - Not driven by spatial displacement
- Spillover to **non-targeted** sectors: **services (knowledge-intensive)**
- Increases in wages, skills and human capital ("**good jobs**")

This Paper

Does PBIP foster long-run agglomeration?

What are the sources of persistence?

WHAT

- **Unique historical setting**
- PBIP in Italy (1960s-70s)
- Create clusters, subsidies to manufacturing firms

HOW

- **One century** of census data + social security (Bank of Italy)
- **Exogenous spatial variation**
- Assignment mechanism set in 1950s

PREVIEW

- **Positive effect** on employment density while policy is in place
- **Persistence** beyond the end of the policy
 - Not driven by spatial displacement
- Spillover to **non-targeted** sectors: **services (knowledge-intensive)**
- Increases in wages, skills and human capital ("**good jobs**")
- Policy design: role of **initial conditions**

I. THE POLICY

The IDAs

- **Industrial Development Areas** (IDAs, 1960s-1970s)
 - Groups of municipalities identified by the Italian government
 - Suitable hosts for industrial clusters

The IDAs

- **Industrial Development Areas** (IDAs, 1960s-1970s)
 - Groups of municipalities identified by the Italian government
 - Suitable hosts for industrial clusters
- **Goal:** stimulate industrial concentration in high-potential areas
 - “*Clearly directing location choices of economic agents*”
 - “*Establishing **positive externalities** thanks to proximity to other firms and workers*”

The IDAs

- **Industrial Development Areas** (IDAs, 1960s-1970s)
 - Groups of municipalities identified by the Italian government
 - Suitable hosts for industrial clusters
- **Goal:** stimulate industrial concentration in high-potential areas
 - “*Clearly directing location choices of economic agents*”
 - “*Establishing **positive externalities** thanks to proximity to other firms and workers*”
- Part of the *Extraordinary Intervention in the Mezzogiorno* (**EIM**):
 - Large development program in Southern Italy (1950-1992)
 - Managed by the central government

The EIM...



The EIM area

The EIM...

- 1950-1960: infrastructure building



The EIM area

The EIM...

- 1950-1960: infrastructure building
- From 1960: also **industrial policy**
 - Investment subsidies (firms apply)
 - Manufacturing only



The EIM area

The EIM... and the IDAs

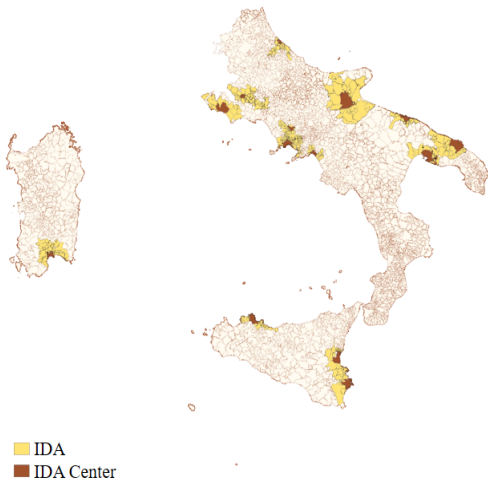
- 1950-1960: infrastructure building
- From 1960: also **industrial policy**
 - Investment subsidies (firms apply)
 - Manufacturing only
 - Place-based dimension: the **IDAs**



■ IDA
■ IDA Center

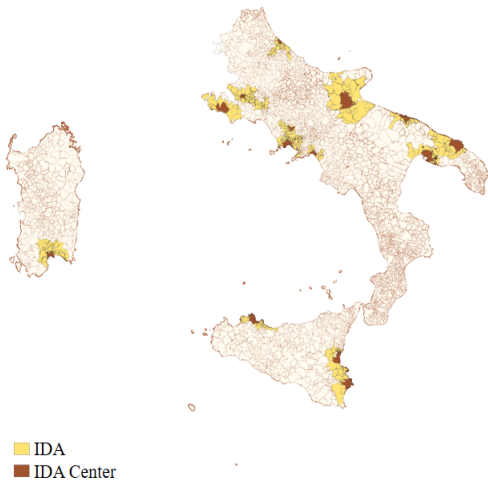
The EIM area

The EIM... and the IDAs



- 1950-1960: infrastructure building
- From 1960: also **industrial policy**
 - Investment subsidies (firms apply)
 - Manufacturing only
 - Place-based dimension: the **IDAs**
- IDA **subsidies more generous** than elsewhere in EIM area (~€90bn)
 - Higher investment subsidy rate
 - Infrastructures, houses for workers

The EIM... and the IDAs



The EIM area

- 1950-1960: infrastructure building
- From 1960: also **industrial policy**
 - Investment subsidies (firms apply)
 - Manufacturing only
 - Place-based dimension: the **IDAs**
- IDA **subsidies more generous** than elsewhere in EIM area (~€90bn)
 - Higher investment subsidy rate
 - Infrastructures, houses for workers
- IDAs: **high-potential** areas of South
 - Requirements on population, geography, industrial presence
 - Centered around a large city
 - Approved by central government

detail

theory

data

expenses

descriptives

II. IDENTIFICATION

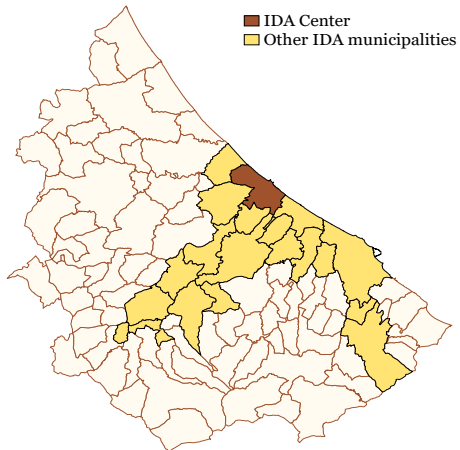
The Minimum IDA Border



- Exploit **criteria** for the establishment of an IDA
- Centered around a large city ...

Example: The Pescara IDA

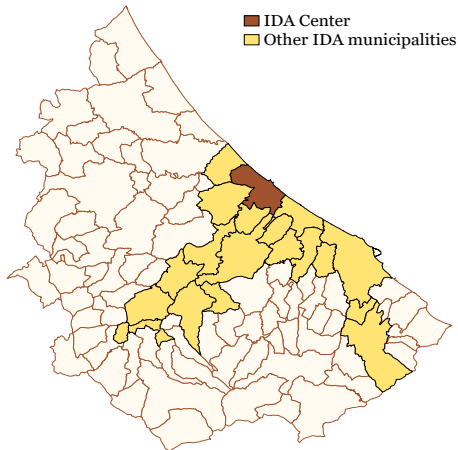
The Minimum IDA Border



- Exploit **criteria** for the establishment of an IDA
- Centered around a large city ...
- ... Then include additional municipalities

Example: The Pescara IDA

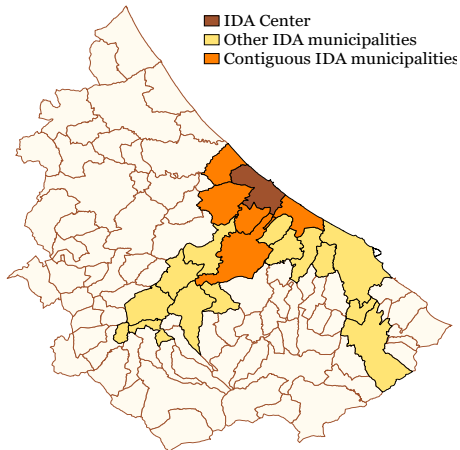
The Minimum IDA Border



Example: The Pescara IDA

- Exploit **criteria** for the establishment of an IDA
- Centered around a large city ...
- ... Then include additional municipalities
- Minimum number:
IDA center +

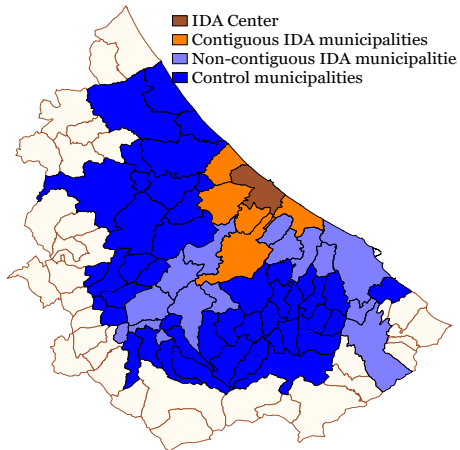
The Minimum IDA Border



Example: The Pescara IDA

- Exploit **criteria** for the establishment of an IDA
- Centered around a large city ...
- ... Then include additional municipalities
- Minimum number:
IDA center + contiguous municipalities
⇒ “CONTIGUITY RULE”

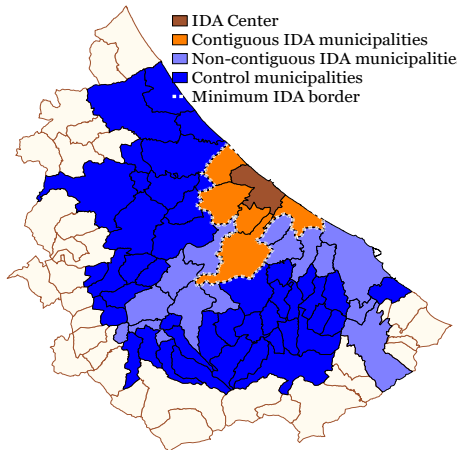
The Minimum IDA Border



Example: The Pescara IDA

- Exploit **criteria** for the establishment of an IDA
- Centered around a large city ...
- ... Then include additional municipalities
- Minimum number:
IDA center + contiguous municipalities
⇒ **“CONTIGUITY RULE”**
- Compare them to **municipalities further out**

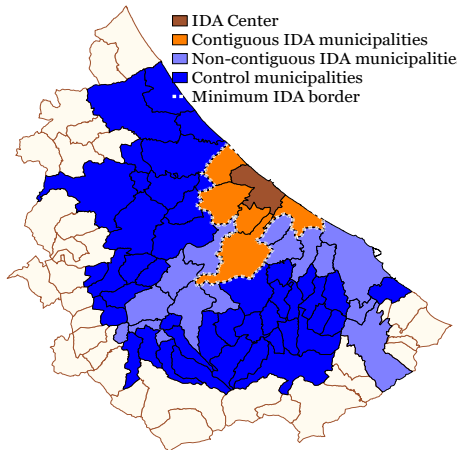
The Minimum IDA Border



Example: The Pescara IDA

- Exploit **criteria** for the establishment of an IDA
- Centered around a large city ...
- ... Then include additional municipalities
- Minimum number:
IDA center + contiguous municipalities
⇒ “CONTIGUITY RULE”
- Compare them to **municipalities further out**
- Around “**minimum**” IDA border

The Minimum IDA Border



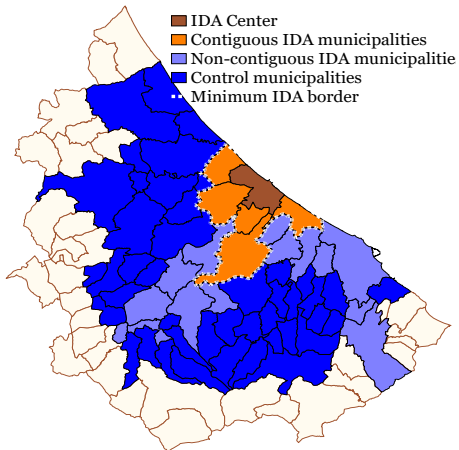
Example: The Pescara IDA

- Exploit **criteria** for the establishment of an IDA
- Centered around a large city ...
- ... Then include additional municipalities
- Minimum number:
IDA center + contiguous municipalities
⇒ “CONTIGUITY RULE”
- Compare them to **municipalities further out**
- Around “**minimum**” IDA border
- **Balancing** tests in the paper

balancing

first stage

The Minimum IDA Border

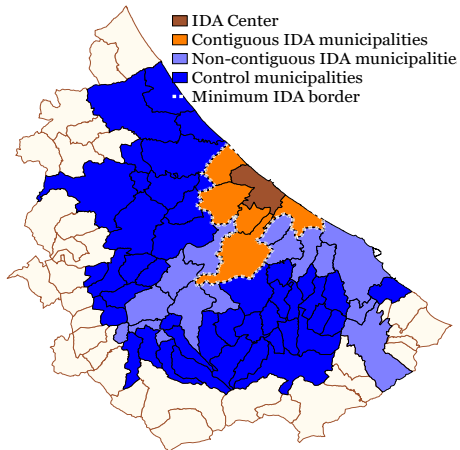


Example: The Pescara IDA

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot W_m + \epsilon_{m,t}$$

- $Y_{m,t}$: employment density in municipality m , census year t
- $W_m = 1$ for municipalities within cutoff
- ρ_j : coefficient of interest

The Minimum IDA Border

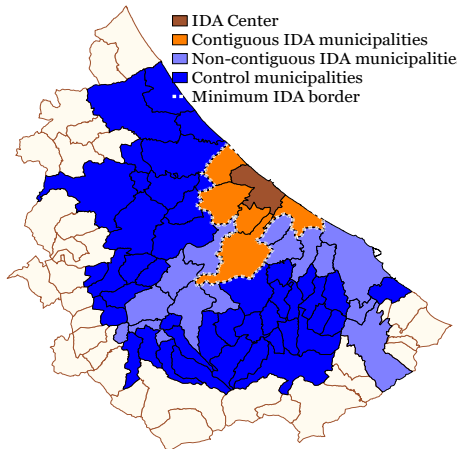


Example: The Pescara IDA

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot W_m + \epsilon_{m,t}$$

- $Y_{m,t}$: employment density in municipality m , census year t
- $W_m = 1$ for municipalities within cutoff
- ρ_j : coefficient of interest
- In the paper:
- ❶ Cross-sectional fuzzy RD

The Minimum IDA Border



Example: The Pescara IDA

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot W_m + \epsilon_{m,t}$$

- $Y_{m,t}$: employment density in municipality m , census year t
- $W_m = 1$ for municipalities within cutoff
- ρ_j : coefficient of interest
- In the paper:
 - 1 Cross-sectional fuzzy RD
 - 2 Other design: **placebo centers**
 - Address spatial spillovers

fuzzy rd

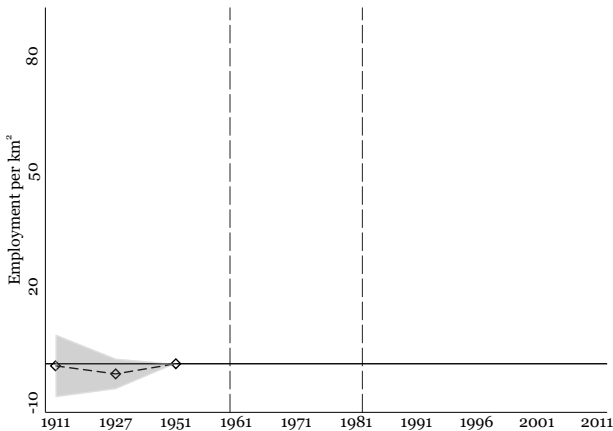
placebo centers

III. MAIN RESULTS

a. Employment density

Diff-in-Disc – Long-Term Agglomeration

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot W_m + \epsilon_{m,t} \quad (\text{DD})$$



rd plots

firms

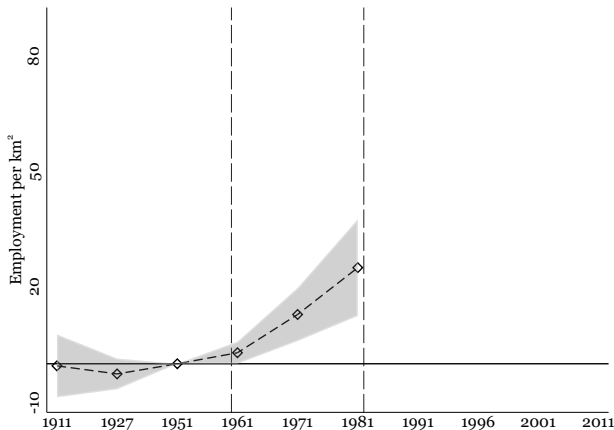
population

identification

ruling out spillovers

Diff-in-Disc – Long-Term Agglomeration

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot W_m + \epsilon_{m,t} \quad (\text{DD})$$



rd plots

firms

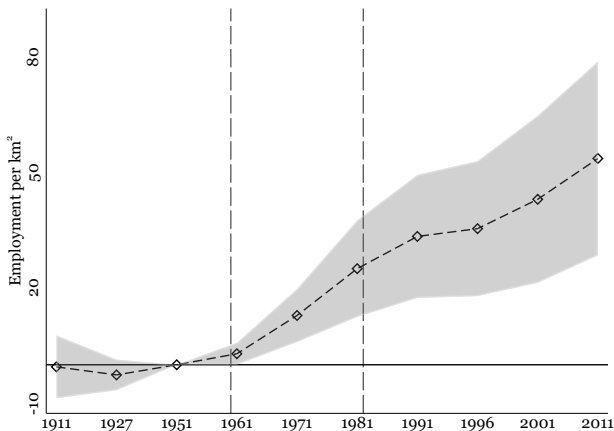
population

identification

ruling out spillovers

Diff-in-Disc – Long-Term Agglomeration

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot W_m + \epsilon_{m,t} \quad (\text{DD})$$



rd plots

firms

population

identification

ruling out spillovers

Migration and Participation

- Is the effect driven by **migration** from nearby areas?
 - No historical migration data, hard to quantify directly
 - No effects on migration rates after the policy
 - Placebo centers: displacement only during IDA years

table

spatial spillovers

Migration and Participation

- Is the effect driven by **migration** from nearby areas?

table

 - No historical migration data, hard to quantify directly
 - No effects on migration rates after the policy
 - Placebo centers: displacement only during IDA years

spatial spillovers

- But also increase in local labor market **participation**...
- ... and lower **unemployment** rates for residents

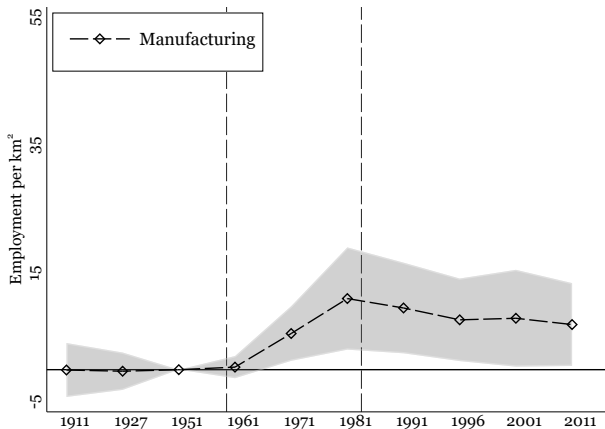
table

III. MAIN RESULTS

b. Sector breakdown

Sector Breakdown

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot W_m + \epsilon_{m,t} \quad (\text{DD})$$



firms

rd plots

logs

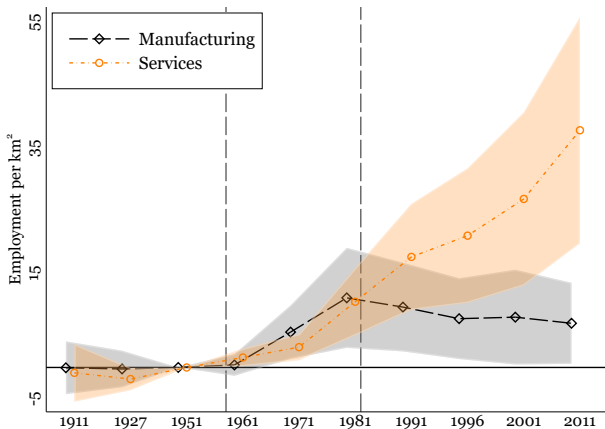
staggered design

placebo centers

structural change

Sector Breakdown

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot W_m + \epsilon_{m,t} \quad (\text{DD})$$



firms

rd plots

logs

staggered design

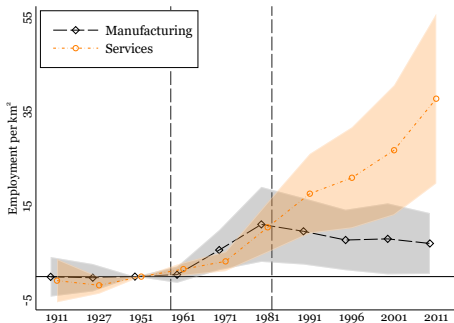
placebo centers

structural change

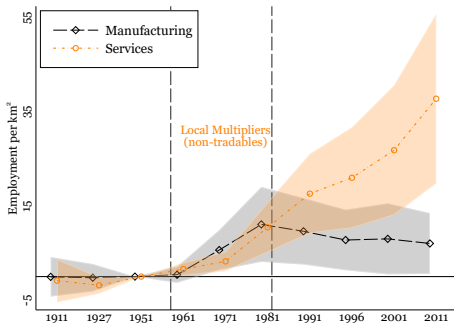
IV. MECHANISMS

The Role of Services

- **What explains the rise in services?**

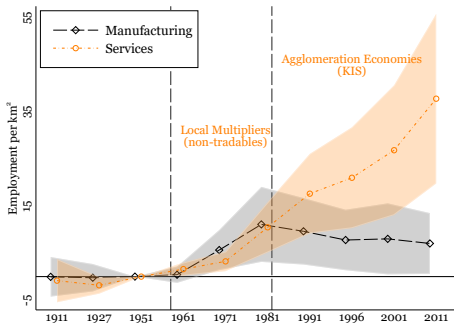


The Role of Services



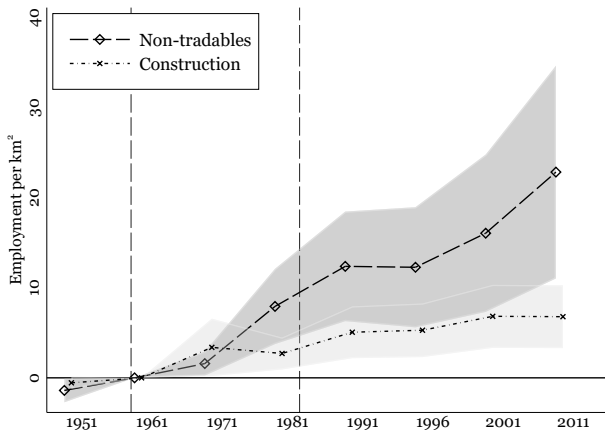
- What explains the rise in services?
- Boost to manufacturing \Rightarrow **Local multiplier** to services
(Moretti, 2010)
 - Multiplier estimate ~ 1
 - Should be in **non-tradables**
- Cannot fully explain persistence

The Role of Services



- **What explains the rise in services?**
- Boost to manufacturing \Rightarrow **Local multiplier** to services
(Moretti, 2010)
 - Multiplier estimate ~ 1
 - Should be in **non-tradables**
- Cannot fully explain persistence
- **Agglomeration economies**
 - Knowledge spillovers, specialized labor pool
- Testable implications
 - **Knowledge-intensive services (KIS)**
 - Human capital accumulation
 - Higher wages
 - Higher house prices

Which Services? The Rise of KIS



Non-tradables: wholesale and retail trade, hospitality, other.

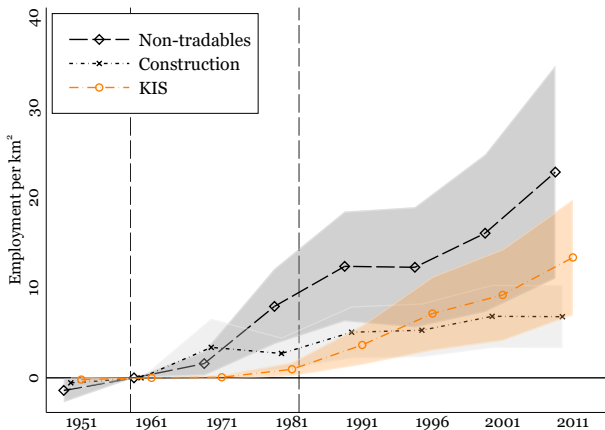
KIS: communication, finance and insurance, services to firms.

shares

firms

other identification

Which Services? The Rise of KIS



Non-tradables: wholesale and retail trade, hospitality, other.

KIS: communication, finance and insurance, services to firms.

shares

firms

other identification

The Role of High-Tech Manufacturing

- What led to the development of KIS?
- The policy affected the **composition** of manufacturing
- Larger share of **high-tech** manufacturing in treated areas

subsidies

table

The Role of High-Tech Manufacturing

- What led to the development of KIS?
- The policy affected the **composition** of manufacturing
- Larger share of **high-tech** manufacturing in treated areas
- Contributed to subsequent growth of KIS in two ways:
 - ① **Supply** of skilled workers

subsidies

table

kis hires

The Role of High-Tech Manufacturing

- What led to the development of KIS?
- The policy affected the **composition** of manufacturing subsidies
- Larger share of **high-tech** manufacturing in treated areas table
- Contributed to subsequent growth of KIS in two ways:
 - ① **Supply** of skilled workers kis hires
 - ② **Demand** of business services table descriptive input-output

The Role of High-Tech Manufacturing

- What led to the development of KIS?
- The policy affected the **composition** of manufacturing subsidies
- Larger share of **high-tech** manufacturing in treated areas table
- Contributed to subsequent growth of KIS in two ways:
 - ① **Supply** of skilled workers kis hires
 - ② **Demand** of business services table descriptive input-output
- Local **wages**: \uparrow 10 log points in 2011 table
 - \uparrow 27 log points in KIS
- **Human capital accumulation**: share of graduates \uparrow 10ppt in 2011 table

Much More in the Paper

- **Firms:**

- Larger, higher paying
- Higher productivity and investment in KIS and manuf.
- Higher business dynamism in KIS

table

table

figure

- **Agglomeration economies:**

- Higher house prices and incomes
- Address alternative channel: continued public spending

table

table

- **Cost-benefit analysis**

cost-benefit

- **Heterogeneity and implications**

more

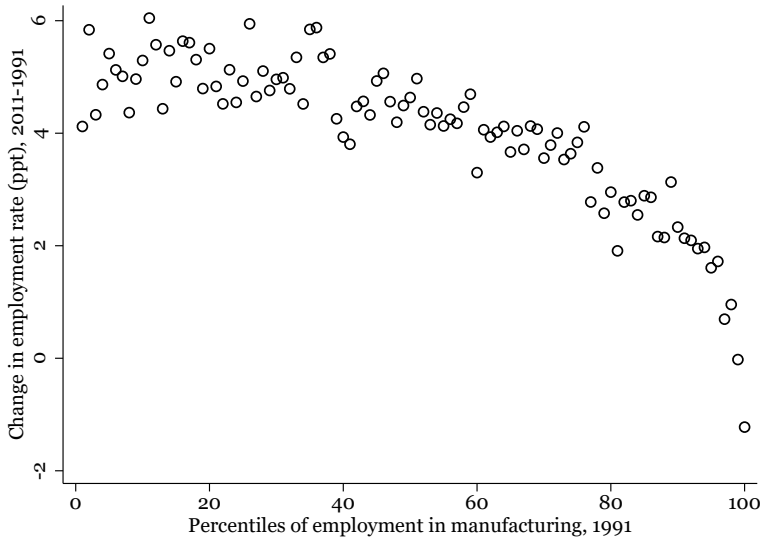
- Short-lived effects in other EIM areas

Conclusions

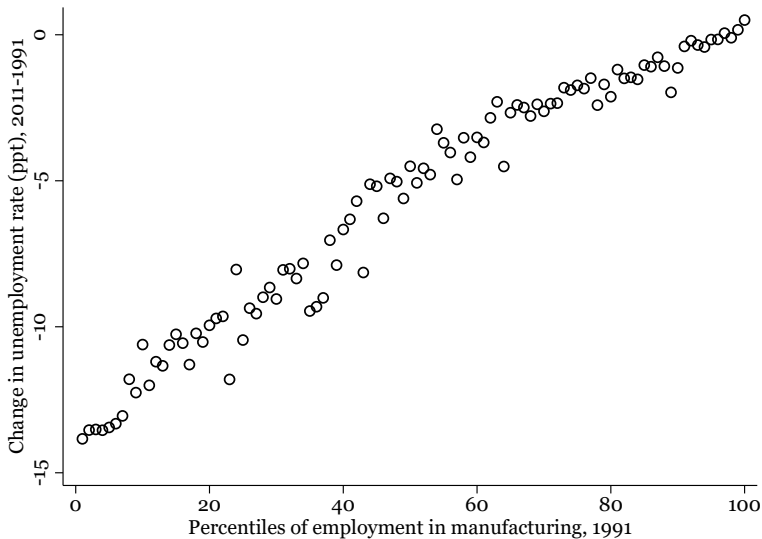
- PBIP can generate **virtuous cycles** in targeted areas
 - Agglomeration of workers and firms beyond the end of the policy
- Persistence linked to response of **services**
 - Rise in knowledge-intensive jobs
 - Human capital accumulation, higher wages
- PBIP expedited structural transformation and created **“good jobs”**
(Rodrik and Stantcheva, 2021)
- Net benefits outweigh the costs
- Persistence depends on **initial conditions** and market access
 - No long-run effects in peripheral areas
- Important policy implications, but warrants further research

APPENDIX

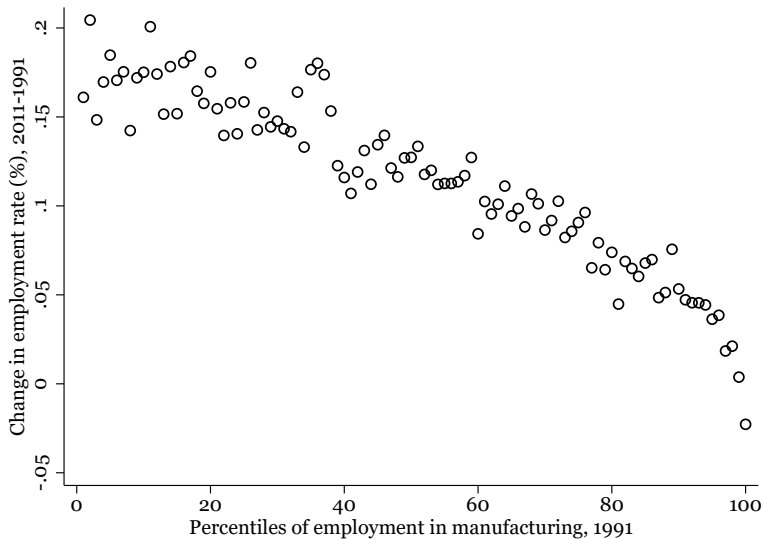
The Effects of Manufacturing Decline



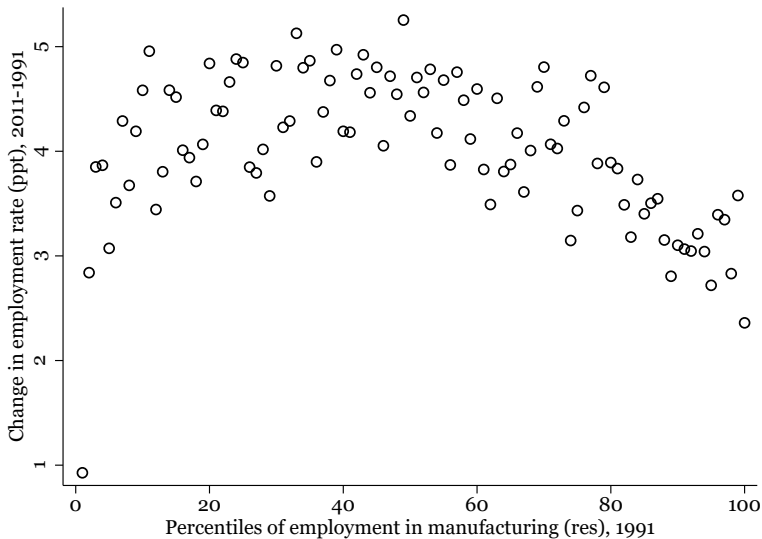
The Effects of Manufacturing Decline



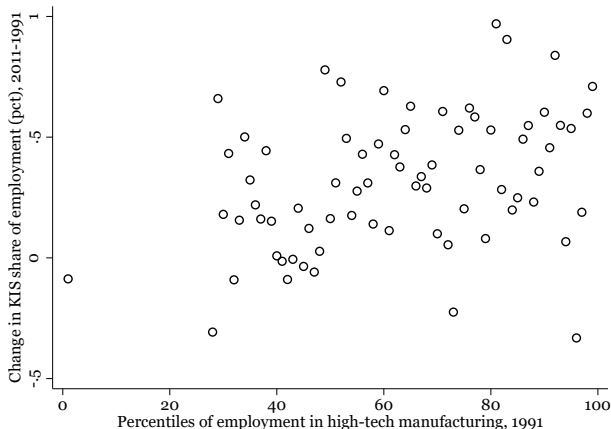
The Effects of Manufacturing Decline



The Effects of Manufacturing Decline



The Effects of Manufacturing Decline



1sd higher share of high-tech mfg in 1991 (25ppt) \Rightarrow 2ppt higher share of KIS in 2011 (20% of mean in Italy)

Estimation sample: 1sd higher share of high-tech mfg in 1991 (20ppt) \Rightarrow 5ppt higher share of KIS in 2011 (30% of mean)

(OLS and IV in line, also considering downward bias in OLS due to measurement error) [back](#)

Literature

- Industrial policy

(Juhasz, 2018; Hanlon, 2020; Mitrunen, 2020; Choi & Levchenko, 2021; Kantor & Whalley, 2022; Lane, 2022)

⇒ First paper detailing the response of the services sector

- Long-run effects of place-based (cluster) policies

(Kline & Moretti, 2014a; von Ehrlich & Seidel, 2018; Criscuolo et al., 2019; Garin & Rothbaum, 2022; Giorcelli & Li, 2022; Heblich et al., 2022; Lapoint & Sakabe, 2022)

⇒ Not much evidence on industrial cluster policies

⇒ Novel insights on sources of agglomeration and policy design

- Spillovers of government intervention

(Moretti, 2010; Atalay et al., 2022; Giorcelli & Li, 2022; Sieglöcher et al., 2022)

⇒ Dynamic estimates of spatial and sectoral spillovers

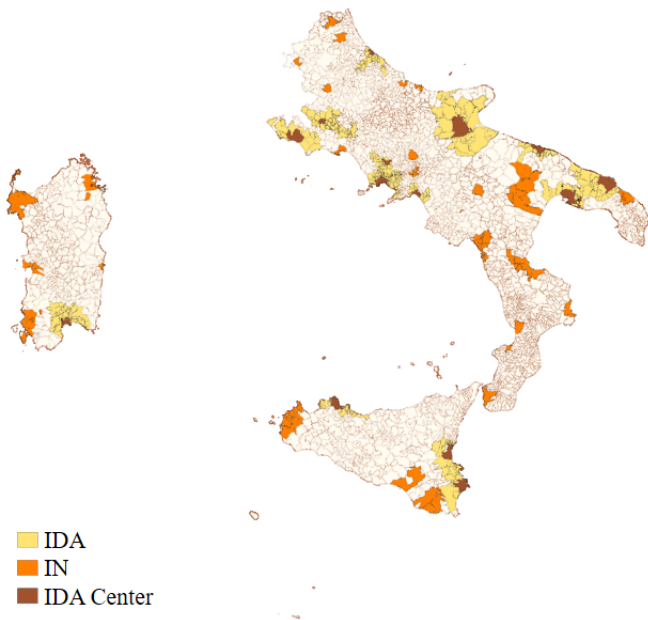
back

The IDAs

- Created upon initiative of local public authorities – "**consortium**"
 - Submit a general development plan to the government
 - Plan included list of candidate IDA municipalities (objective criteria)
- Upon approval, the Cassa subsidized expenses borne by consortium
- IDA subsidies more generous than elsewhere in EIM area
 - Firm subsidies
 - Higher subsidy rate
 - Available to all IDA firms
 - While only to SMEs in small municipalities outside of IDAs
 - Infrastructure: industrial buildings, houses for workers, professional training, connection to energy and transport services
- Late 1970s: EIM focus shifted to internal areas of the South

back

The Industrial Zones



What Do IDAs Do?

- ❶ More generous investment subsidies
 - ⇒ **capital relatively cheaper** for IDA firms
 - Ambiguous response of local labor demand
- ❷ Infrastructure investments in the area
 - ⇒ **higher local productivity** in IDAs
 - Raise local labor demand
 - Simple spatial model in the paper details
 - (Kline, 2010; Kline & Moretti, 2014)
 - If PBIP raises local labor demand ⇒ **higher worker density**
 - **Agglomeration economies**: density ↑ ⇒ productivity ↑ ⇒ density ↑
 - Effects persist beyond end of PBIP
 - **Need to observe local economic density over time**

back

A Simple Spatial Model

- Employment effects of a PBIP altering cost of capital across areas
(Kline, 2010; Kline & Moretti, 2014b)
- Two cities $j \in \{A, B\}$, workers (measure 1) making location decisions
 - No mobility costs
 - Each worker inelastically supplies one unit of labor (all employed)
- Worker utility: $u_{ij} = w_j - r_j + A_j + \epsilon_{ij} = \bar{u}_j + \epsilon_{ij}$
 - w_j : wage in city j
 - r_j : rental rate of housing in city j
 - A_j : local amenities
 - ϵ_{ij} : mean zero idiosyncratic preferences of worker i for city j
 - Prevent workers from being perfectly mobile
 - \bar{u}_j : mean indirect utility (average valuation of city j)
- Worker i locates in city A if $u_{iA} \geq u_{iB}$, or $\epsilon_{iB} - \epsilon_{iA} \leq \bar{u}_A - \bar{u}_B$
- Measure of workers locating in city A : $L_A = G(\bar{u}_A - \bar{u}_B)$

A Simple Spatial Model

- Firms choose inputs to maximize: $X_j L_j^\alpha K_j^{1-\alpha} - w_j L_j - \rho(1 - \tau_j) K_j$
 - $Y_j = X_j L_j^\alpha K_j^{1-\alpha}$: output (unitary price)
 - L_j, K_j : production inputs; X_j : productivity in city j
 - ρ : marginal cost of capital; τ_j : capital subsidy in city j
 - Firms make zero profits

- Solving firm problem leads to inverse local demand equation:

$$\ln w_j = M + \frac{1}{\alpha} \ln X_j - \frac{1-\alpha}{\alpha} \ln \rho(1 - \tau_j)$$

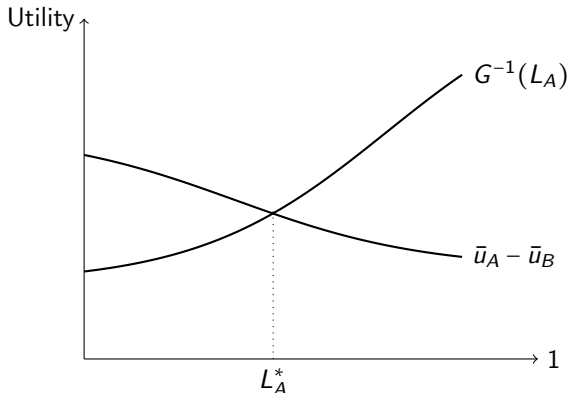
- M : constant term
 - Labor demand flat in wage-employment space
 - Constant returns to scale + infinite supply elasticity of capital
 - Wages \uparrow with local productivity and \downarrow with local cost of capital
- Marginal cost of housing: $r_j = r(L_j)$
 - $r(\cdot)$ weakly increasing (land is fixed)
 - Workers and landowners are separate agents

Model Equilibrium

$$G^{-1}(L_A) = \frac{e^M}{\rho^{\frac{(1-\alpha)}{\alpha}}} \left[\frac{X_A^{\frac{1}{\alpha}}}{(1-\tau_A)^{\frac{(1-\alpha)}{\alpha}}} - \frac{X_B^{\frac{1}{\alpha}}}{(1-\tau_B)^{\frac{(1-\alpha)}{\alpha}}} \right] + (A_A - A_B) - (r(L_A) - r(1 - L_A))$$

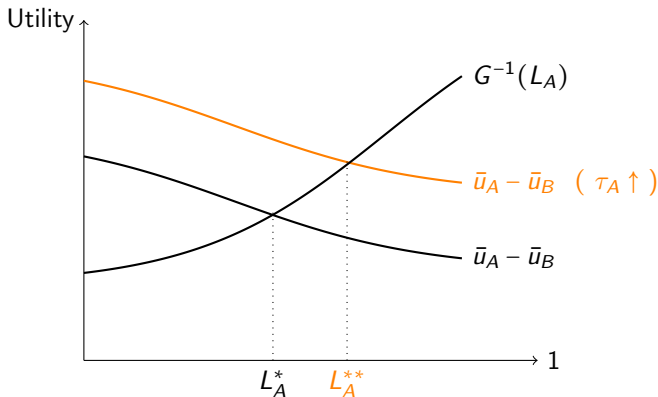
LHS: taste of marginal worker for city B relative to A

RHS: difference in real wages less amenities (WTP to move from B to A)



The Employment Effect of PBIP

- PBIP: $\tau_A \uparrow$, so wage in A rises by $dw_A/d\tau_A = w_A(1 - \alpha)/\alpha(1 - \tau_A)$
- Pushes relative demand curve up and raises L_A
 - Magnitude depends on workers' preferences for location, which determine worker mobility, and on local elasticity of housing supply
 - Similar conclusions if PBIP raises local productivity X_A
- Agglomeration economies: $X_j = X(L_j) \Rightarrow$ multiple equilibria



Main Data Sources

Analysis conducted at the **municipality** level

- ❶ Industrial census data (1911, 1927, 1951-2011)
 - Workers and establishments by municipality and sector
 - Manually digitized 1911 and 1927 census
 - Main outcome: **employment density over one century**
- ❷ Universe of EIM transfers
 - Municipality-year, 1950-1992
 - Split by intervention type
- ❸ Administrative data from Bank of Italy (1990-2011)
 - Universe of firms in social security records (INPS)
 - Information on location, sector, wages, balance sheet
 - Matched with 7% random sample of workers

maps

table

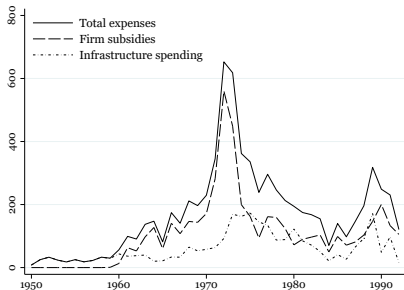
sectors

back

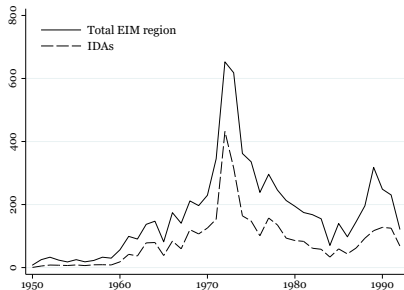
IDAs Absorbed Most of EIM Expenses

- **Total cost of IDAs:** ~€90bn (>50% of total EIM expenditure)
- ~ 0.5% GDP (~ 2% investment) on average each year

Total EIM expenses by item



Expenses by area



EIM expenses in euros (2011 prices) scaled by total population in the EIM region in 1951.
Concessional loans to firms are excluded.

[back](#)

IDAs – Descriptives

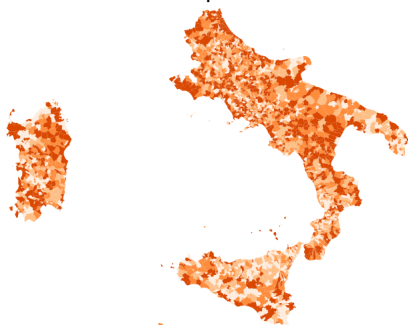
- Does belonging to an IDA affect long-run agglomeration?
- IDA municipalities are **positively selected**

	IDA muni.	IDA muni. excl. centers	Other muni.
Employment density (1951)	48.57 (119.24)	39.88 (89.05)	9.69 (19.30)
Establ. density (1951)	16.92 (27.27)	15.42 (23.84)	4.74 (7.45)
Manuf. empl. dens. (1951)	21.80 (60.12)	18.86 (52.99)	4.19 (9.41)
Manuf. establ. dens. (1951)	5.90 (9.46)	5.46 (8.60)	2.08 (2.63)
Population density (1951)	642.30 (1025.90)	596.44 (918.83)	162.99 (325.32)
Agriculture share (% , 1951)	27.83 (14.35)	28.76 (13.93)	38.63 (13.81)
High sch. educ. (% , 1951)	2.31 (1.58)	2.08 (1.17)	1.76 (0.94)
Mean elevation	148.23 (133.97)	151.17 (135.47)	468.17 (318.56)
Slope	381.77 (412.46)	382.39 (416.94)	725.14 (468.80)
Coastal location	0.23 (0.42)	0.20 (0.40)	0.16 (0.37)
Number of municipalities	326	312	2327

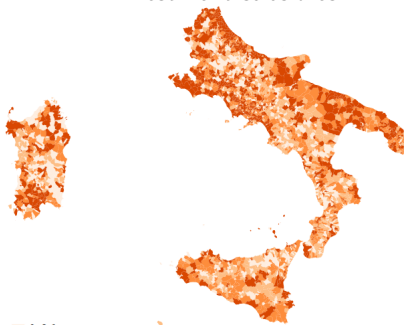
EIM Firm Subsidies Concentrated in IDAs

Total expenses

Firm investment subsidies



0-1598
1598-3106
3106-6134
6134+



0-26
26-333
333-1670
1670+

Total expenses in euros (2011 prices) per 1951 inhabitant, cumulated between 1950 and 1992.

[back](#)

Half of the EIM Expenses in the 1970s

Table: Cumulative Cassa expenses per decade

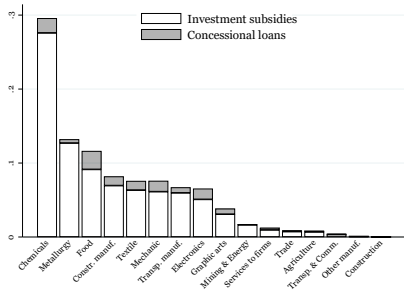
	Total expenses		Infrastructure spending		Firm subsidies	
	Raw amount	Per capita	Raw amount	Per capita	Raw amount	Per capita
1950-1959	5,309	236.4	5,290	235.5	19	0.8
1960-1969	29,990	1,335.2	8,607	383.2	21,382	952.0
1970-1979	79,439	3,536.9	26,368	1,174.0	53,071	2,362.9
1980-1989	37,270	1,659.4	16,781	747.2	20,489	912.3
1990-1992	13,494	600.8	3,635	161.8	9,859	439.0
Total	165,502	7,368.7	60,681	2701.7	104,821	4,667.0

Raw amounts in € million (2011 prices). Per capita amounts in € (2011 prices) per 1951 inhabitant in the Cassa's region. Amounts computed only from geo-coded interventions available in the ASET database.

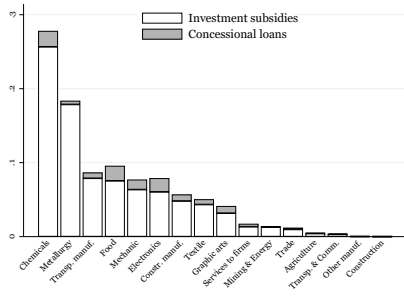
[back](#)

Most Firm Subsidies in Heavy Manufacturing Sectors

Full EIM area



IDAs



Sector breakdown of firm investment subsidies and concessional loans.

[back1](#)

[back2](#)

Estimation Strategy

- Fuzzy RD design around minimum IDA border:

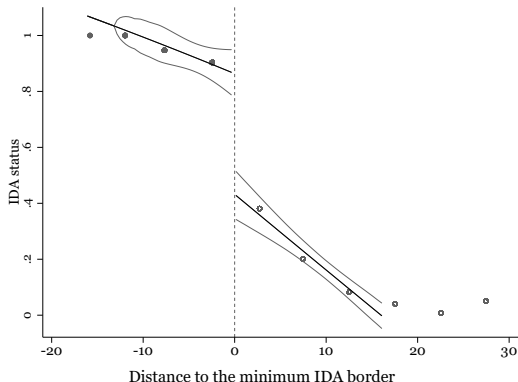
$$IDA_m = \mu_{i(m)} + \vartheta \cdot W_m + \varphi(\delta_m) + u_m \quad (\text{FS})$$

$$Y_m = \mu_{i(m)} + \pi \cdot W_m + \varphi(\delta_m) + v_m \quad (\text{RF})$$

- IDA_m : binary treatment (= 1 if municipality m included in IDA)
- W_m : binary instrument (= 1 if within minimum IDA border)
- δ_m : distance to minimum IDA border
- $\mu_{i(m)}$: IDA region effect (IDA to which municipality m belongs)
- $\varphi(\cdot)$ linear, 16-km symmetric bandwidth
- SEs clustered by IDA region

[details](#)[back](#)

First Stage: 40ppt Change in IDA Status



Negative distance denotes municipalities within the minimum IDA border.

- Key identifying assumption: **continuity**
- No jump in baseline outcomes; geography; other economic, demographic and political traits; other policies
- Alternative design: **rule out displacement** to control group

The Minimum IDA Border – First Stage

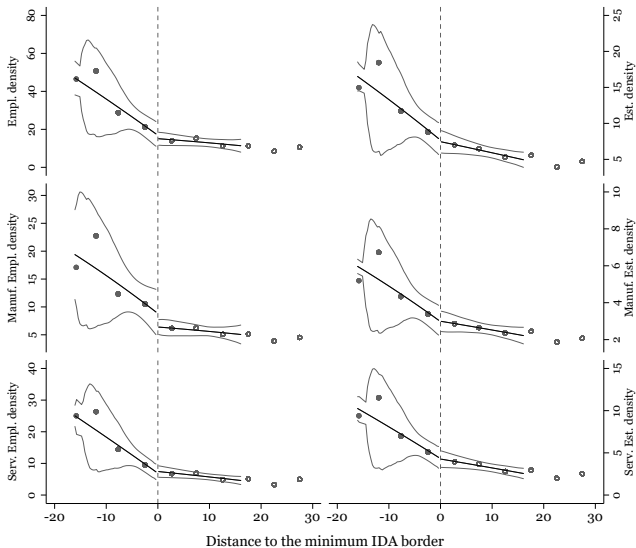
Table: IDAs - First stage

	IDA status	EIM expenses
RD Estimate	0.39 (0.09)***	5.72 (2.50)**
Mean around the border	0.36	7.41
Standard deviation	0.48	13.54
Observations	587	563
R^2	0.46	0.11

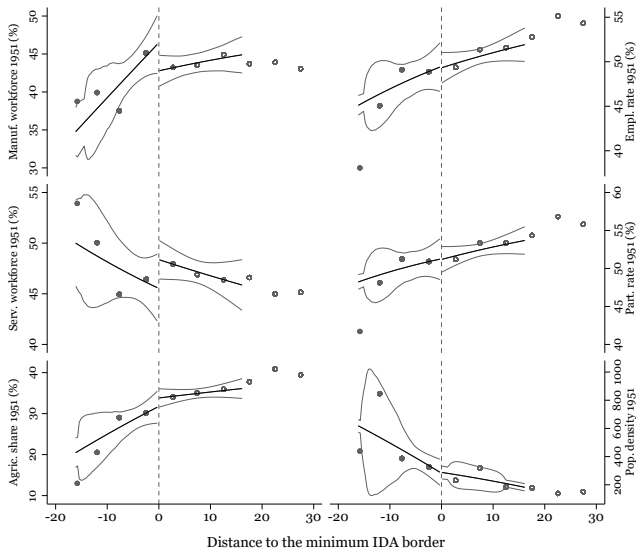
Estimation output of Equation FS using a 16-km symmetric bandwidth around the minimum IDA border. The specification controls for a linear polynomial in the distance to the border and for IDA region effects. EIM expenses measured in thousand € (2011 prices) per 1951 resident, winsorized at 1 and 99 percent. Standard errors clustered by IDA region in parentheses.

[back](#)

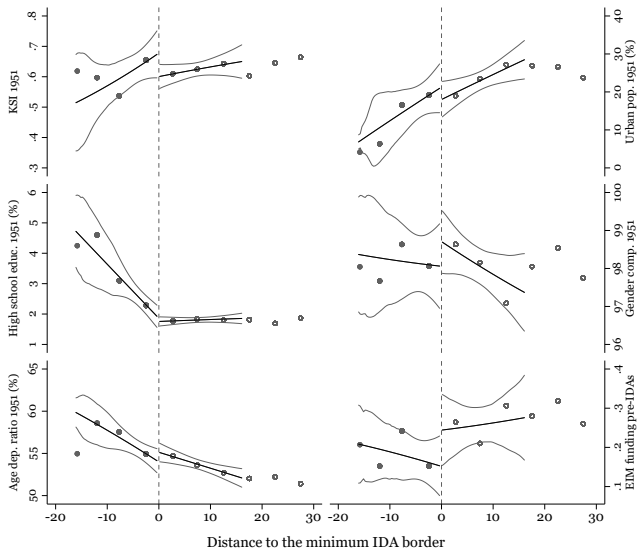
Continuity – No Jump in Density in 1951



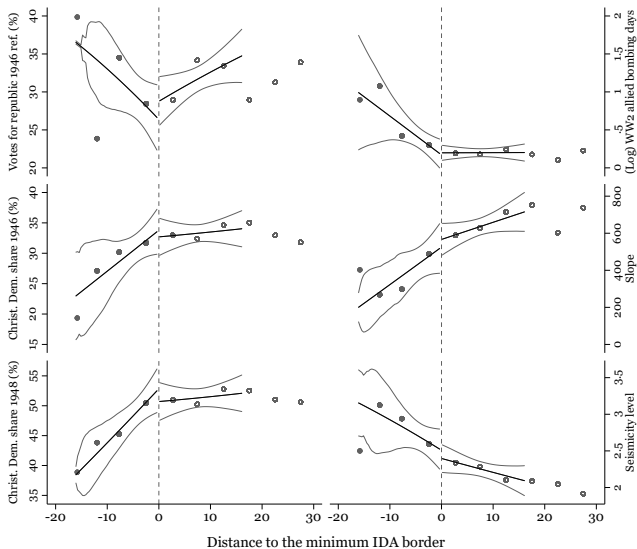
The Minimum IDA Border – Other Checks



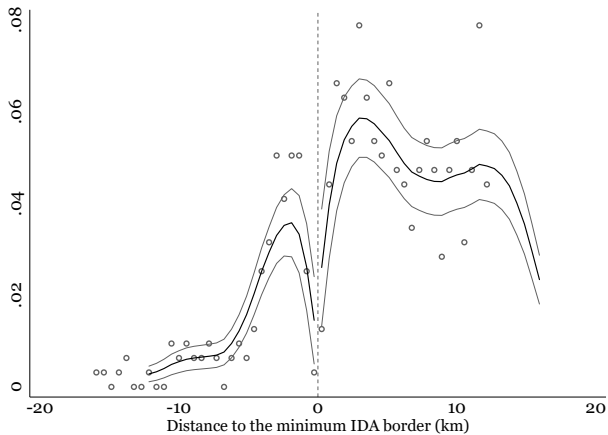
The Minimum IDA Border – Other Checks



The Minimum IDA Border – Other Checks



McCrary test

[back1](#)[back](#)

The Minimum IDA Border – Other Checks

Table: Balancing tests, minimum IDA border

(a)	Empl.	Manuf. Empl.	Serv. Empl.	Est.	Manuf. Est.	Serv. Est.
RD Estimate	6.50 (3.17)*	4.12 (1.40)**	2.19 (1.97)	1.49 (1.52)	0.41 (0.52)	0.90 (0.91)
Mean	15.75	7.01	7.24	7.03	2.87	3.95
S.D.	25.09	11.85	12.05	9.23	3.30	5.80
Observations	586	586	586	586	586	586
R ²	0.15	0.16	0.16	0.20	0.20	0.20
(b)	Manuf. work.	Serv. work.	Agric. share	Empl. rate	Part. rate	Pop. dens.
RD Estimate	1.67 (1.83)	-2.16 (1.36)	-3.80 (1.86)*	-0.70 (1.01)	-0.53 (1.02)	34.26 (80.33)
Mean	43.76	47.01	33.73	50.21	52.10	267.44
S.D.	12.57	11.84	12.97	9.51	9.23	602.66
Observations	563	563	563	563	563	563
R ²	0.20	0.17	0.28	0.42	0.46	0.09
(c)	KSI	High school	Age dep.	Urban pop.	Gender	Pre-IDA exp.
RD Estimate	0.06 (0.05)	0.57 (0.23)**	-0.85 (0.54)	2.52 (3.90)	-0.58 (0.59)	-0.06 (0.07)
Mean	0.63	1.97	54.05	21.95	98.05	0.24
S.D.	0.26	1.20	5.95	25.05	4.78	0.46
Observations	587	563	563	537	563	563
R ²	0.12	0.17	0.46	0.63	0.25	0.07
(d)	Rep. 1946	CD 1946	CD 1948	Bomb.	Slope	Seism.
RD Estimate	1.03 (2.14)	-0.71 (2.67)	-0.68 (2.49)	0.13 (0.13)	-27.45 (57.73)	-0.03 (0.04)
Mean	31.26	32.83	50.85	0.24	598.33	2.34
S.D.	17.43	15.09	15.73	0.63	515.50	1.03
Observations	550	545	545	587	587	513
R ²	0.32	0.12	0.18	0.20	0.26	0.85

The Minimum IDA Border – Identification

- Identifying assumptions:

❶ **A1. Relevance.** The minimum IDA border induces a discontinuous jump in treatment status IDA_m :

$$\lim_{\delta_m \rightarrow 0^+} Pr(IDA_m = 1 \mid \delta_m) < \lim_{\delta_m \rightarrow 0^-} Pr(IDA_m = 1 \mid \delta_m)$$

❷ **A2. Continuity.** Mean potential outcomes $E[Y_m(0) \mid \delta_m]$ and $E[Y_m(1) \mid \delta_m]$ are continuous at $\delta_m = 0$.

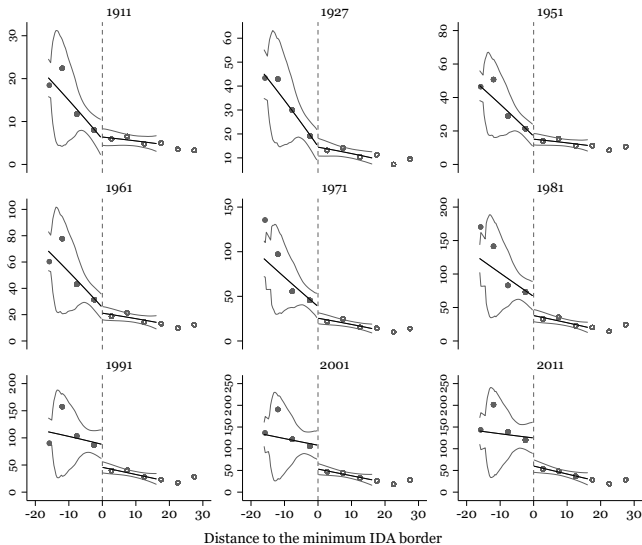
❸ **A3. Local monotonicity (no defiers).** There exists a neighborhood $\$$ of the cutoff where no municipality is such that: $IDA_m(\delta_m) = 1 - W_m$

- Under A1, A2 and A3 the fuzzy RD estimand $\beta = \pi/\vartheta$ identifies the local average treatment effect (LATE) for the sub-population of compliers

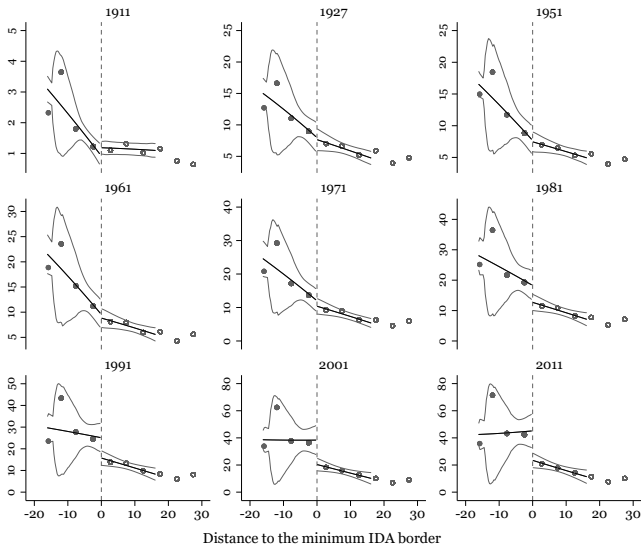
(Hahn et al., 2001; Imbens and Lemieux, 2008)

back

Main Result: Persistent Effect on Empl/km²



Graphical Evidence – Establishments/km²



Regression Estimates

Table: Employment density - Baseline

	Reduced form	2-SLS	
		IDA status	EIM subsidies
	(1)	(2)	(3)
Contemporaneous effect (1991)			
RD Estimate	43.31	110.82	7.23
	(19.08)**	(43.03)**	(3.26)**
Mean around the border	47.62	47.62	46.63
Standard deviation	79.68	79.68	78.05
Observations	586	586	562
R^2	0.22		
KP F -stat		19.06	5.18
Persistent effect (2011)			
RD Estimate	62.99	161.16	10.34
	(27.18)**	(63.14)**	(4.49)**
Mean around the border	62.97	62.97	61.42
Standard deviation	108.15	108.15	105.18
Observations	586	586	562
R^2	0.24		
KP F -stat		19.06	5.18

Column (1) shows the estimation output of Equation [RF](#). Column (2) reports the fuzzy RD estimates. Column (3) replaces IDA status with EIM subsidies as treatment variable. All regressions are estimated over a 16-km symmetric bandwidth around the minimum IDA border and control for a linear polynomial in the distance to the border and IDA region effects. Standard errors clustered by IDA region in parentheses.

Regression Estimates

Table: Establishment density - Baseline

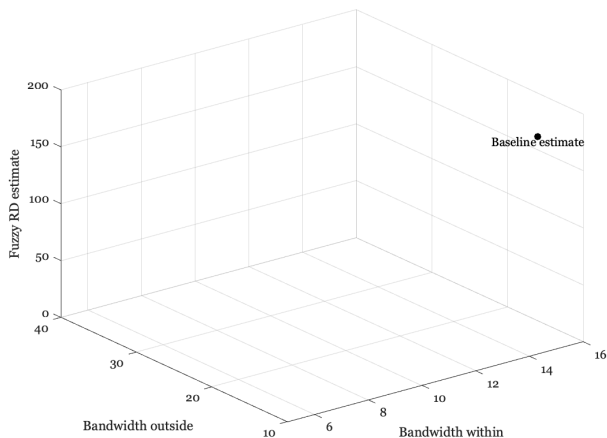
	Reduced form	2-SLS	
		IDA status	EIM subsidies
	(1)	(2)	(3)
Contemporaneous effect (1991)			
RD Estimate	9.18 (4.82)*	23.50 (11.01)**	1.60 (0.81)*
Mean around the border	15.08	15.08	14.82
Standard deviation	21.98	21.98	21.53
Observations	586	586	562
R^2	0.23		
KP F -stat		19.06	5.18
Persistent effect (2011)			
RD Estimate	19.83 (8.97)*	50.73 (20.58)**	3.43 (1.63)**
Mean around the border	23.10	23.10	22.63
Standard deviation	37.88	37.88	36.87
Observations	586	586	562
R^2	0.25		
KP F -stat		19.06	5.18

Column (1) shows the estimation output of Equation [RF](#). Column (2) reports the fuzzy RD estimates. Column (3) replaces IDA status with EIM subsidies as treatment variable. All regressions are estimated over a 16-km symmetric bandwidth around the minimum IDA border and control for a linear polynomial in the distance to the border and IDA region effects. Standard errors clustered by IDA region in parentheses.

Robustness

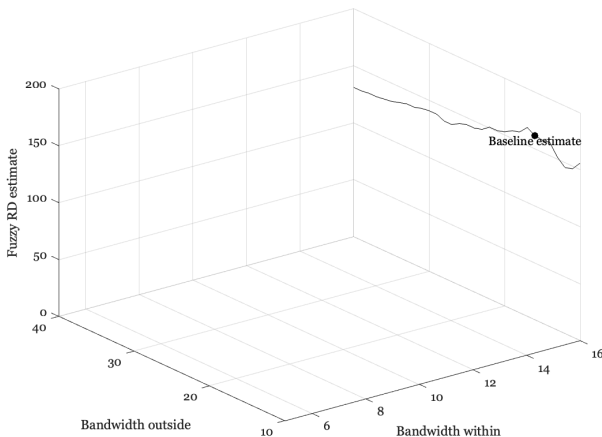
- Polynomial specification [table](#)
 - Conley standard errors [table](#)
 - Local randomization inference [table](#)
 - Exclude IDA center, control for distance to IDA center [table](#)
 - Exclude IDA region effects [table](#)
 - Exclude one IDA region at a time [figure](#)
 - Include very close IDAs [table](#)
 - Non-parametric RD [table](#)
 - Quantile treatment effects [figure](#)
- [back](#)

Estimates Robust to Bandwidth – Empl/km² 2011



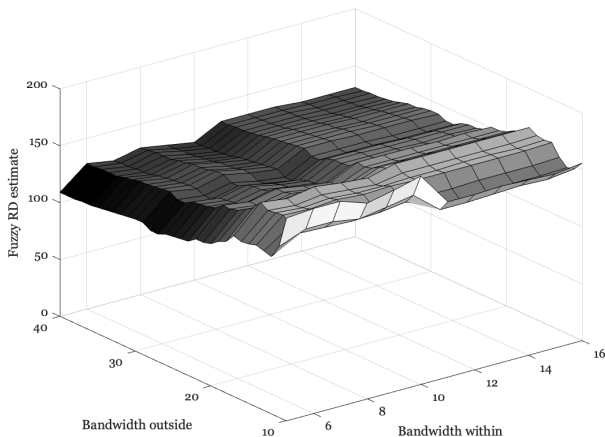
Estimates of the fuzzy RD coefficient for Employment/km² in 2011 using varying bandwidths around the RD cutoff.

Estimates Robust to Bandwidth – Empl/km² 2011



Estimates of the fuzzy RD coefficient for Employment/km² in 2011 using varying bandwidths around the RD cutoff.

Estimates Robust to Bandwidth – Empl/km² 2011



Estimates of the fuzzy RD coefficient for Employment/km² in 2011 using varying bandwidths around the RD cutoff.

Increase in Resident Population

Table: (Log) Employment and population density estimates

	(Log) Employment density		(Log) Population density	
	Red. Form	2-SLS	Red. Form	2-SLS
Contemporaneous effect (1991)				
RD Estimate	0.51 (0.21)**	1.30 (0.49)**	0.41 (0.16)**	1.06 (0.37)***
Mean around the border	3.00	3.00	5.16	5.16
Standard deviation	1.30	1.30	1.13	1.13
Observations	586	586	587	587
Persistent effect (2011)				
RD Estimate	0.55 (0.22)**	1.41 (0.52)**	0.39 (0.16)**	1.00 (0.37)**
Mean around the border	3.16	3.16	5.20	5.20
Standard deviation	1.44	1.44	1.21	1.21
Observations	586	586	587	587

Outcomes defined as the natural logarithm of the number of workers per km² and of the number of residents per km². Standard errors clustered by IDA region in parentheses.

Robustness Tests

Table: Employment density - Robustness tests

	(1) 2 nd order	(2) 3 rd order	(3) Excl. centers	(4) Dist. to center	(5) No IDA region eff.
Contemporaneous effect (1991)					
RD Estimate	82.35 (38.96)**	92.91 (40.20)**	81.44 (41.01)*	111.98 (43.71)**	107.72 (40.82)**
Mean around the border	47.62	47.62	42.39	47.62	47.62
Standard deviation	79.68	79.68	66.86	79.68	79.68
Observations	586	586	574	586	586
KP F-stat	26.03	12.69	18.52	18.60	22.58
Persistent effect (2011)					
RD Estimate	123.04 (61.84)*	140.17 (67.47)**	126.85 (60.08)**	162.57 (63.91)**	157.70 (59.35)**
Mean around the border	62.97	62.97	56.39	62.97	62.97
Standard deviation	108.15	108.15	93.55	108.15	108.15
Observations	586	586	574	586	586
KP F-stat	26.03	12.69	18.52	18.60	22.58

Columns (1) and (2) specify $\varphi(\delta_m)$ as a quadratic and cubic polynomial, respectively. Column (3) excludes IDA centers from the estimation sample. Column (4) controls linearly for the distance to the IDA center. Column (5) excludes IDA region effects from the baseline specification.

Conley Standard Errors

Table: Employment and establishment density - Conley standard errors

	Employment per km ²		Establishments per km ²	
	1991	2011	1991	2011
RD Estimate	43.31 (12.00)***	62.99 (16.81)***	9.18 (3.25)***	19.83 (5.90)***
Mean around the border	47.62	62.97	15.08	23.10
Standard deviation	79.68	108.15	21.98	37.88
Observations	586	586	586	586

Standard errors allow for spatial correlation (Conley, 1999). See text for details. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

[back](#)

Local Randomization Inference

Table: Employment and establishment density - Randomization inference

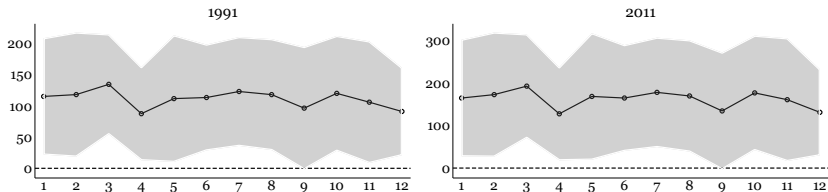
	Employment per km ²		Establishments per km ²	
	1991	2011	1991	2011
ITT	47.06	73.62	13.21	27.57
Finite sample P-value	0.00	0.00	0.01	0.01
Asymptotic P-value	0.01	0.01	0.01	0.01
Window	2.06	2.06	2.06	2.06

Fuzzy RD estimation results under local randomization inference (Cattaneo et al., 2016), 1,000 repetitions. See text for details. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

[back](#)

⇒ Reject sharp null of no treatment effect

Exclude One IDA at a Time



Estimates of the fuzzy RD coefficient and 95% confidence intervals excluding one IDA region at a time in 1991 (top panel) and 2011 (bottom panel).

[back](#)

Include Very Close IDAs

Table: Employment density - All IDAs

	Reduced form	2-SLS	
	(1)	IDA status (2)	EIM subsidies (3)
Contemporaneous effect (1991)			
RD Estimate	50.01 (19.19)**	157.95 (68.70)**	8.44 (4.01)**
Mean around the border	70.49	70.49	69.78
Standard deviation	111.57	111.57	111.24
Observations	775	775	744
R^2	0.40		
KP F -stat		15.42	7.87
Persistent effect (2011)			
RD Estimate	64.04 (24.82)**	202.25 (83.97)**	10.36 (4.63)**
Mean around the border	96.25	96.25	94.95
Standard deviation	149.60	149.60	148.15
Observations	775	775	744
R^2	0.45		
KP F -stat		15.42	7.87

Replication of baseline estimates including also Napoli and Caserta IDAs (excluded from the baseline analysis because of the small distance between the two IDA centers). Standard errors clustered by IDA region in parentheses.

Non-Parametric RD

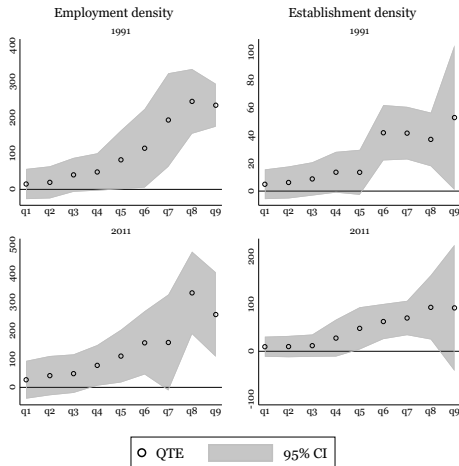
Table: Employment density - Non-parametric fuzzy RD estimates

	Contemporaneous effect (1991)		Persistent effect (2011)	
	Conventional	Robust	Conventional	Robust
RD Estimate	106.87 (66.06)	143.59 (89.24)	178.46 (105.19)*	234.04 (139.36)*
Bandwidth within	5.94	5.94	6.42	6.42
Bandwidth outside	22.00	22.00	20.74	20.74
Mean around the border	40.84	40.84	54.36	54.36
Standard deviation	68.63	68.63	95.10	95.10
Observations	708	708	680	680

Fuzzy RD estimates obtained using the non-parametric estimation and robust bias-corrected inference method proposed by Calonico et al. (2014). The optimal bandwidth is computed by minimizing the Mean Squared Error separately left and right of the cutoff. Observations are weighted using a triangular kernel. The specification controls for IDA region effects and standard errors are clustered by IDA region.

back

QTE – Larger in Higher Deciles



Quantile treatment effects for the fuzzy RD estimate in the baseline specification. The estimators are described in Frandsen et al. (2012). The algorithm calculates the propensity score using a gaussian kernel and running 100 distribution regressions to estimate the marginal distributions of the potential outcomes (not just the average treatment effect).

No Migration and Relocation in the Long Run

Table: Migration and relocation – Fuzzy RD estimates

	Net migration	Mobil.	Mobil. work
Contemporaneous effect (1991)			
RD Estimate	0.02 (0.09)	5.35 (2.96)*	69.44 (38.37)*
Mean around the border	-0.02	19.35	108.48
Standard deviation	0.31	8.48	92.48
Observations	587	587	587
Persistent effect (2011)			
RD Estimate	-0.30 (0.24)	4.19 (3.06)	62.07 (46.61)
Mean around the border	-0.04	25.75	155.80
Standard deviation	0.63	9.52	115.50
Observations	587	587	587

"Net migration" is the net inflow of immigrants into the municipality as a share of resident population. "Mobil." is the share of the resident population who travel daily for work or study outside the municipality of usual residence to the resident population aged up to 64 years old. "Mobil. work" is the share of resident population commuting daily for work outside the municipality of residence to resident population commuting daily for work within the municipality of residence.

Effects on Employment and Participation Rate

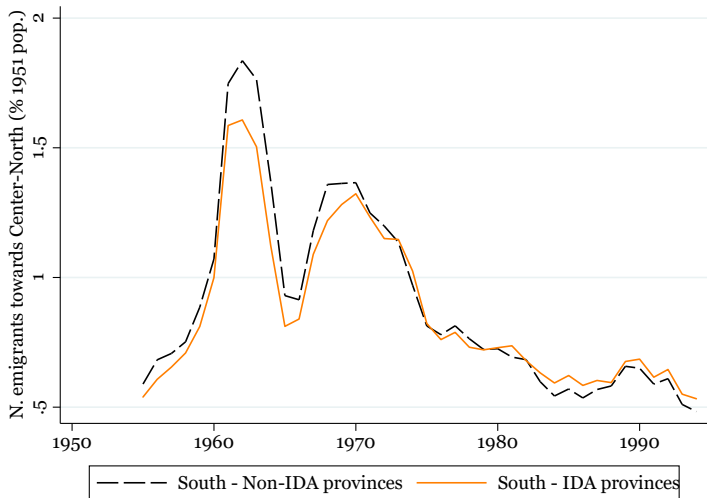
Table: Employment and participation rate – Fuzzy RD estimates

	1981	1991	2011
Employment rate			
RD Estimate	4.75 (1.60)***	3.97 (1.69)**	1.90 (1.31)
Mean around the border	36.23	33.88	38.33
Standard deviation	5.78	5.68	4.66
Observations	581	587	587
Participation rate			
RD Estimate	3.45 (1.26)**	3.40 (1.17)***	3.09 (1.32)**
Mean around the border	46.91	47.21	46.13
Standard deviation	5.99	4.51	4.50
Observations	581	587	587
Unemployment rate			
RD Estimate	-4.65 (2.31)**	-3.56 (2.17)	1.51 (1.75)
Mean around the border	22.75	28.33	16.97
Standard deviation	7.67	9.32	5.18
Observations	581	587	587

"Employment rate" is the ratio of employed people to total residents aged 15 years and older.

"Participation rate" is the ratio of the resident working population to the resident population of the same age group. "Unemployment rate" is the ratio of the resident population 15 years and older seeking employment to resident population 15 years and older in employment.

Out-Migration to Center-North

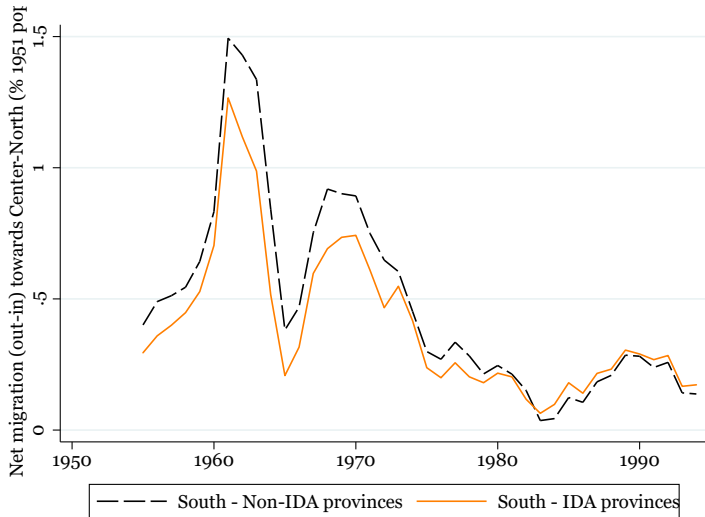


Number of emigrants to Center-North scaled by 1951 population. Average across provinces.

[back1](#)

[back2](#)

Out-Migration to Center-North

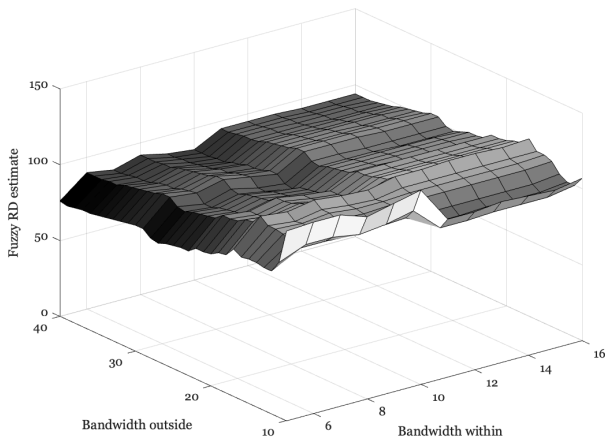


Net emigrants (out-in) to Center-North scaled by 1951 population. Average across provinces.

[back1](#)

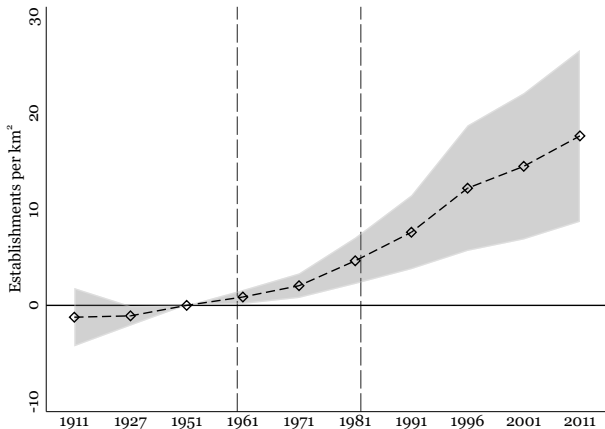
[back2](#)

Estimates Robust to Bandwidth – Empl/km² 1991



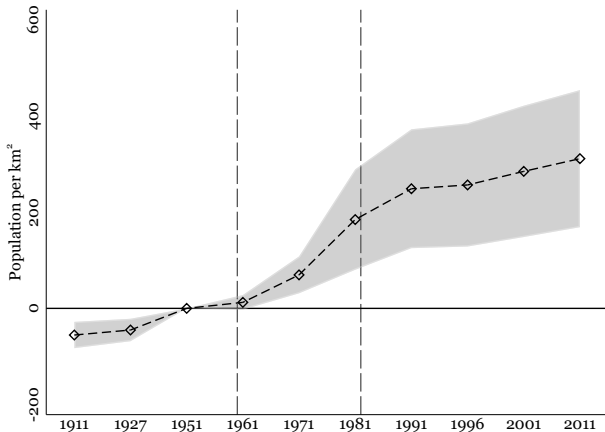
Estimates of the fuzzy RD coefficient for Employment/km² in 1991 using varying bandwidths around the RD cutoff.

Diff-in-Disc – Establishment density



[back](#)

Diff-in-Disc – Population density



[back](#)

Diff-in-Disc Identification

- Allows bordering a large city to affect outcomes independently of IDA status
 - Contiguity treatment $W \in \{0, 1\}$
 - Potential outcomes $Y_m^p(i, w)$ with $IDA_m^p = i \in \{0, 1\}$, $W_m^p = w \in \{0, 1\}$ and $p \in \{0, 1\}$ denotes time period (pre/post IDAs)
- Less stringent identifying assumptions than baseline:
 - ❶ **A2b. Continuity.** Mean potential outcomes $E[Y_m^p(i, w) \mid \delta_m]$ are continuous at $\delta_m = 0$ for $p = 0, 1$, $i = 0, 1$ and $w = 0, 1$.
 - ❷ **A4. Parallel trends.** The effect of contiguity at $\delta_m = 0$ does not change over time: $Y_m^1(\cdot, 1) - Y_m^1(\cdot, 0) = Y_m^0(\cdot, 1) - Y_m^0(\cdot, 0)$.

back

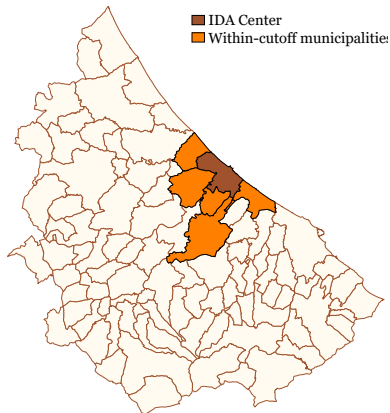
Using Placebo Centers



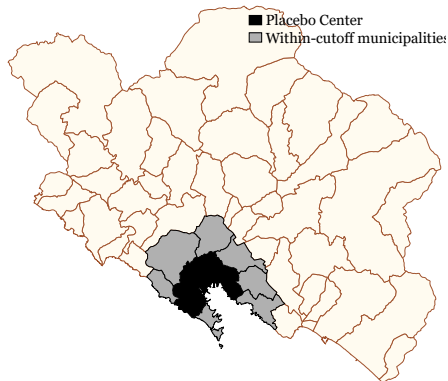
- Effects could be driven by **spillovers** to nearby control areas
- Provincial capitals in Center-North
- Would have been IDA centers if in EIM area
⇒ **Placebo centers**
- Can be exploited to
 - 1 Rule out spillovers
 - 2 Estimate spillovers

back

Ruling Out Spillovers: Controls Away From IDAs



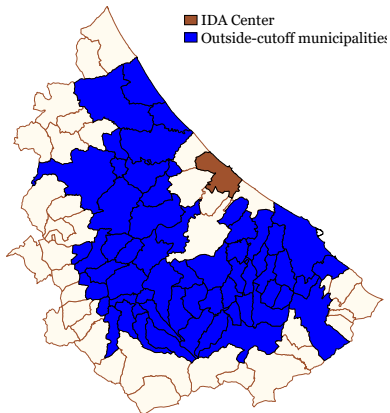
Example: The Pescara IDA



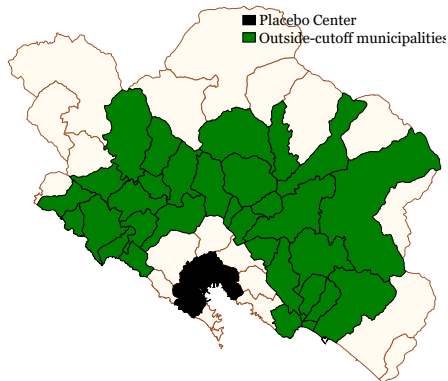
Example: The Spezia Placebo

[back](#)

Event Study “Outside”: Directly Estimate Spillovers



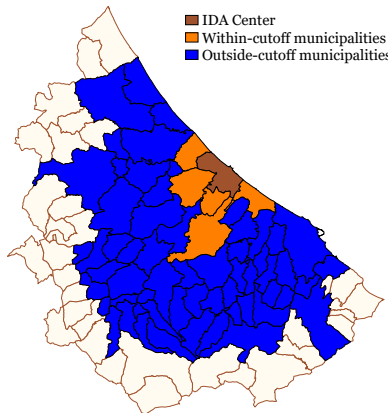
Example: The Pescara IDA



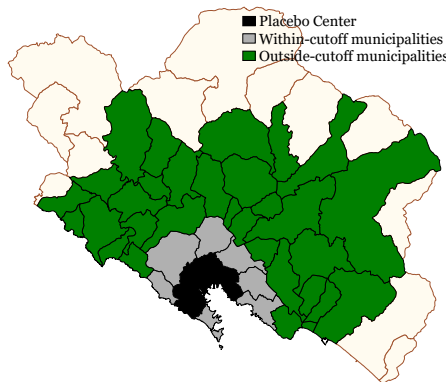
Example: The Spezia Placebo

[back](#)

Putting All Together: Triple Differences



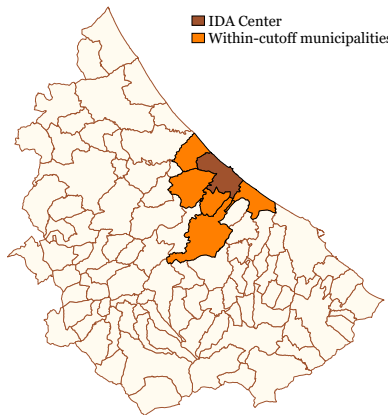
Example: The Pescara IDA



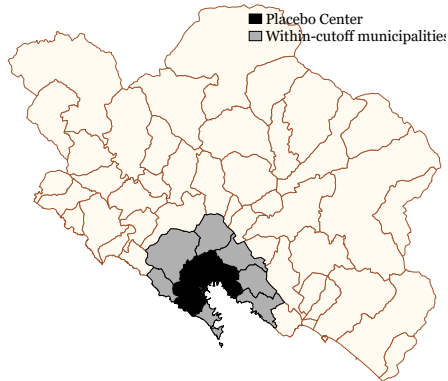
Example: The Spezia Placebo

[detail](#) [back](#)

Ruling Out Spillovers: Controls Away From IDAs



Example: The Pescara IDA

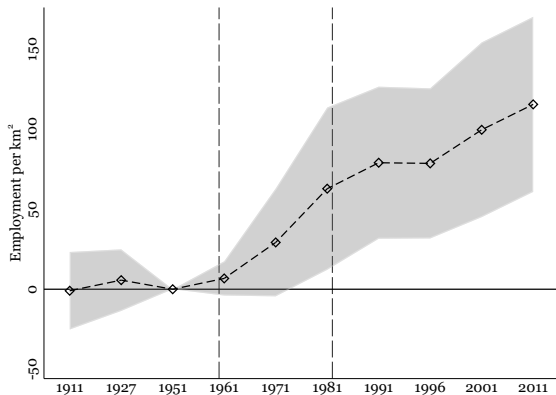


Example: The Spezia Placebo

Ruling Out Spillovers: Controls Away From IDAs

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot T_m + \epsilon_{m,t} \quad (2)$$

where $T_m = 1[EIM]$

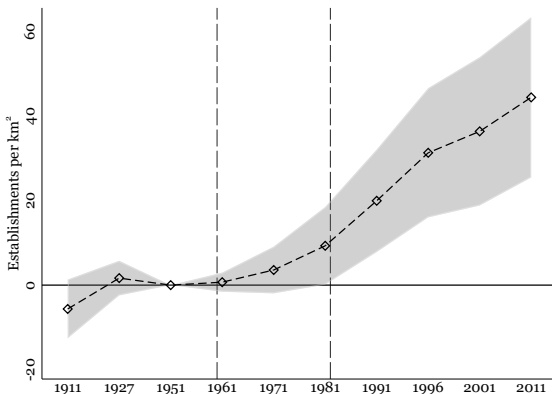
[back1](#)[back2](#)

⇒ **Baseline effects not driven by spillovers**

Ruling Out Spillovers: Controls Away From IDAs

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot T_m + \epsilon_{m,t} \quad (3)$$

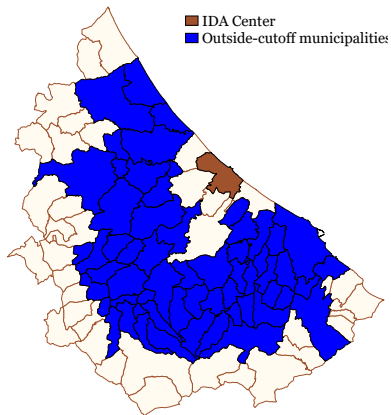
where $T_m = 1[EIM]$



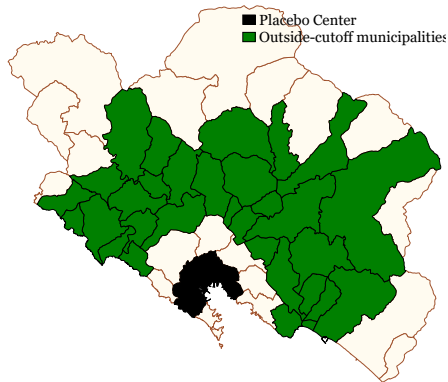
[back1](#)

[back2](#)

Event Study “Outside”: Directly Estimate Spillovers



Example: The Pescara IDA

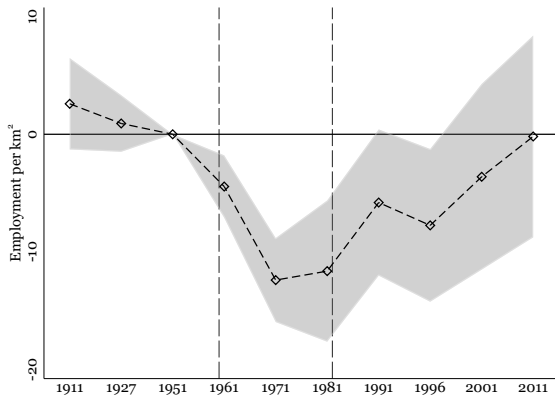


Example: The Spezia Placebo

Event Study “Outside”: Directly Estimate Spillovers

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot T_m + \epsilon_{m,t} \quad (4)$$

where $T_m = 1[EIM]$



[back1](#)

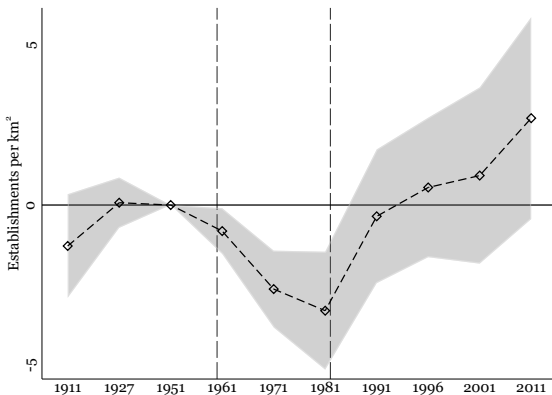
[back2](#)

⇒ Evidence of displacement, but not in long run

Event Study “Outside”: Directly Estimate Spillovers

$$Y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot T_m + \epsilon_{m,t} \quad (5)$$

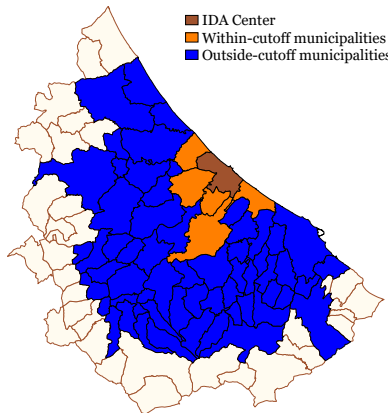
where $T_m = 1[EIM]$



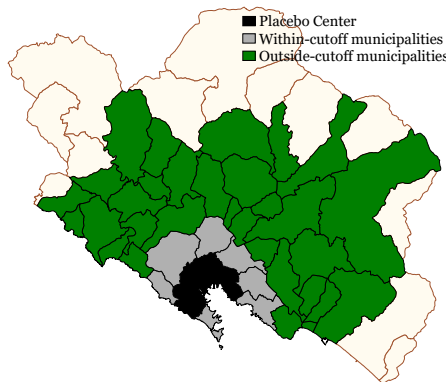
[back1](#)

[back2](#)

Putting All Together: Triple Differences



Example: The Pescara IDA

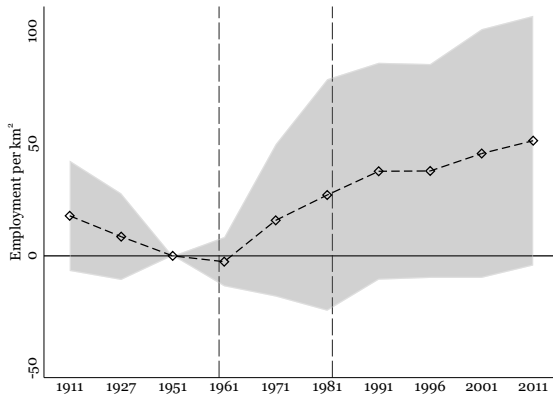


Example: The Spezia Placebo

detail

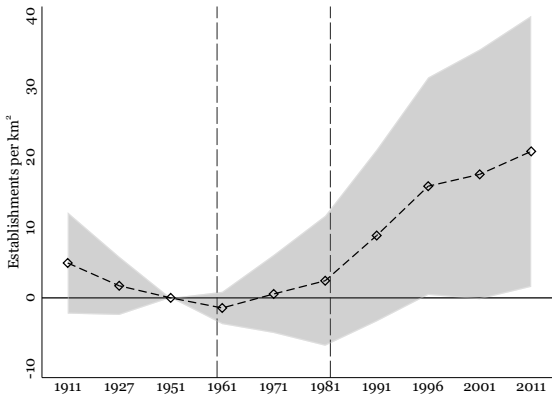
Triple Differences – Employment density

$$Y_{m,t} = \mu_m + \sum_{j \neq 1951} \gamma_j \cdot 1[t = j] \cdot W_m + \sum_{j \neq 1951} \eta_j \cdot 1[t = j] \cdot T_m + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot W_m \cdot T_m + v_{m,t} \quad (6)$$



Triple Differences – Establishment density

$$Y_{m,t} = \mu_m + \sum_{j \neq 1951} \gamma_j \cdot 1[t = j] \cdot W_m + \sum_{j \neq 1951} \eta_j \cdot 1[t = j] \cdot T_m + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot W_m \cdot T_m + v_{m,t} \quad (7)$$



Triple Differences – Breakdown

Consider the fully saturated model:

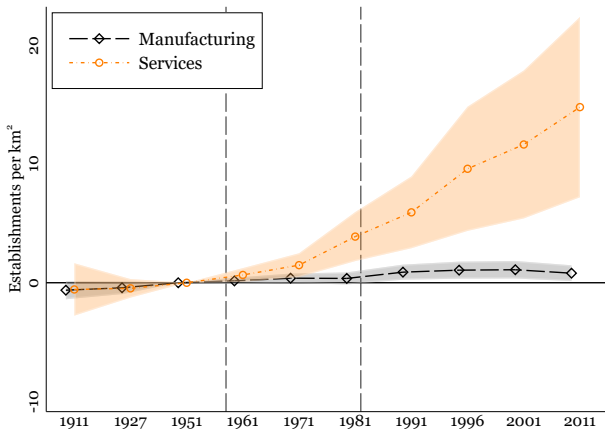
$$Y_m = \beta_0 + \beta_1 \cdot T_m + \beta_2 \cdot W_m + \beta_3 \cdot P + \beta_4 \cdot T_m \cdot W_m + \beta_5 \cdot T_m \cdot P + \beta_6 \cdot W_m \cdot P + \rho \cdot T_m \cdot W_m \cdot P + \epsilon_m$$

The triple differences parameter ρ identifies:

$$\begin{aligned} \rho = & \underbrace{(E[Y_m \mid T_m = 1, W_m = 1, P = 1] - E[Y_m \mid T_m = 1, W_m = 1, P = 0]) \\ & - (E[Y_m \mid T_m = 0, W_m = 1, P = 1] - E[Y_m \mid T_m = 0, W_m = 1, P = 0])}_{\text{"Within" effect}} \\ & - \\ & \underbrace{(E[Y_m \mid T_m = 1, W_m = 0, P = 1] - E[Y_m \mid T_m = 1, W_m = 0, P = 0]) \\ & + (E[Y_m \mid T_m = 0, W_m = 0, P = 1] - E[Y_m \mid T_m = 0, W_m = 0, P = 0])}_{\text{"Outside" (spillover) effect}} \end{aligned}$$

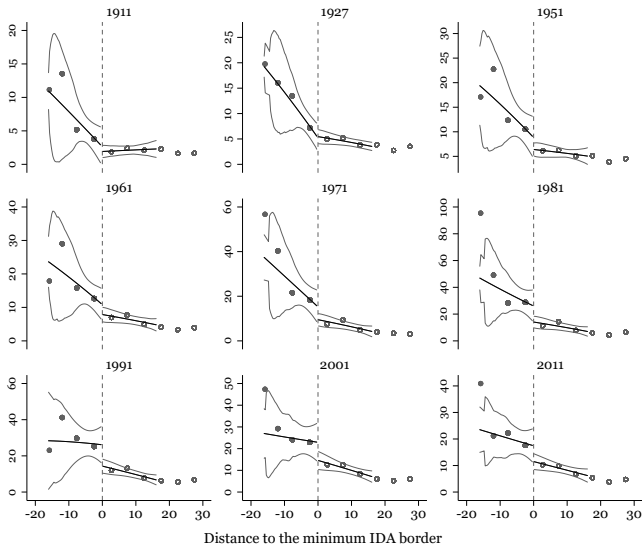
[back](#)

Diff-in-Disc – Establishment density

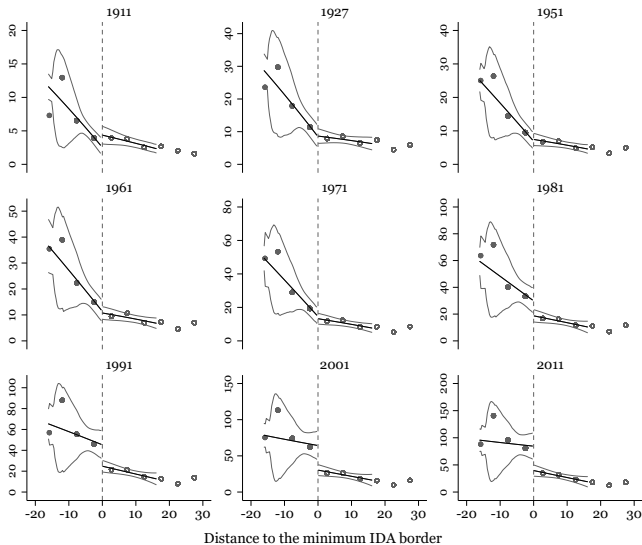


[back](#)

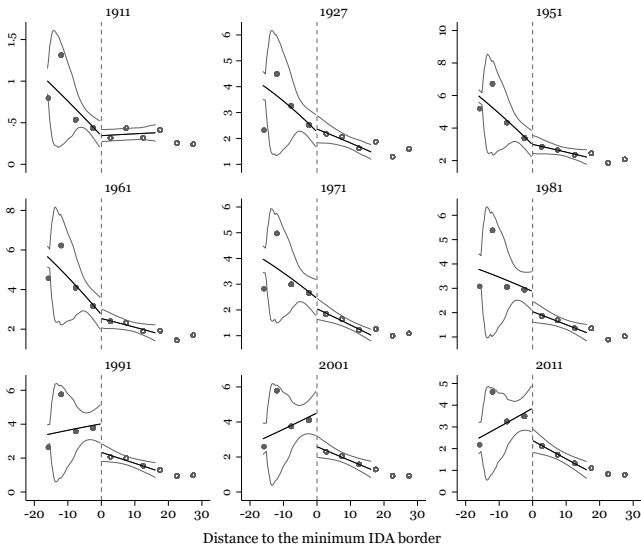
Graphical Evidence – Manuf. Employment density



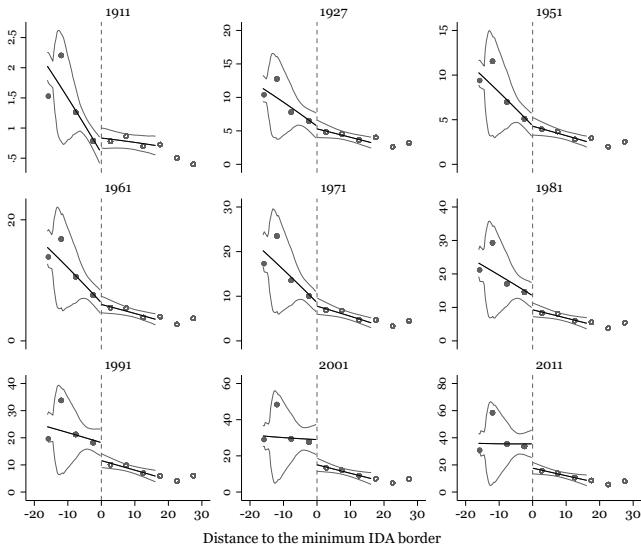
Graphical Evidence – Serv. Employment density



Graphical Evidence – Manuf. Establishment density



Graphical Evidence – Serv. Establishment density



Estimates by Sector

Table: Manufacturing and services densities – Fuzzy RD estimates

	Employment density		Establishment density	
	Manufacturing	Services	Manufacturing	Services
Contemporaneous effect (1991)				
RD Estimate	28.27 (14.08)**	57.40 (23.17)**	3.69 (1.61)**	17.76 (8.32)**
Mean around the border	14.06	25.45	2.26	11.10
Standard deviation	26.80	43.14	3.30	16.90
Observations	586	586	586	586
Persistent effect (2011)				
RD Estimate	14.99 (9.68)	112.61 (45.43)**	2.75 (1.51)*	43.22 (17.35)**
Mean around the border	11.01	41.52	2.08	17.87
Standard deviation	18.74	75.44	3.08	30.85
Observations	586	586	586	586

[back](#)

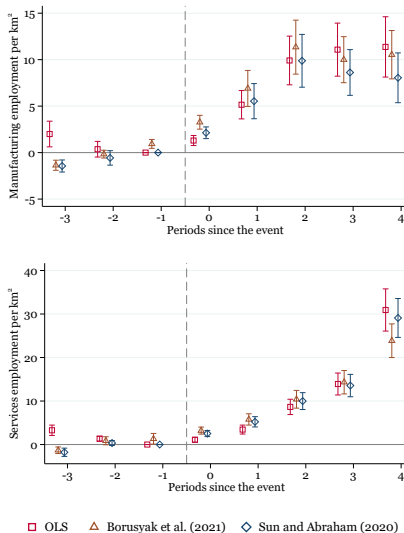
Log Estimates by Sector

Table: (Log) Employment estimates – Manufacturing and services

	(Log) Manuf. Empl. per km ²		(Log) Serv. Empl. per km ²	
	Red. Form	2-SLS	Red. Form	2-SLS
	Contemporaneous effect (1991)			
RD Estimate	0.52 (0.24)*	1.32 (0.52)**	0.46 (0.20)**	1.18 (0.50)**
Mean around the border	1.51	1.51	2.37	2.37
Standard deviation	1.55	1.55	1.28	1.28
Observations	586	586	586	586
	Persistent effect (2011)			
RD Estimate	0.38 (0.23)	0.97 (0.52)*	0.56 (0.23)**	1.44 (0.55)**
Mean around the border	1.35	1.35	2.68	2.68
Standard deviation	1.54	1.54	1.46	1.46
Observations	586	586	586	586

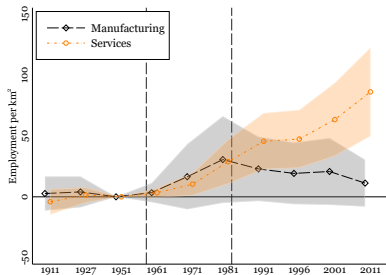
[back](#)

Staggered Event Study

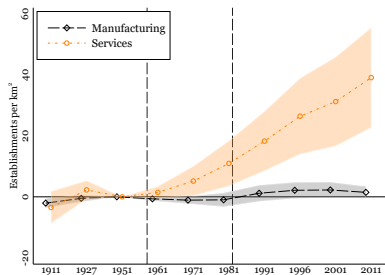


Event Study Within: Sector Breakdown

Employment density



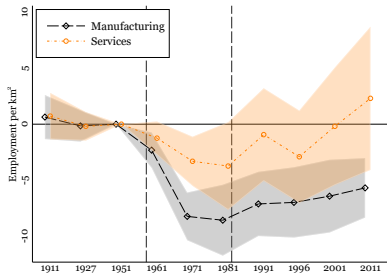
Establishment density



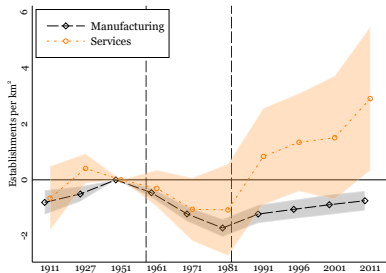
[back](#)

Event Study Outside: Sector Breakdown

Employment density



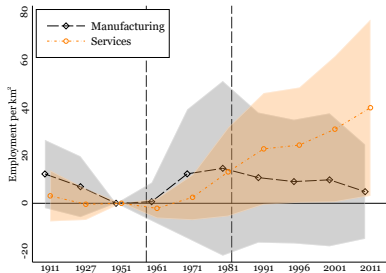
Establishment density



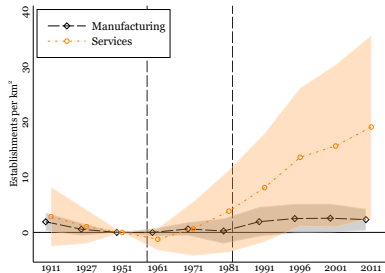
[back](#)

Triple Differences: Sector Breakdown

Employment density

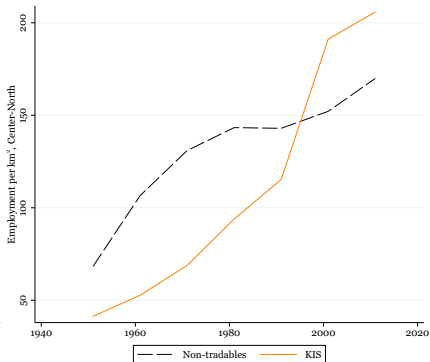
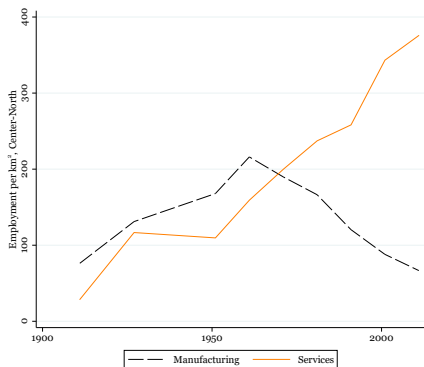


Establishment density



[back](#)

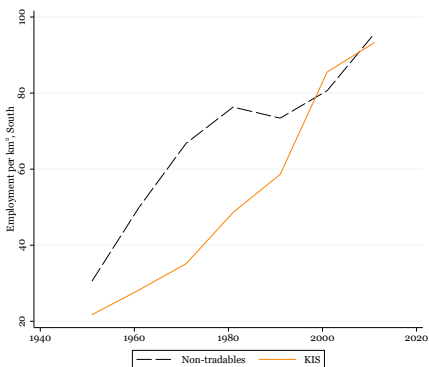
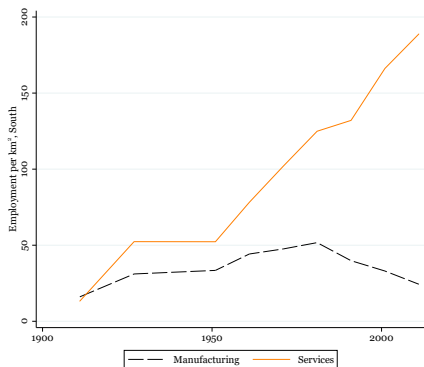
Structural Change



Sample restricted to provincial capitals.

[back](#)

Structural Change



Sample restricted to provincial capitals.

[back](#)

Larger Share of KIS in IDA Municipalities

Table: Employment and firm shares within services – Fuzzy RD estimates

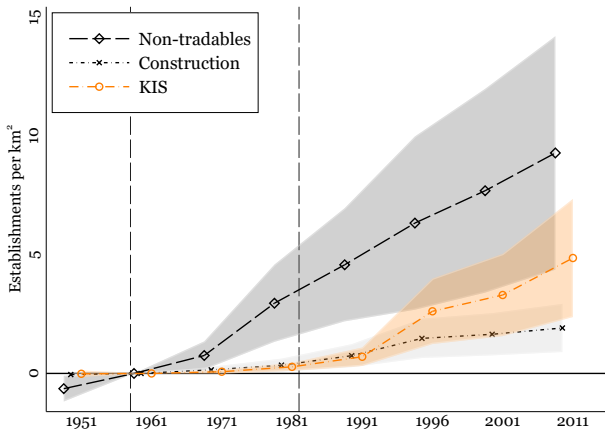
	Employment		Establishments	
	KIS	Other serv.	KIS	Other serv.
Contemporaneous effect (1991)				
RD Estimate	0.08 (0.06)	-0.08 (0.06)	0.06 (0.03)**	-0.06 (0.03)**
Mean around the border	0.17	0.83	0.11	0.89
Standard deviation	0.19	0.19	0.10	0.10
Observations	570	570	570	570
Persistent effect (2011)				
RD Estimate	0.08 (0.04)**	-0.08 (0.04)**	0.06 (0.02)***	-0.06 (0.02)***
Mean around the border	0.10	0.90	0.10	0.90
Standard deviation	0.10	0.10	0.06	0.06
Observations	585	585	585	585

The outcomes are the share of employment and establishments in KIS and other services. The shares are obtained from social security data on the universe of Italian firms and the KIS classification is obtained from Eurostat/OECD.

KIS – Eurostat Classification

- High-tech knowledge-intensive services:
 - Motion picture, video and television programme production, sound recording and music publishing activities (59);
 - Programming and broadcasting activities (60);
 - Telecommunications (61);
 - Computer programming, consultancy and related activities (62);
 - Information service activities (63);
 - Scientific research and development (72)
- Knowledge-intensive market services (excluding financial intermediation and high-tech services):
 - Water transport (50);
 - Air transport (51);
 - Legal and accounting activities (69);
 - Activities of head offices; management consultancy activities (70);
 - Architectural and engineering activities; technical testing and analysis (71);
 - Advertising and market research (73);
 - Other professional, scientific and technical activities (74);
 - Employment activities (78);
 - Security and investigation activities (80)
- Knowledge-intensive financial services:
 - Financial service activities, except insurance and pension funding (64);
 - Insurance, reinsurance and pension funding, except compulsory social security (65);
 - Activities auxiliary to financial services and insurance activities (66)
- Other knowledge-intensive services:
 - Publishing activities (58);
 - Veterinary activities (75);
 - Public administration and defence; compulsory social security (84);
 - Education (85);
 - Human health activities (86);
 - Residential care activities (87);
 - Social work activities without accommodation (88);
 - Creative, arts and entertainment activities (90);
 - Libraries, archives, museums and other cultural activities (91);
 - Gambling and betting activities (92);
 - Sports activities and amusement and recreation activities (93)

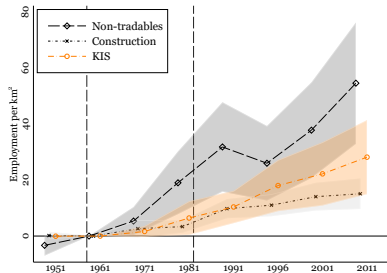
The Rise of KIS – Establishment density



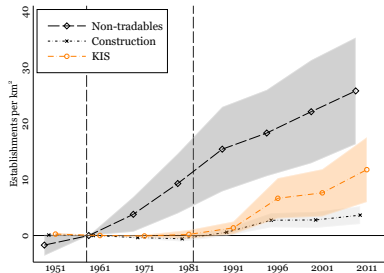
[back](#)

Event Study Within – The Rise of KIS

Employment density



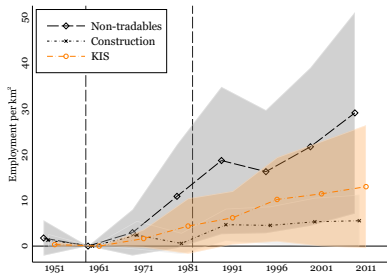
Establishment density



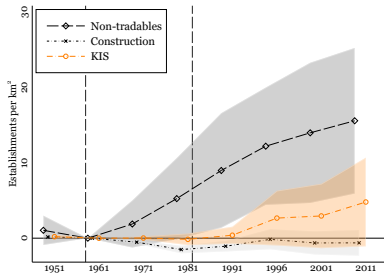
[back](#)

Triple Differences – The Rise of KIS

Employment density



Establishment density



[back](#)

Higher Shares in High-Tech Manufacturing

Table: Employment and firm shares within manufacturing – Fuzzy RD estimates

	Employment, 1991		Establishments, 1991	
	High-tech	Low-tech	High-tech	Low-tech
RD Estimate	0.27 (0.09)***	-0.27 (0.09)***	0.15 (0.05)***	-0.15 (0.05)***
Mean around the border	0.16	0.84	0.14	0.86
Standard deviation	0.21	0.21	0.14	0.14
Observations	566	566	566	566

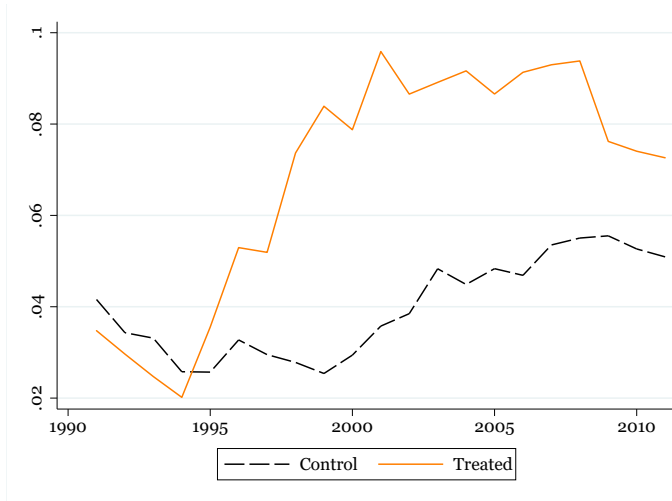
The outcomes are the share of employment across manufacturing sub-sectors, grouped by technological intensity. The shares are obtained from social security data on the universe of Italian firms and the technology classification is obtained from Eurostat/OECD.

[detail](#) [back](#)

High-Tech Manuf. – Eurostat Classification

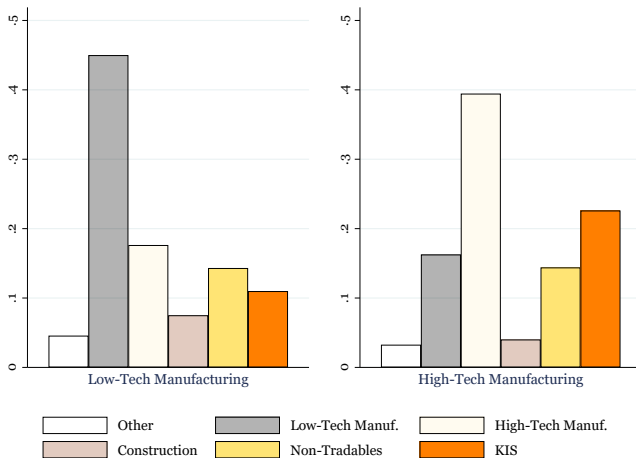
- High-technology:
 - Manufacture of basic pharmaceutical products and pharmaceutical preparations (21);
 - Manufacture of computer, electronic and optical products (26);
 - Manufacture of air and spacecraft and related machinery (30.3)
- Medium-high-technology:
 - Manufacture of chemicals and chemical products (20);
 - Manufacture of weapons and ammunition (25.4);
 - Manufacture of electrical equipment (27);
 - Manufacture of machinery and equipment n.e.c. (28);
 - Manufacture of motor vehicles, trailers and semi-trailers (29);
 - Manufacture of other transport equipment (30) excluding Building of ships and boats (30.1) and excluding Manufacture of air and spacecraft and related machinery (30.3);
 - Manufacture of medical and dental instruments and supplies (32.5)
- Medium-low-technology:
 - Reproduction of recorded media (18.2);
 - Manufacture of coke and refined petroleum products (19);
 - Manufacture of rubber and plastic products (22);
 - Manufacture of other non-metallic mineral products (23);
 - Manufacture of basic metals (24);
 - Manufacture of fabricated metal products, except machinery and equipment (25) excluding Manufacture of weapons and ammunition (25.4);
 - Building of ships and boats (30.1);
 - Repair and installation of machinery and equipment (33)
- Low-technology:
 - Manufacture of food products (10);
 - Manufacture of beverages (11);
 - Manufacture of tobacco products (12);
 - Manufacture of textiles (13);
 - Manufacture of wearing apparel (14);
 - Manufacture of leather and related products (15);
 - Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials (16);
 - Manufacture of paper and paper products (17);
 - Printing and reproduction of recorded media (18) excluding Reproduction of recorded media (18.2);
 - Manufacture of furniture (31);
 - Other manufacturing (32) excluding Manufacture of medical and dental instruments and supplies (32.5)

More KIS New Hires From High-Tech Manufacturing



Cumulative share of job-to-job new hires in KIS coming from high-tech manufacturing, separately for treated and control municipalities, since 1991. The shares are computed for municipalities included in the baseline estimation sample. Treated municipalities are those bordering IDA centers.

More KIS Demand From High-Tech Manufacturing



Breakdown of inputs demanded by low-technology and high-technology manufacturing industries, respectively, for 2020. Each bar is computed as the average across industries. The KIS classification and the manufacturing technology intensity classification are obtained from Eurostat/OECD.

Higher Share of Business Services

Table: Employment shares within 3-digit services – Fuzzy RD estimates

	RD Estimate	S.E.	Mean	S.D.
Other human resources provision	3.17	(1.76)*	0.31	3.82
Maintenance and repair of motor vehicles	2.49	(0.66)***	4.31	7.14
Computer programming, consultancy and related	1.60	(0.66)**	0.91	2.53
Other specialised wholesale	1.43	(0.84)*	1.93	3.48
Reinsurance	0.72	(0.41)*	0.39	1.55
Sports activities	0.69	(0.38)*	0.31	1.79
Management consultancy activities	0.49	(0.21)**	0.34	1.05
Legal activities	0.30	(0.16)*	0.45	0.80
Renting and operating of own or leased real estate	0.07	(0.04)*	0.05	0.24
Other telecommunications activities	0.07	(0.04)	0.03	0.18
Passenger air transport	0.03	(0.01)*	0.00	0.04
Fund management activities	0.01	(0.01)	0.00	0.03
Wholesale and retail trade and repair of vehicles	-0.01	(0.01)*	0.00	0.02
Retail sale in non-specialised stores	-0.13	(0.08)*	0.03	0.18
Wholesale of agricult. raw materials and animals	-1.24	(0.77)	0.85	5.30
Retail sale of food, beverages and tobacco	-2.91	(1.06)***	3.28	4.82

Regressions run for employment shares within services using 3-digit sectors. We show estimates with $p\text{-value} < 0.11$. Each outcome is in percentage units. Standard errors clustered by IDA region in parentheses. Descriptive statistics computed within the estimation sample.

[back](#)

Higher Share of Business Services

Table: Firm shares within 3-digit services – Fuzzy RD estimates

	RD Estimate	S.E.	Mean	S.D.
Reinsurance	0.79	(0.49)	0.66	1.80
Management consultancy activities	0.68	(0.30)**	0.44	1.01
Data processing, hosting and related; web portals	0.66	(0.41)	0.52	1.29
Sports activities	0.64	(0.36)*	0.39	1.61
Legal activities	0.55	(0.28)**	0.75	1.13
Other professional, scientific and technical activ.	0.47	(0.19)**	0.33	0.99
Support activities for transportation	0.44	(0.17)***	0.73	1.47
Buying and selling of own real estate	0.41	(0.20)**	0.15	0.63
Retail trade not in stores, stalls or markets	0.26	(0.09)***	0.16	0.52
Other postal and courier activities	0.14	(0.08)*	0.06	0.24
Wholesale of information and communication equip.	0.11	(0.06)**	0.12	0.39
Market research and public opinion polling	0.11	(0.06)*	0.04	0.21
Fund management activities	0.03	(0.01)*	0.01	0.06
Translation and interpretation activities	0.01	(0.00)*	0.00	0.01
Wholesale and retail trade and repair of vehicles	-0.04	(0.02)**	0.01	0.05
Retail sale in non-specialised stores	-0.21	(0.11)*	0.05	0.26
Beverage serving activities	-3.16	(1.83)*	9.77	7.36
Retail sale of food, beverages and tobacco	-4.15	(1.19)***	5.38	4.57

Regressions run for firm shares within services using 3-digit sectors. We show estimates with p -value<0.11. Each outcome is in percentage units. Standard errors clustered by IDA region in parentheses. Descriptive statistics computed within the estimation sample.

Higher Wages in the Long Run

Table: (Log) wages – Fuzzy RD estimates

	Total	By sector		Within services	
		Manufacturing	Services	KIS	Other serv.
Contemporaneous effect (1991)					
RD Estimate	0.13 (0.06)**	0.18 (0.10)*	0.13 (0.07)*	0.26 (0.17)	0.11 (0.07)
Mean around the border	7.11	7.09	7.13	7.13	7.12
Standard deviation	0.14	0.23	0.19	0.40	0.18
Observations	582	566	570	450	570
Persistent effect (2011)					
RD Estimate	0.10 (0.04)***	0.12 (0.06)**	0.12 (0.05)**	0.27 (0.13)**	0.11 (0.05)**
Mean around the border	7.10	7.09	7.01	7.05	7.00
Standard deviation	0.12	0.19	0.17	0.32	0.18
Observations	586	569	585	490	585

Outcome computed as the natural logarithm of the average monthly wage paid by the firm, then averaged across firms in a municipality.

akm

back

Positive Effect on Human Capital and High-Skill Jobs

Table: Education and occupations - Fuzzy RD estimates

	High school educ.	Univ. degree	Low-skill	High-skill
Contemporaneous effect (1991)				
RD Estimate	11.04 (3.75)***	5.42 (2.20)**	-9.26 (3.40)**	11.08 (4.27)**
Mean around the border	15.12	5.60	15.23	17.86
Standard deviation	5.60	3.57	7.81	6.93
Observations	587	587	587	587
Persistent effect (2011)				
RD Estimate	10.58 (3.63)***	9.02 (3.10)***	-11.36 (3.02)***	9.84 (3.39)***
Mean around the border	35.22	18.56	21.95	25.02
Standard deviation	6.93	5.90	8.10	6.51
Observations	587	587	587	587

"High school educ.": share of people aged at least 6 with high school education or more.

"Univ. degree": share of the resident population aged 30-34 years old with a university degree.

"Low-skill": employment share of those in low-skill jobs (unskilled occupations – Isco08 code 8).

"High-skill": employment share of those in high-skill jobs (Legislators, Entrepreneurs, High Executives, Scientific and Highly Specialized Intellectual Professions, Technical Professions – Isco08 codes 1, 2 and 3)

Larger Worker AKM Effects

Table: Worker AKM effects – Fuzzy RD estimates (2011)

	Total	By sector		Within services	
		Manufacturing	Services	KIS	Other serv.
RD Estimate	0.07 (0.02)***	0.03 (0.05)	0.14 (0.05)**	0.22 (0.11)**	0.13 (0.05)**
Mean around the border	-0.17	-0.17	-0.22	-0.19	-0.22
Standard deviation	0.11	0.12	0.18	0.21	0.19
Observations	576	506	548	327	544

The outcomes are the worker fixed effects from an AKM model of the (log) wage estimated between 1991 and 2011. The worker effects are then averaged at the municipality level.

[back](#)

Larger and Higher-Paying Firms

Table: Firm size and wage distribution – Fuzzy RD estimates

	Firm size			Firm wage		
	T1	T2	T3	T1	T2	T3
Contemporaneous effect (1991)						
RD Estimate	-0.02 (0.03)	-0.04 (0.03)	0.06 (0.04)	-0.10 (0.03)***	0.04 (0.02)**	0.06 (0.04)
Mean around the border	0.42	0.32	0.26	0.39	0.31	0.30
Standard deviation	0.13	0.10	0.11	0.14	0.10	0.12
Observations	582	582	582	582	582	582
Persistent effect (2011)						
RD Estimate	-0.05 (0.03)*	-0.02 (0.02)	0.07 (0.03)**	-0.04 (0.02)**	-0.01 (0.01)	0.05 (0.02)**
Mean around the border	0.43	0.33	0.24	0.35	0.33	0.32
Standard deviation	0.09	0.07	0.09	0.10	0.07	0.10
Observations	586	586	586	586	586	586

Outcomes are computed as the share of firms in each tertile of firm size and wage paid.

[back](#)

Balance Sheet Outcomes

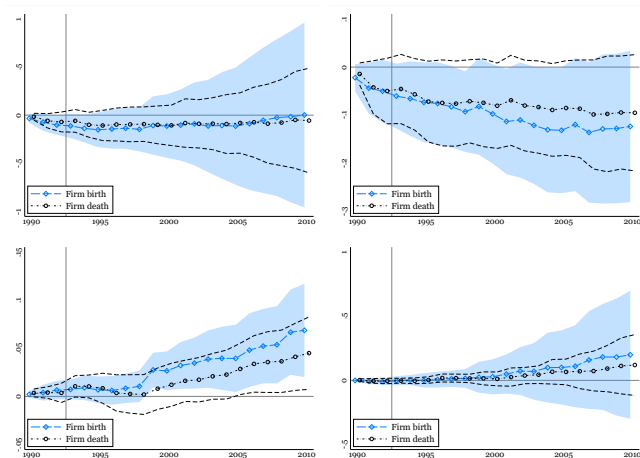
Table: Balance sheet outcomes, 2011 – Fuzzy RD estimates

	Total	By sector		Within services	
		Manufacturing	Services	KIS	Other serv.
		Value added			
RD Estimate	0.52 (0.31)*	1.54 (0.53)***	0.04 (0.31)	1.43 (0.64)**	-0.16 (0.33)
Mean around the border	4.49	4.31	4.24	4.00	4.23
Standard deviation	0.88	1.07	0.90	1.12	0.91
Observations	577	507	545	369	543
		Investment			
RD Estimate	0.31 (0.25)	1.02 (0.43)**	0.48 (0.35)	1.98 (0.99)**	0.34 (0.36)
Mean around the border	2.87	2.68	2.60	2.04	2.59
Standard deviation	1.14	1.41	1.25	1.56	1.27
Observations	582	516	553	369	552
		Sales			
RD Estimate	0.42 (0.35)	1.35 (0.55)**	0.04 (0.38)	1.40 (0.72)*	-0.05 (0.42)
Mean around the border	6.07	5.78	6.00	5.00	6.04
Standard deviation	0.92	1.20	0.99	1.19	1.00
Observations	582	519	558	378	556
		Profits			
RD Estimate	1.04 (0.49)**	2.23 (0.82)***	0.82 (0.62)	-0.66 (1.02)	0.84 (0.68)
Mean around the border	2.21	2.26	2.01	2.07	2.03
Standard deviation	1.42	1.63	1.49	1.69	1.47
Observations	361	285	316	240	307

All outcomes are as of 2011 and expressed in natural logarithm, scaled by total firm workforce.

[back](#)

Higher Business Dynamism in KIS



Top: Total, Manufacturing; Bottom: KIS, Other services. Coefficient estimates for the fuzzy RD model. Firm birth and death rates computed as the cumulative number of firm births and death every year since 1990, as a share of the total number of firms in the municipality in 1990.

[back](#)

Higher House Prices and Incomes

Table: Other outcomes – Fuzzy RD estimates

	Housing value	Rents	Tax income	Gini coeff.	KSI
RD Estimate	543.97 (214.44)**	2.01 (0.88)**	0.33 (0.09)***	0.03 (0.01)***	-0.20 (0.10)**
Mean around the border	1087.09	3.94	8.95	0.38	0.97
Standard deviation	580.83	1.97	0.23	0.03	0.32
Observations	574	537	587	587	586

“Housing value” and “Rents” are residential real estate prices and rents as of Q1-2011, measured in € / squared meter. “Tax income” denote (log) tax income in € / capita in 2010. “Gini coeff.” is the Gini coefficient as of 2011. “KSI” is the Krugman Specialization Index for manufacturing in 2011

[back](#)

No Effect on Municipal Expenditure

Table: Municipal expenditure – Fuzzy RD estimates

a)	Total	Admin.	Educ.	Viabil.	Territ.
RD Estimate	-0.10 (0.12)	-0.06 (0.14)	-0.25 (0.14)*	-0.11 (0.21)	-0.02 (0.16)
Mean around the border	9.43	8.18	6.84	7.21	8.09
Standard deviation	0.41	0.39	0.43	0.65	0.58
Observations	587	587	587	587	587

b)	Social	Just. & pol.	Cult. & sport	L. 488/1992	EU Funds
RD Estimate	0.11 (0.16)	0.21 (0.20)	-0.19 (0.22)	0.91 (1.24)	0.15 (0.30)
Mean around the border	6.90	6.15	6.37	4.45	6.46
Standard deviation	0.54	0.41	0.75	4.34	1.24
Observations	587	587	587	587	544

Outcomes in Panel a) and Columns (1)-(3) of Panel b) are cumulative municipality expenditures between 2000 and 2011, sourced from municipality balance sheets. All items include both current and capital expenditure. "L. 488/1992" measures the total funds obtained through Law 488/1992. "EU Funds" are total funds received through the EU Structural Funds program between 2007 and 2013. All variables are expressed in natural logarithm of the per capita amount (using the 2001 population).

V. COST-BENEFIT ANALYSIS

Cost-Benefit Analysis

- Were IDAs cost-effective? How do they compare to other policies?
- **Caveat:** cannot assess effects on national welfare
 - Cannot estimate impact on South-North migration
 - Consider benefits for the South in isolation

descriptives

- Analysis informed by **long-run estimates:**

① **Cost-per-job:** ~\$21,000 (2011 prices)

details

- Rises to ~\$32,000 assuming 50% DWL
- In line with similar programs in other countries
(Busso et al., 2013; Criscuolo et al., 2019; Sieglöcher et al., 2022)
- Smaller than estimates for other Italian policies
(Cerqua & Pellegrini, 2014; Cingano et al., 2022)

② **Benefits:** net gains after 1990 compensate for total cost

details

- Calculate net benefits accruing to workers, firms and landlords
(Busso et al., 2013)
- 60% to workers, 38% to firms
- Gains for landlords likely underestimated

back

Cost per Job Calculations

- Two approaches leading to similar results:
 - ① Use fuzzy RD estimate: €1000 per 1951 resident lead to 10.3 more workers per km² in 2011
 - ② Use long-run employment effect from other specifications
 - Diff-in-disc, event study using Center-North, triple difference
 - Compute effect on EIM expenses in each design
- Divide total cost by total jobs created
 - Computed using average municipality area and average 1951 population in estimation sample
- Convert to \$ using average exchange rate in 2011 (1.3924)
- Assume 50 percent deadweight loss
(Busso et al., 2013; Criscuolo et al., 2019; Siegloch et al., 2022)

Cost-Benefit Analysis

- Back-of-the-envelope calculations based on Busso et al. (2013)
(Chaurey, 2017; Lu et al., 2019; Lapoint & Sakabe, 2022)
 - Spatial equilibrium model allowing for simple approximations of welfare effects via reduced-form elasticities
- Focus on gains after the policy (yearly flows 1991-2011)
 - ① Workers: annual wage bill for the universe of Italian firms
 - ② Firms: impute profits for all incorporated firms using fitted value of regression of firm profits on wages, employment, year and province dummies. Sets profits of all non-incorporated firms equal to zero
 - ③ Landlords: housing rents computed using rental prices in municipality, then multiplied by estimate of total building area
- Compute effect of IDA on (log of) each outcome, $\hat{\pi}_j$ [table](#)
- Compute counterfactual flow:
 $counterfactual_j = actual_j / (1 + (e^{\hat{\pi}_j} - 1))$
- Compute net surplus and PDV using 10% discount rate
- Compare net benefits to total cost of IDAs (~€88bn) [table](#)

[back](#)

Effects on wage bill, profits and housing rents

Table: Coefficient estimates, cost-benefit analysis

	(Log) Wage bill	(Log) Firm profits	(Log) Rents	
			2004	2011
RD Estimate	0.70 (0.33)**	0.97 (0.37)***	0.18 (0.05)***	0.19 (0.06)***
Observations	12,282	8,573	535	537

For wage bill and firm profits, we estimate Equation RF on the pooled sample of years 1991-2011 and control for year effects. For rents, we run Equation RF separately for 2004 and 2011. Standard errors clustered by IDA region in parentheses.

[back](#)

Net Benefits of IDAs

Table: Aggregate benefits of the IDA policy

	Actual (€bn)	$\hat{\pi}_j$	Counterf. (€bn)	Benefit (€bn)	PDV benefits (€bn)
Wage bill	237.16	0.70	118.07	119.09	52.06
Firm profits	118.68	0.97	44.80	73.88	32.66
Housing rents	20.63	0.19	17.12	3.50	1.21
Total	376.46		179.99	196.47	85.93

All amounts are cumulated between 1991 and 2011 and measured in billion € (2011 prices). The counterfactual amount is obtained as $counterfactual_j = actual_j / (1 + (e^{\hat{\pi}_j} - 1))$. The presented discounted value is calculated using a 10% discount rate. The effect of the policy $\hat{\pi}_j$ is estimated using the reduced-form specification in Equation [RF](#). For firm profits, the actual flows refer only to incorporated firms in the Cerved data.

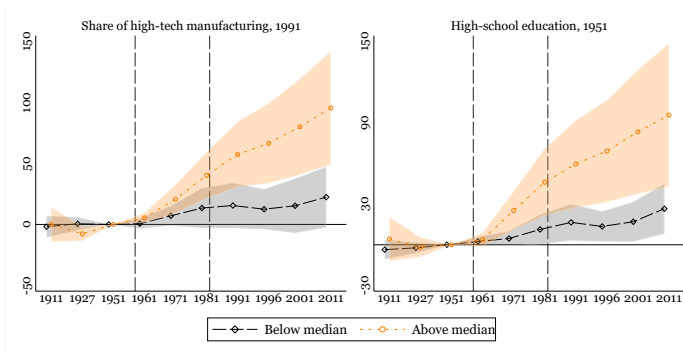
Caveats:

- Cannot measure expenses borne by consortium
- Very high discount rate
- Underestimate total firm profits (only incorporated firms)
- Underestimate building area (1.3% of total), hence rental gains
- Do not include ~€10bn increase in housing value for landlords

VI. HETEROGENEITY AND IMPLICATIONS

What Led to the Success of IDAs?

- What made IDAs a successful example of PBIP?
- Heterogeneity: study characteristics of IDAs leading to persistence



more

- Persistence visible across heterogeneity cuts
- Study effects of intervention in other EIM areas

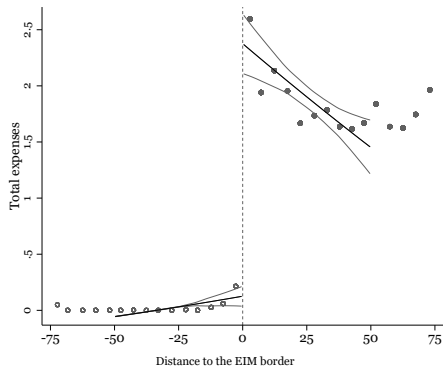
The EIM Border

- Examine results at the **EIM border**

The border

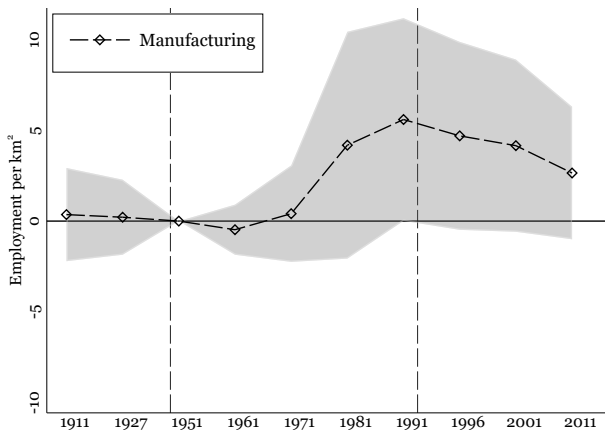


EIM expenses



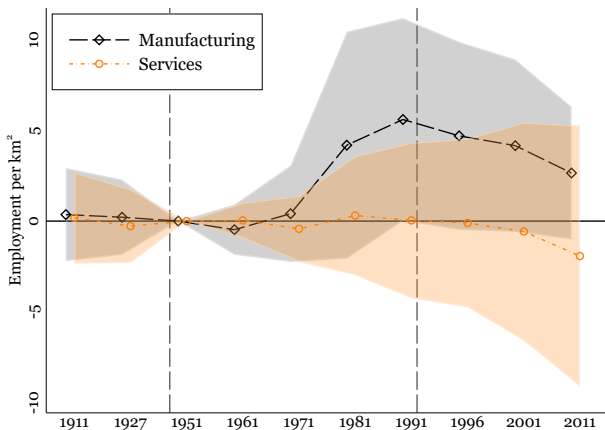
The EIM Border – Diff-in-Disc

$$y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot B_m + \epsilon_{m,t} \quad (\text{DD2})$$



The EIM Border – Diff-in-Disc

$$y_{m,t} = \mu_m + \sigma_t + \sum_{j \neq 1951} \rho_j \cdot 1[t = j] \cdot B_m + \epsilon_{m,t} \quad (\text{DD2})$$

[firms](#)[rd plots](#)[table](#)[back](#)

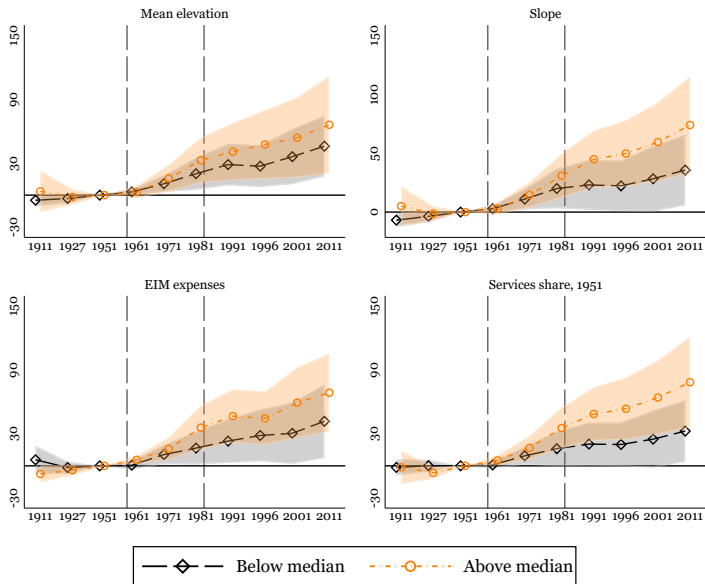
The EIM Border – Other Evidence

- No increase in KIS jobs [figure](#) [table](#)
- No effect on high-tech manufacturing [table](#)
- No long-run effect on wages [table](#)
- No effect on education, reduction in high-skill occupations [table](#)
- Larger firms, but not higher-paying [table](#)
- No balance sheet effects in KIS [table](#)
- Null or negative effect on house prices and incomes [table](#) [back](#)

The IDAs vs the EIM Border

	IDAs	EIM border
Firm subsidies	4.99 (10.51)	4.53 (8.21)
Infrastructure spending	2.62 (5.18)	3.10 (4.76)
Employment density (1951)	19.01 (23.09)	7.47 (14.31)
Establishment density (1951)	8.33 (8.55)	3.43 (5.11)
Manuf. employment density (1951)	9.47 (13.76)	3.10 (6.19)
Manuf. establishment density (1951)	3.44 (3.64)	1.64 (2.25)
Share of high-tech manuf. (% , 1951)	5.11 (5.50)	5.21 (2.94)
Population density (1951)	307.76 (318.29)	111.81 (104.39)
Agriculture share (% , 1951)	31.28 (13.53)	34.49 (12.00)
High school education (% , 1951)	2.17 (1.20)	1.84 (0.88)
Mean elevation	188.38 (153.53)	728.24 (440.26)
Slope	417.26 (460.47)	947.85 (572.53)
Seismicity	2.80 (0.91)	1.66 (0.72)
Number of municipalities	95	168

Heterogeneity Across IDAs

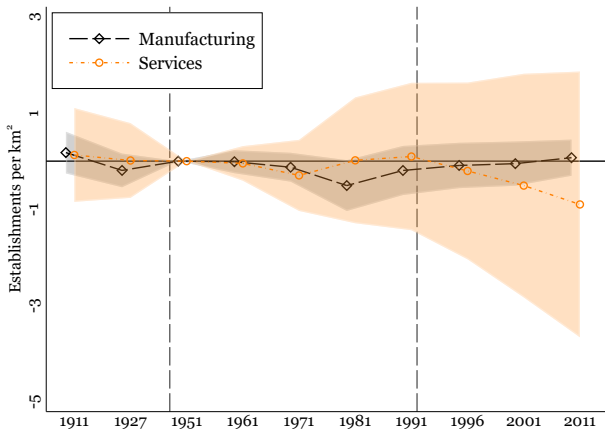


The EIM Border – Identification

- Main identifying assumption: continuity of (mean) potential outcomes at the border
(Albanese et al., 2023)
- Pre-1950 parliamentary discussion: border based on execution of infrastructure projects
 - Tronto river basin (Marche), Latina reclamation area (Lazio)
 - No prospects of industrial policy at the time
 - The Cassa had an initial 10-year mandate
- No systematic overlap with regional/provincial boundaries
- Border not relevant for other regional and EU policies

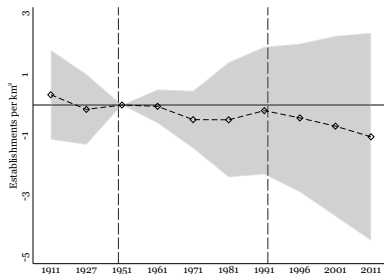
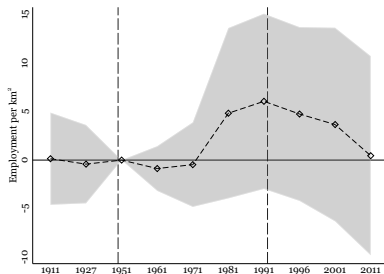
back

EIM Border Diff-in-Disc – Establishment density



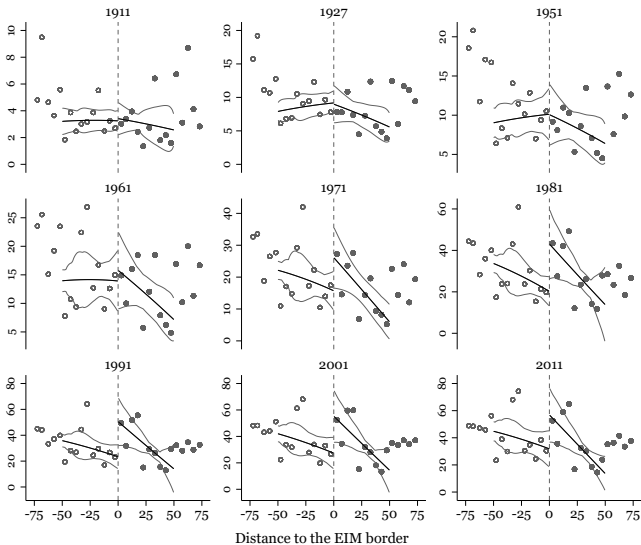
[back](#)

EIM Border Diff-in-Disc – Total Employment and Establishment density

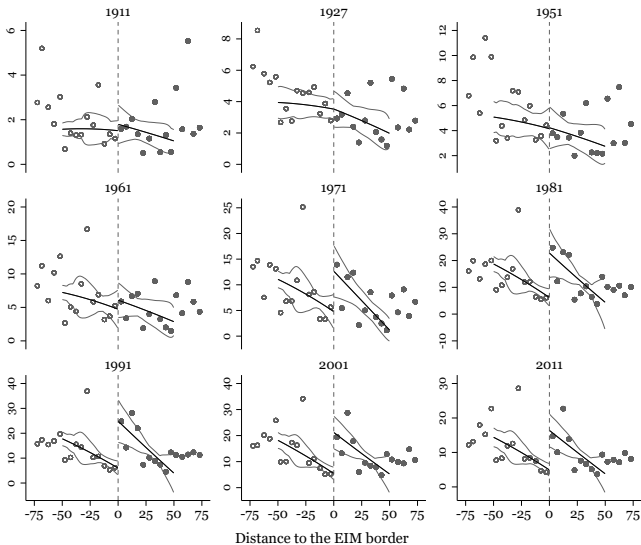


[back](#)

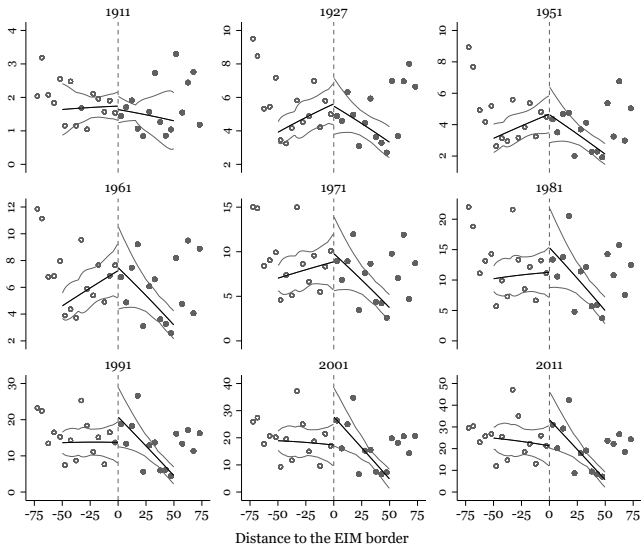
EIM Border – Employment density



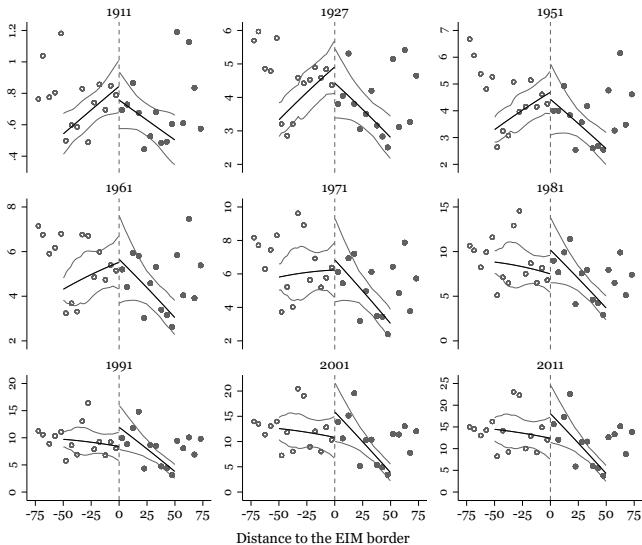
EIM Border – Manuf. Employment density



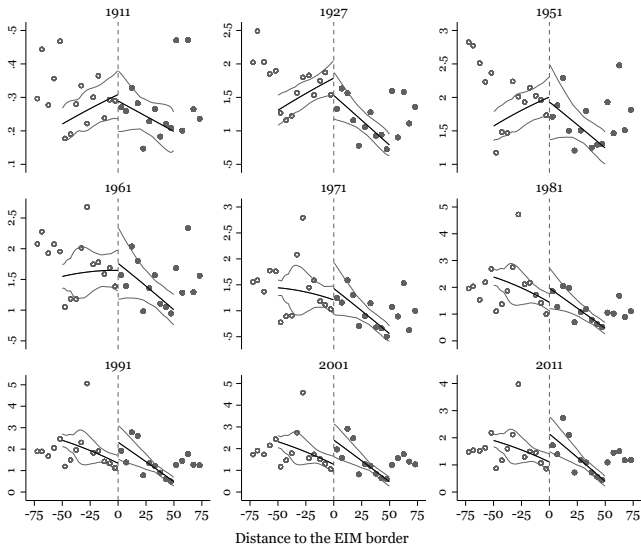
EIM Border – Serv. Employment density



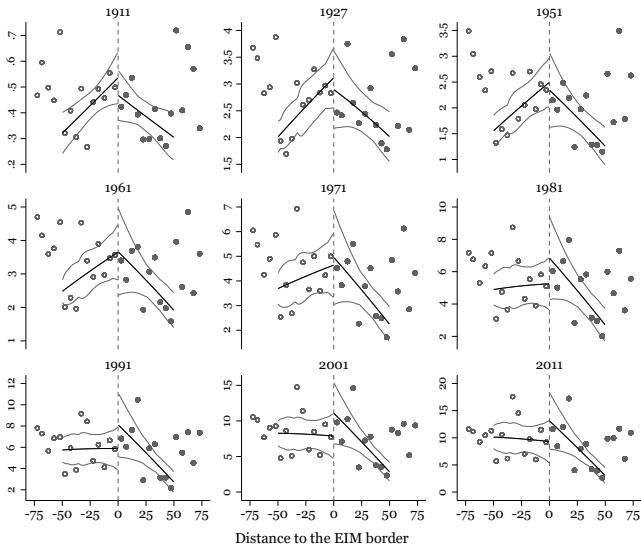
EIM Border – Establishment density



EIM Border – Manuf. Establishment density



EIM Border – Serv. Establishment density



No Long Run Effects at the EIM Border

Table: RD Estimates – EIM border

	Empl., 1991	Empl., 2011	Est., 1991	Est., 2011
RD Estimate	18.59 (9.93)*	14.95 (11.72)	1.94 (2.40)	2.77 (4.09)
Mean around the border	30.78	37.09	8.64	12.59
Standard deviation	61.14	71.38	14.74	24.01
Observations	587	587	587	587
R^2	0.29	0.30	0.34	0.29

Coefficient estimates from a sharp RD at the EIM border separately for employment per km² and establishments per km². All regressions are estimated over a 50-km symmetric bandwidth around the EIM border and control for a linear polynomial in the distance to the border and border segment effects. Standard errors allow for spatial correlation following Conley (1999).

[back](#)

No Long Run Effects at the EIM Border

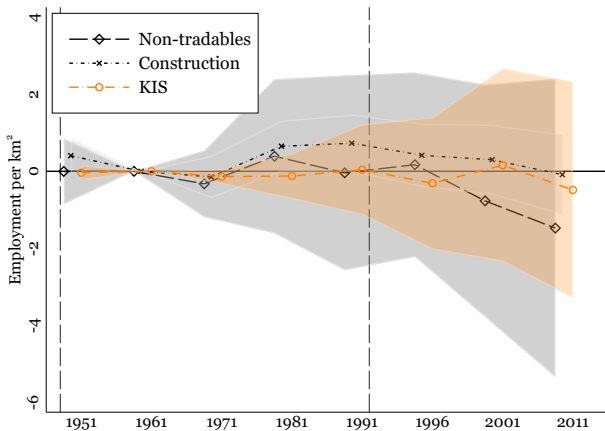
Table: RD Estimates – EIM border

	Employment density		Establishment density	
	Manufacturing	Services	Manufacturing	Services
Contemporaneous effect (1991)				
RD Estimate	15.36 (4.02)***	3.44 (5.01)	0.71 (0.42)	1.03 (1.81)
Mean around the border	12.77	13.53	1.66	5.76
Standard deviation	28.13	28.45	3.22	10.48
Observations	587	587	587	587
Persistent effect (2011)				
RD Estimate	9.26 (2.61)***	6.04 (7.86)	0.77 (0.35)**	1.56 (3.25)
Mean around the border	9.61	21.79	1.40	9.14
Standard deviation	19.60	46.82	2.61	18.81
Observations	587	587	587	587

Coefficient estimates from a sharp RD at the EIM border separately for employment per km² and establishments per km². All regressions are estimated over a 50-km symmetric bandwidth around the EIM border and control for a linear polynomial in the distance to the border and border segment effects. Standard errors allow for spatial correlation following Conley (1999).

[back](#)

EIM Border – No Effect on KIS



[back](#)

EIM Border – No Effect on KIS

Table: Employment and firm shares within services – EIM border

	Employment		Establishments	
	KIS	Other serv.	KIS	Other serv.
Contemporaneous effect (1991)				
RD Estimate	-0.02 (0.03)	0.02 (0.03)	-0.01 (0.02)	0.01 (0.02)
Mean around the border	0.13	0.87	0.11	0.89
Standard deviation	0.20	0.20	0.14	0.14
Observations	526	526	526	526
Persistent effect (2011)				
RD Estimate	0.00 (0.02)	-0.00 (0.02)	0.01 (0.01)	-0.01 (0.01)
Mean around the border	0.09	0.91	0.09	0.91
Standard deviation	0.13	0.13	0.09	0.09
Observations	570	570	570	570

All regressions are estimated over a 50-km symmetric bandwidth around the EIM border and control for a linear polynomial in the distance to the border and border segment effects. Standard errors allow for spatial correlation. The outcomes are the share of employment and establishments in KIS and other services. The shares are obtained from social security data on the universe of Italian firms and the KIS classification is obtained from Eurostat/OECD.

EIM Border – No Effect on High-Tech Manufacturing

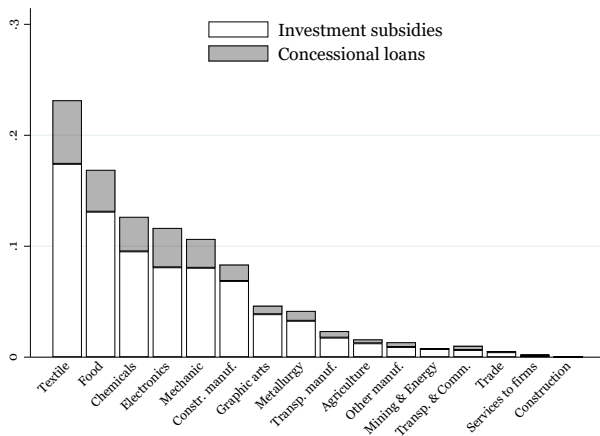
Table: Employment and firm shares within manufacturing – EIM border

	Employment, 1991		Establishments, 1991	
	High-tech	Low-tech	High-tech	Low-tech
RD Estimate	0.02 (0.03)	-0.02 (0.03)	-0.00 (0.03)	0.00 (0.03)
Mean around the border	0.14	0.86	0.13	0.87
Standard deviation	0.21	0.21	0.15	0.15
Observations	509	509	509	509

All regressions are estimated over a 50-km symmetric bandwidth around the EIM border and control for a linear polynomial in the distance to the border and border segment effects. Standard errors allow for spatial correlation. The outcomes are the share of employment across manufacturing sub-sectors, grouped by technological intensity. The shares are obtained from social security data on the universe of Italian firms and the technology classification is obtained from Eurostat/OECD.

[back](#)

EIM Border – Firm Subsidies, Sector Breakdown



[back](#)

EIM Border – No Long Run Effect on Wages

Table: (Log) wages – EIM border

	Total	By sector		Within services	
		Manufacturing	Services	KIS	Other serv.
Contemporaneous effect (1991)					
RD Estimate	0.15 (0.02)***	0.19 (0.04)***	0.16 (0.04)***	0.08 (0.10)	0.15 (0.04)***
Mean around the border	7.11	7.12	7.09	7.08	7.10
Standard deviation	0.17	0.25	0.29	0.47	0.24
Observations	580	509	526	331	519
Persistent effect (2011)					
RD Estimate	0.04 (0.03)	0.04 (0.05)	0.06 (0.04)	0.09 (0.09)	0.06 (0.04)
Mean around the border	7.08	7.12	6.93	7.05	6.91
Standard deviation	0.18	0.26	0.28	0.52	0.28
Observations	584	514	570	387	569

All regressions are estimated over a 50-km symmetric bandwidth around the EIM border and control for a linear polynomial in the distance to the border and border segment effects. Standard errors allow for spatial correlation. Outcome computed as the natural logarithm of the average monthly wage paid by the firm, then averaged across firms in a municipality.

EIM Border – No Effect on Education

Table: Education and occupations – EIM border

	High school educ.	Univ. degree	Low-skill	High-skill
Contemporaneous effect (1991)				
RD Estimate	-0.18 (0.74)	-0.28 (0.51)	-0.39 (0.62)	-1.55 (0.83)*
Mean around the border	16.87	5.65	10.96	17.32
Standard deviation	5.18	3.73	4.72	5.91
Observations	585	585	585	585
Persistent effect (2011)				
RD Estimate	-0.34 (0.86)	0.01 (1.01)	0.71 (0.75)	-1.66 (0.81)**
Mean around the border	38.19	20.65	18.83	24.74
Standard deviation	6.20	7.51	4.92	5.55
Observations	587	587	587	587

“High school educ.”: share of people aged at least 6 with high school education or more.

“Univ. degree”: share of the resident population aged 30-34 years old with a university degree.

“Low-skill”: employment share of those in low-skill jobs (unskilled occupations – Isco08 code 8). “High-skill”: employment share of those in high-skill jobs (Legislators, Entrepreneurs, High Executives, Scientific and Highly Specialized Intellectual Professions, Technical Professions – Isco08 codes 1, 2 and 3)

EIM Border – Larger Firms

Table: Firm size and wage distribution – EIM border

	Firm size			Firm wage		
	T1	T2	T3	T1	T2	T3
Contemporaneous effect (1991)						
RD Estimate	-0.11 (0.03)***	0.01 (0.02)	0.10 (0.02)***	-0.19 (0.03)***	0.07 (0.02)***	0.11 (0.03)***
Mean around the border	0.42	0.33	0.25	0.36	0.32	0.32
Standard deviation	0.18	0.17	0.15	0.20	0.15	0.18
Observations	580	580	580	580	580	580
Persistent effect (2011)						
RD Estimate	-0.07 (0.02)***	0.02 (0.02)	0.05 (0.02)***	-0.03 (0.02)	0.01 (0.02)	0.03 (0.02)
Mean around the border	0.42	0.32	0.25	0.36	0.30	0.34
Standard deviation	0.16	0.13	0.13	0.15	0.13	0.14
Observations	584	584	584	584	584	584

All regressions are estimated over a 50-km symmetric bandwidth around the EIM border and control for a linear polynomial in the distance to the border and border segment effects. Standard errors allow for spatial correlation. Outcomes are computed as the share of firms in each tertile of firm size (Columns (1)-(3)) and wage (Columns (4)-(6)).

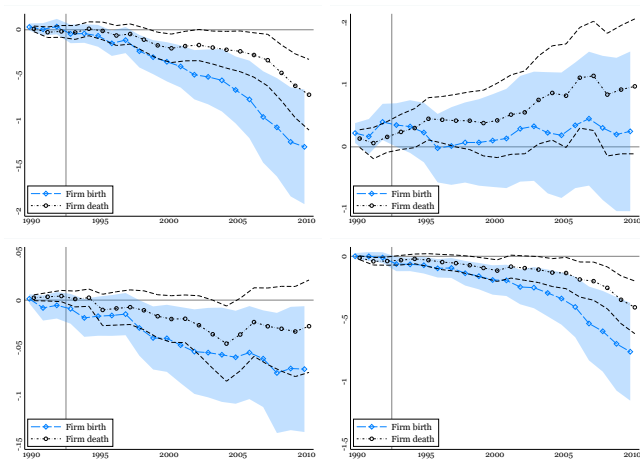
EIM Border – No Balance Sheet Effects in KIS

Table: Balance sheet outcomes, 2011 – EIM border

	Total	By sector		Within services	
		Manufacturing	Services	KIS	Other serv.
		Value added			
RD Estimate	0.50 (0.15)***	0.39 (0.19)**	0.27 (0.19)	0.21 (0.25)	0.31 (0.20)
Mean around the border	4.38	4.28	4.11	3.94	4.13
Standard deviation	1.00	1.10	1.19	0.99	1.23
Observations	542	417	497	278	484
		Investment			
RD Estimate	0.85 (0.21)***	0.50 (0.25)*	0.79 (0.25)***	0.47 (0.38)	0.81 (0.25)***
Mean around the border	2.66	2.48	2.41	2.00	2.41
Standard deviation	1.35	1.48	1.51	1.58	1.53
Observations	542	418	496	270	487
		Sales			
RD Estimate	0.74 (0.17)***	0.35 (0.21)*	0.49 (0.20)**	0.37 (0.29)	0.48 (0.21)**
Mean around the border	5.89	5.71	5.79	5.01	5.86
Standard deviation	1.11	1.19	1.28	1.23	1.30
Observations	548	425	507	287	496
		Profits			
RD Estimate	0.93 (0.31)***	0.28 (0.39)	0.09 (0.36)	-0.02 (0.42)	0.21 (0.37)
Mean around the border	2.21	2.27	2.18	1.80	2.21
Standard deviation	1.65	1.79	1.68	1.45	1.73
Observations	334	247	275	173	271

All regressions are estimated over a 50-km symmetric bandwidth around the EIM border and control for a linear polynomial in the distance to the border and border segment effects. Standard errors allow for spatial correlation. All outcomes are as of 2011 and expressed in natural logarithm, scaled by total firm workforce.

Effects on Business Dynamism



Top: Total, Manufacturing; Bottom: KIS, Other services. Coefficient estimates for the sharp RD model at the border. Firm birth and death rates computed as the cumulative number of firm births and death every year since 1990, as a share of the total number of firms in the municipality in 1990.

EIM Border – Effects on House Prices and Incomes

Table: Other outcomes – EIM border

	Housing value	Rents	Tax income	Gini coeff.	KSI
RD Estimate	-153.68 (67.86)**	-0.57 (0.26)**	-0.02 (0.02)	0.01 (0.00)*	0.02 (0.06)
Mean around the border	1106.11	4.14	9.18	0.37	1.06
Standard deviation	511.06	2.01	0.15	0.04	0.43
Observations	584	522	586	587	586

All regressions are estimated over a 50-km symmetric bandwidth around the EIM border and control for a linear polynomial in the distance to the border and border segment effects. Standard errors allow for spatial correlation. "Housing value" and "Rents" are residential real estate prices and rents as of Q1-2011, measured in euros per squared meter. "Tax income" denote (log) tax income in euros per capita in 2010. "Gini coeff." is the Gini coefficient as of 2011. "KSI" is the Krugman Specialization Index for manufacturing in 2011.

[back](#)

External Validity

- Extrapolate RD effects away from the cutoff
(Angrist & Rokkanen, 2015)
- “CIA covariates” break correlation between outcome and score
 - Obtain “CIA covariates” using data driven algorithm
(Palomba, 2023)
 - Density in 1951, elevation, slope and seismicity
- “CIA covariates” identify counterfactual and extrapolate effect [table](#)
- Other issue: external validity to other compliance groups
(Bertanha and Imbens, 2020)
 - Fail to reject equality of average outcomes across compliance types, but not enough power
 - EIM border suggests never-takers unlikely to benefit from policy in the long run

[back](#)

External Validity of IDA Estimates

Table: External validity

Bandwidth	CIA		External validity
	Distance to the minimum IDA border (1)	(2)	Employment density, 2011 (3)
20 km	-1.86 (0.53)***	-1.07 (0.28)***	58.15 (26.44)*
30 km	-1.32 (0.27)***	-0.21 (0.15)	57.04 (26.09)*
40 km	-1.03 (0.16)***	-0.24 (0.09)**	59.78 (27.83)*
50 km	-0.72 (0.11)***	-0.08 (0.06)	59.93 (27.72)*
60 km	-0.55 (0.09)***	-0.03 (0.05)	59.15 (27.20)*
70 km	-0.49 (0.07)***	-0.04 (0.04)	59.05 (26.98)*
80 km	-0.46 (0.06)***	-0.04 (0.04)	59.00 (27.08)*

Columns (1) and (2) show the coefficient for the running variable (distance to the minimum IDA border) in a regression of the outcome (employment density in 2011) on the running variable outside of the minimum border, within the bandwidth indicated on the left. Column (2) additionally controls for slope, mean elevation, seismicity and population density in 1951. Column (3) estimates Equation [RF](#) within the bandwidth indicated on the left, but replaces distance to the border with the above covariates.