The employment multiplier of data centers: a preliminary exploration

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Results are preliminary - Do not quote or cite

Introduction

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Data centers have become critical infrastructure in the digital economy, with investment surging due to AI, cloud computing, and digital services

Governments and localities are actively courting data center projects with tax incentives and infrastructure investments, often justified by promised job creation and economic development

These policy decisions implicitly assume that data centers generate substantial positive employment effects

However, the net employment effects of data center remain theoretically ambiguous and has not yet been studied empirically

Data centers are exceptionally ICT and capital-intensive relative to their direct employment compared to traditional sectors' plants:

- Data centers require specialized workers whose local supply may be strongly limited
- They rely on global (or at least non-local) supply chains for ICT and cooling components, potentially limiting local economic spillovers
- However, the high wages paid to data center employees and the demand for specialized services – from electrical contractors to ICT providers – could generate substantial indirect employment that offsets the small direct workforce

Our (preliminary) results

This work-in-progress aims to estimate the employment multiplier of data centers, providing evidence on whether these investments deliver the promised employment benefits that justify public subsidies

We match information on the number of data centers and employees at the level of French commuting zones:

- 280 commuting zones (excluding Corsica and overseas territories)
- 2 years: 2011 and 2022

Preliminary OLS results estimate a positive and significant employment multiplier of data centers:

- Concentrated in non-tradable sectors
- Increasing employment in intellectual occupations, but negatively associated with intermediate ones

Data

Data - Data Centers and French administrative data

We match several data sources on data centers:

- **Sources:** Baxtel, Datacentermap, Peering

We follow these steps:

1. We verify the existence of each data center through websites or news sources
2. We retrieve the tax codes of firms owning each data center from their website
3. We match the tax codes with information from the French business register
4. We match locations provided by the sources above with information on firms' plants to retrieve the fiscal code of each plant, its entry/closure date, and commuting zone code
5. We clean mergers and acquisitions: these sometimes result in a change in the fiscal code and a "fake entry" (the data center was already active)
6. Finally, we compute the number of data centers at the commuting zone-year level

We match data centers data with local employment and establishment administrative data:

- **Establishment stock:** 2006-2024
- **Establishments' employment:** 2006-2024 for information on total employment and by industry, 2011/2016/2022 for information on employment types (part/full-time, gender, occupation)

Summary statistics

How many and when

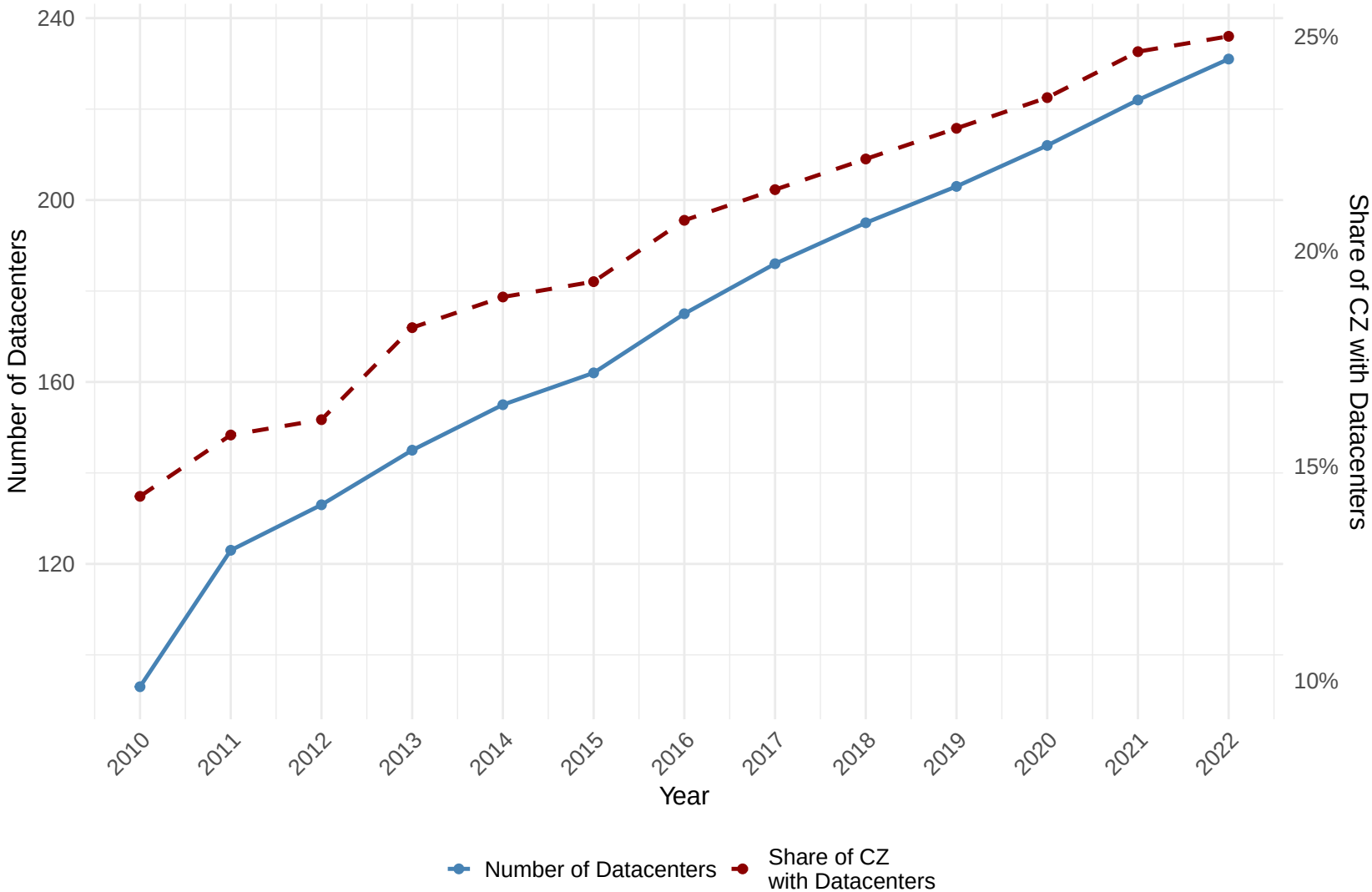

Figure 1: The time series of data centers.

Data Center Presence (2011-2022)

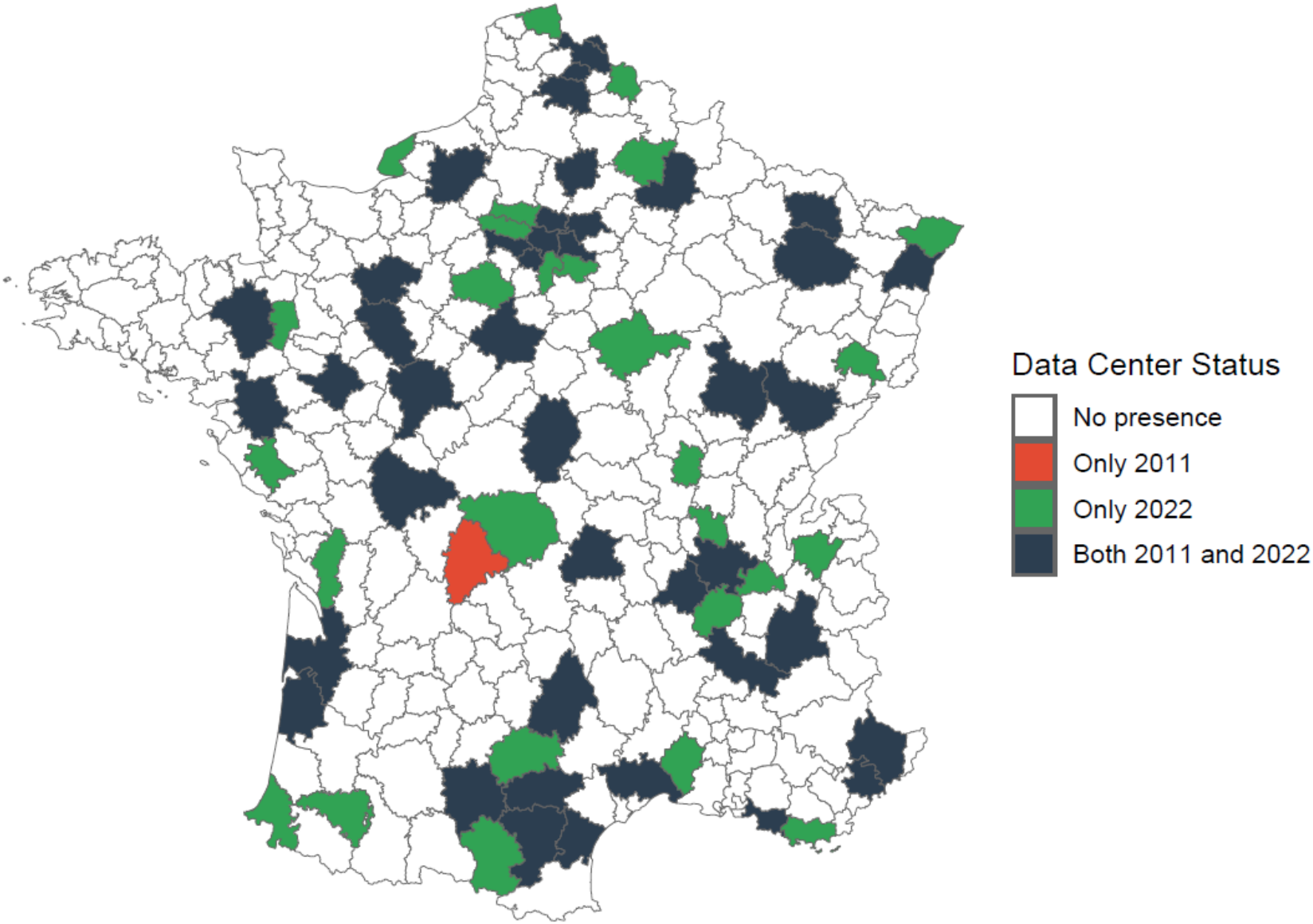

Figure 2: Changes in data center status.

Change in Data Centers (2011-2022)

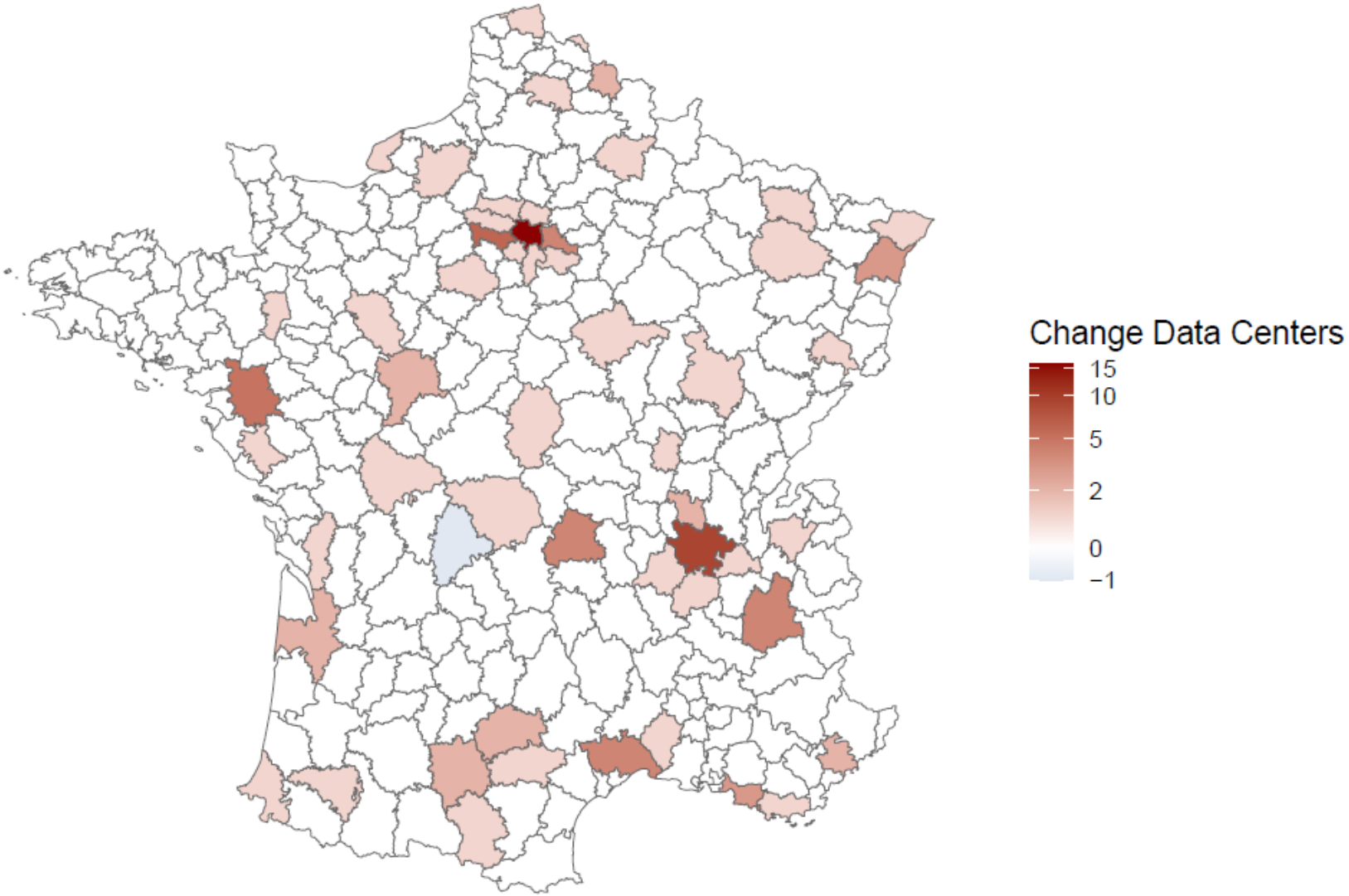

Figure 3: Change in data center number.

Averages

Table 1: Employment Structure in CZ With and Without Data Centers

	(1) All CZ	(2) No DC	(3) Yes DC	(4) Δ Yes DC (also entry) (2022–2011)	(5) Δ Yes DC (alwyas had DC) (2022–2011)
Total Occupations	94,18	51,28	262,03	-20,45%	8,49%
Intellectual Occ.	17,6	6,04	62,82	-8,88%	26,87%
Intermediate Occ.	24,35	12,53	70,57	-20,57%	8,08%
Clerical Occ.	25,43	14,51	68,15	-29,32%	-2,26%
Manual Occ.	19,16	12,87	43,75	-27,16%	-3,93%
Female	45,44	24,68	126,63	-19,58%	9,19%
Male	48,74	26,59	135,4	-21,25%	7,84%
Full-time	78,42	42,21	220,06	-19,59%	9,56%
Part-time	15,56	8,96	41,4	-28,93%	-1,20%
Mining	0,08	0,06	0,13	-29,74%	-10,08%
Manufacturing	9,92	6,82	22,06	-21,06%	-1,03%
Utilities	1,14	0,57	3,36	-23,24%	6,05%
Construction	5,55	3,13	15,02	-14,68%	11,61%
Finance	2,72	0,84	10,09	-30,70%	8,03%
ICT Sector	2,96	0,44	12,81	-13,51%	28,62%
Administrative Sec.	6,36	2,54	21,3	-12,73%	18,84%
Accomod. & Food	3,89	1,84	11,9	-7,88%	24,42%
Trade	11,29	6,01	31,94	-19,98%	8,20%
Real Estate	0,98	0,39	3,27	-21,82%	10,53%
Transport & Storage	4,98	2,26	15,61	-25,48%	5,34%
Prof. & Scient.	4,9	1,54	18,02	-8,26%	28,91%
Public, Health, Educ.	8,17	4,29	23,39	-10,16%	18,35%
Other Services	2,82	1,3	8,8	-23,63%	8,46%

Notes: CZ denotes commuting zones. DC stands for data centers. Values represent levels of employment in columns (1)-(3), measured in thousands of jobs, and changes in employment in columns (4) and (5), measured in percentage growth rates. Differences are computed as 2022 minus 2011 log of the average of CZ having at least one DC.

The employment multiplier of data centers: preliminary results

The empirical specification

We estimate via OLS the following equation:

$$\begin{aligned}\text{Growth Rate}_{i,t0-t1} = & a + \beta_1 \text{Change Data Centers}_{i,t0-t1} + \\ & + \beta_{\mathbf{x}} \mathbf{Controls}_{i,t0} + \text{FE}_r + \epsilon_i\end{aligned} \tag{1}$$

Where i is a commuting zone and $t0$ and $t1$ are the start and end of the period considered:

- $\text{Growth Rate}_{i,t,t-5}$ is the growth rate of employment;
- $\text{Growth Data Centers}_{i,t}$ is the change in the number of data centers;
- $\mathbf{Controls}_{i,t0}$ include the growth rate (log-difference) of establishments and occupations in the 5-years previous period, distinguished by ICT and non-ICT sectors (pre-AI long-run changes in ICT intensity);
- FE_r is a vector of FE for French regions.

The baseline period is 2011-2022

- AI-period started in 2010 (Babina *et al.*, 2024; Fontanelli *et al.*, 2025)
- Robustness checks confirm baseline results

Results - Aggregate

Table 2: Total Employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			2011-2022			2012-2022	2010-2022	2011-2023	2011-2024
Change Data Centers	0.0136***	0.0120***	0.00909***	0.00572**	0.00596***	0.00523***	0.00757***	0.00437***	0.00358**
	(0.00457)	(0.00418)	(0.00185)	(0.00259)	(0.00166)	(0.00178)	(0.00198)	(0.00157)	(0.00161)
Observations	280	280	280	280	280	280	280	280	280
Adjusted R-squared	0.043	0.324	0.571	0.556	0.640	0.634	0.600	0.590	0.571
Region FE		X	X	X	X	X	X	X	X
Controls Estab.			X		X	X	X	X	X
Controls Employm.				X	X	X	X	X	X

Notes: Robust standard errors in parentheses. Region fixed effects are defined at the level of French administrative regions. Establishment controls include the log-difference of establishment in both ICT and non-ICT sectors (separately) between 2006-2011 in Columns (1)-(5) and (8)-(9), between 2007 and 2012 in Column (6), and between 2006 and 2010 in Column (7). Employment controls include the log-difference of employment in both ICT and non-ICT sectors (separately) between 2006-2011 in Columns (1)-(5) and (8)-(9), between 2007 and 2012 in Column (6), and between 2006 and 2010 in Column (7).
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Specification (5) $\rightarrow$ an additional data center is associated to 0.6% increase in employment

Robust across different specifications

Results - Industry

Table 3: Sectoral employment

	(1) Mining	(2) Manuf.	(3) Util.	(4) Construction	(5) Trade	(6) Transp. & Stor.	(7) Accom. & Food
Change Data Centers	0.0197	0.00122	0.000537	0.0102**	-0.00264	-0.00399	0.00663*
	(0.0240)	(0.00338)	(0.00697)	(0.00407)	(0.00240)	(0.00412)	(0.00401)
Observations	280	280	280	280	280	280	280
Adjusted R-squared	0.064	0.448	0.116	0.457	0.463	0.137	0.137
	(8) ICT Services	(9) Finance	(10) Real Est.	(11) Prof., Scient. & Tech.	(12) Admin.	(13) Publ., Health & Educ.	(14) Other Serv.
Change Data Centers	0.0267***	0.000489	-0.000367	0.0215***	0.00715	0.00461**	0.00237
	(0.00978)	(0.00457)	(0.0103)	(0.00625)	(0.00660)	(0.00214)	(0.00358)
Observations	280	280	280	280	280	280	280
Adjusted R-squared	0.213	0.193	0.041	0.202	0.110	0.194	0.083
Region FE	X	X	X	X	X	X	X
Controls Estab.	X	X	X	X	X	X	X
Controls Employm.	X	X	X	X	X	X	X

Notes: Robust standard errors in parentheses. All specifications include region fixed effects, establishment controls, and employment controls. Region fixed effects are defined at the level of French administrative regions. Establishment controls include the 2006-2011 log-difference of establishment in both ICT and non-ICT sectors (separately). Employment controls include the 2006-2011 log-difference of employment in both ICT and non-ICT sectors (separately).
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Increase in employment concentrated in many non-tradable sectors

- Construction, Accomodation and Food, ICT Services, Professional/Scientific/Technical, Public/Health/Education

Results - Type of employment

Table 4: Types of occupations

	(1) Part-time	(2) Full-time	(3) Female	(4) Male	(5) Intellectual	(6) Intermediate	(7) Clerical	(8) Manual
Change Data Centers	0.00544**	0.00492***	0.00394***	0.00804***	0.00868***	-0.00291*	-0.00131	0.00113
	(0.00229)	(0.00180)	(0.00138)	(0.00253)	(0.00272)	(0.00155)	(0.00123)	(0.00159)
Observations	280	280	280	280	280	280	280	280
Adjusted R-squared	0.472	0.679	0.679	0.615	0.481	0.515	0.506	0.463
Region FE	X	X	X	X	X	X	X	X
Controls Estab.	X	X	X	X	X	X	X	X
Controls Employm.	X	X	X	X	X	X	X	X

Notes: Robust standard errors in parentheses. All specifications include region fixed effects, establishment controls, and employment controls. Region fixed effects are defined at the level of French administrative regions. Establishment controls include the 2006-2011 log-difference of establishment in both ICT and non-ICT sectors (separately). Employment controls include the 2006-2011 log-difference of employment in both ICT and non-ICT sectors (separately).
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The differences in legal forms (part/full-time) and gender (male/female) of employment are not statistically different

However, when distinguishing occupations by type of occupation, the relationship remains positive and significant for intellectual professions, negative and significant for intermediate occupations

Conclusions

Conclusions and Next Steps

Our preliminary findings suggest that the opening of data centers has a positive association with changes in employment

- Especially in non-tradable sectors and jobs characterized by advanced skills

Next steps will involve building an identification strategy (IVs, shift-share design, event studies using AI exposure indexes crossed with DC presence for treatment)

Furthermore, access to French micro-data will allow us to:

- Study detailed occupational classes within higher intellectual occupations (e.g., engineers vs. executives, ICT vs. non-ICT engineers)
- Exclude data center employment (direct vs. induced effects)

The location choice of data centers remains an open question (Papadakis & Savona, 2024):

- However, this is key to study if positive employment effects will be confirmed
- We plan to study how complementarities with local water availability, electricity plants, fiber infrastructure, and technical human capital access shape the location choices of data center owners

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