Employment Impacts of the CHIPS Act

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Introduction

- Under Biden, industrial policy underwent a revival in the U.S.
  - Industrial policy was long "submerged," operating especially through defense procurement.
  - Recent round is more self-consciously interventionist.
- CHIPS Act is a key element.
- Motivations:
  - National security.
  - Resilience to shocks (e.g. covid).
  - Creating good, high-paying jobs.
- We focus on employment.
  - Has the act created jobs? How many?
  - Politically salient, in past and probably future.

Introduction (cont.)

- Paper is unusual in trying to evaluate impacts very quickly.
  - Maybe quickly enough to inform policy process.
- Challenge: data constraints.
  - Micro-data on plants not available for a couple of years.
  - Employment available sooner than other data.
  - Most recent QCEW wave: 2025q1 (released 9/9/25).
  - First finalized major CHIPS Award: Nov. 2024.
  - Longer-run idea: compare firms with final awards to firms with Preliminary Memoranda of Terms (PMTs) but no award.
- This paper: county-level difference-in-differences.
  - Counties with semiconductor facility vs. counties with high-tech employment but no semiconductor facility.
  - Counties with semiconductor fabrication facility ("fab") vs. counties with semiconductor facility but no fab.

Main Findings

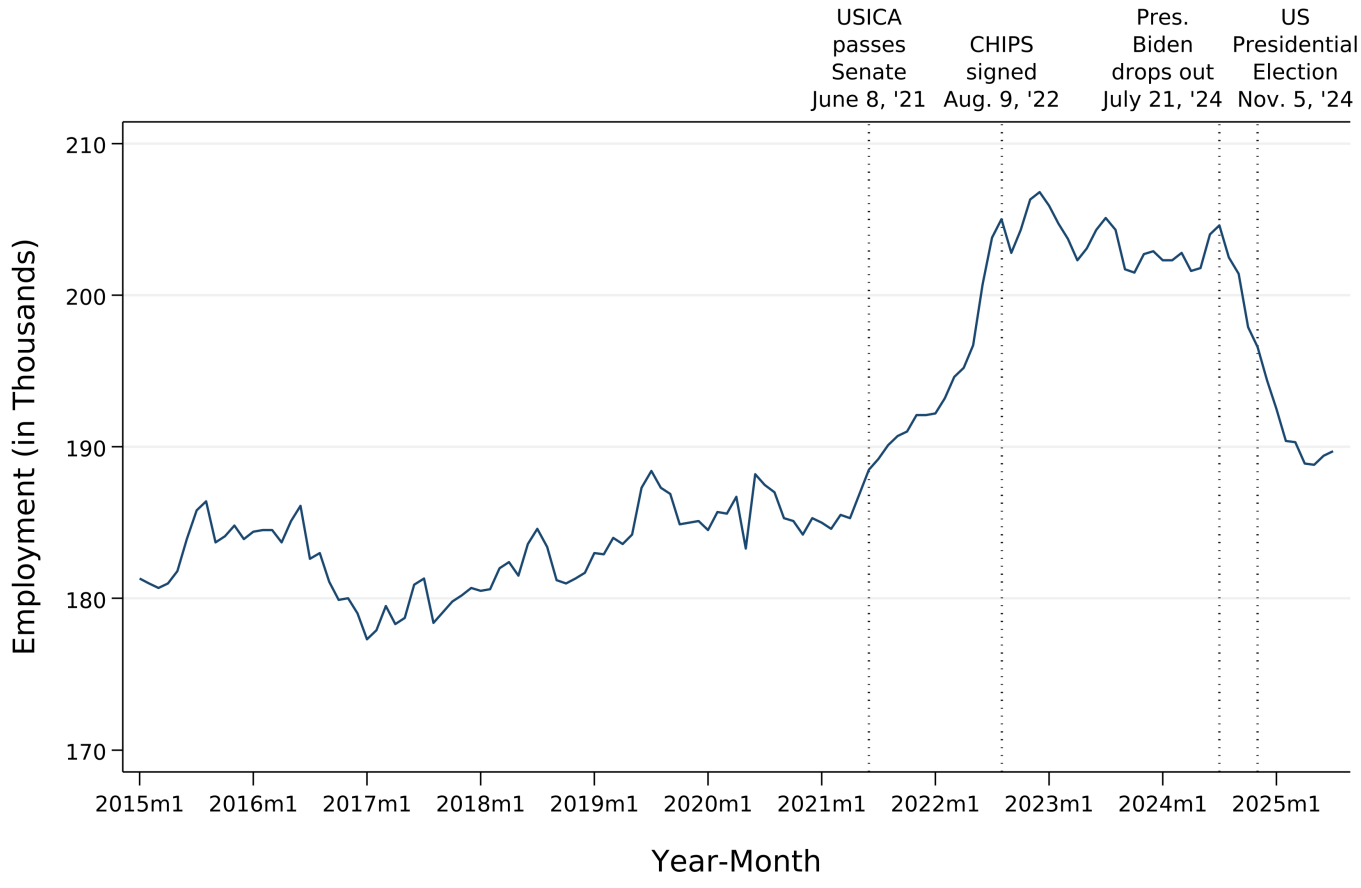
1. Anticipation effects (à la Ramey(2011)).
   - Began with introduction of pre-cursor bill (USICA) in Senate.
   - Bipartisan support evident very early on.
2. Robust employment effects in semiconductors.
   - Direct effect: 110-180 jobs per affected county.
3. Local spillovers on employment in non-residential construction.
   - Indirect effect: 136-203 jobs per affected county.

- Back-of-the-envelope calculations of national effects:
  - Direct effect: 15,000-16,000 jobs.
  - Indirect effect: 28,000-35,000 jobs.
  - Not enormous relative to projected spending of $52.7 billion.
  - But larger than many expected, given industry capital-intensity.

Background

- Components of CHIPS Act:
  - $39 billion: direct subsidies for production of semiconductors and related equipment and materials.
  - $11 billion: R&D funding.
  - 25% investment tax credit.
    - Increased to 35% in July 2025.
- Timing:
  - May-June 2020: Endless Frontiers, CHIPS for Americas Acts introduced.
  - May 18, 2021: US Innovation and Competition Act (USICA) introduced.
  - June 8, 2021: USICA passed Senate 68-32 (with 19 Rep. votes).
  - Feb. 4, 2022: America COMPETES Act passed House.
  - July 27-28, 2022: CHIPS and Science Act passed Senate & House.
  - Aug. 9, 2022: CHIPS and Science Act signed by Biden.
  - Nov. 15, 2024: First major CHIPS Award finalized.

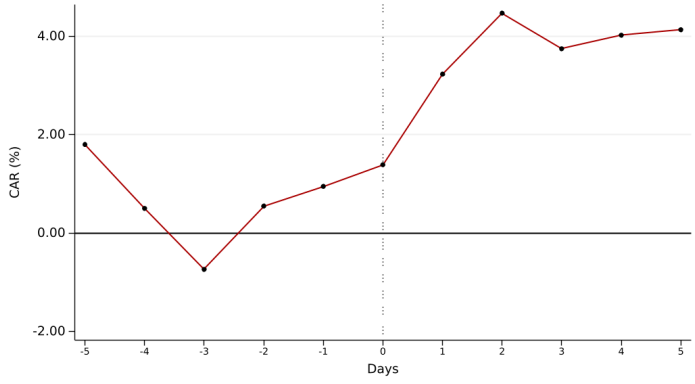
Employment in Semiconductors



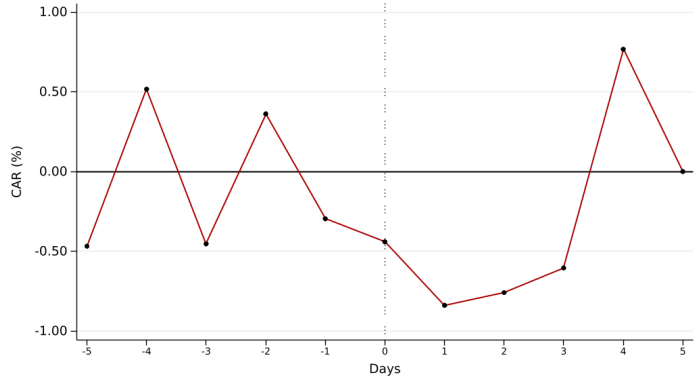
Notes: Figure plots national employmnet in the semiconductor industry (NAICS 334413) from the Current Employment Statistics (National Series).

Stock Market Reaction: Cumulative Abnormal Returns

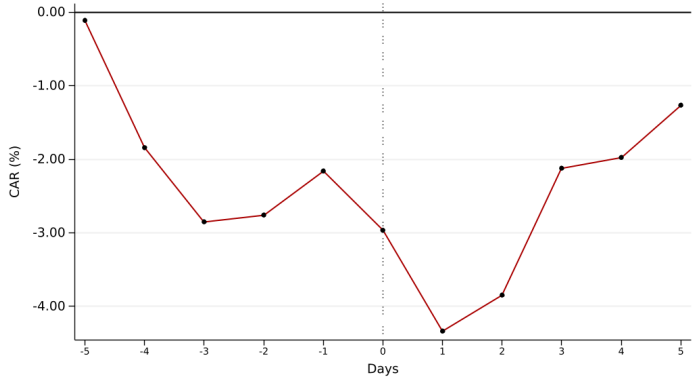
A. May 18, 2021



B. June 8, 2021



C. July 28, 2022



Notes: Cumulative Average Abnormal Returns (CAARs) for 21 seminconductor firms. Abnormal Returns (ARs) calculated by estimating the regression $R_{it} = \gamma_i R_{mt} + \alpha_i + \varepsilon_{it}$, where R_{it} is firm i's return and R_{mt} is the S&P 500's return, over the period 250 days to 30 days before the event, and then defining $AR_{it} = R_{it} - \widehat{\gamma}_i R_{mt} - \widehat{\alpha}_i$ for the indicated event window. The ARs are averaged across firms and summed across event window to get CAARs.

CAARs Table

More Background

- Example of companies' responses: GlobalFoundries, Malta NY
  - July 19, 2021: Press conference with Schumer and Raimondo to announce expansion of existing facility, plans for new facility.
  - CEO Caulfield later told CNBC: "We believe that for economies of scale and the ability to bring capacity online quicker it's better to expand existing facilities."
- Covid chips shortage evident by late 2020 (King et al. 2021).

Industry Employment Plans After USICA Passage

Several companies expressed optimism about forthcoming government support soon after the Senate passed the USICA, even before the House passed its version.

SkyWater Technology (CEO Thomas Sonderman, Q3 2021 Earnings Call, Nov. 3, 2021)

> *"As the country is coalescing around the concept of semiconductor sovereignty, SkyWater plays an increasingly critical role in supporting the vision of reestablishing the U.S. as a technology manufacturing leader... The CHIPS Act received bipartisan support in the Senate, and we remain confident that it will ultimately become law... SkyWater will make a lot of money off the mere fact that there's going to be more innovation, more investment going into R&D... We're talking with the state of Minnesota, both the executive branch as well as the senators and representatives from the U.S. government in terms of how we can accelerate adding capacity into our Minnesota fab so that [we] can resolve some of these near-term supply constraints."*

Follow-up: Around the same time, SkyWater added about 100 jobs at its Bloomington, Minnesota site (Hauser2021).

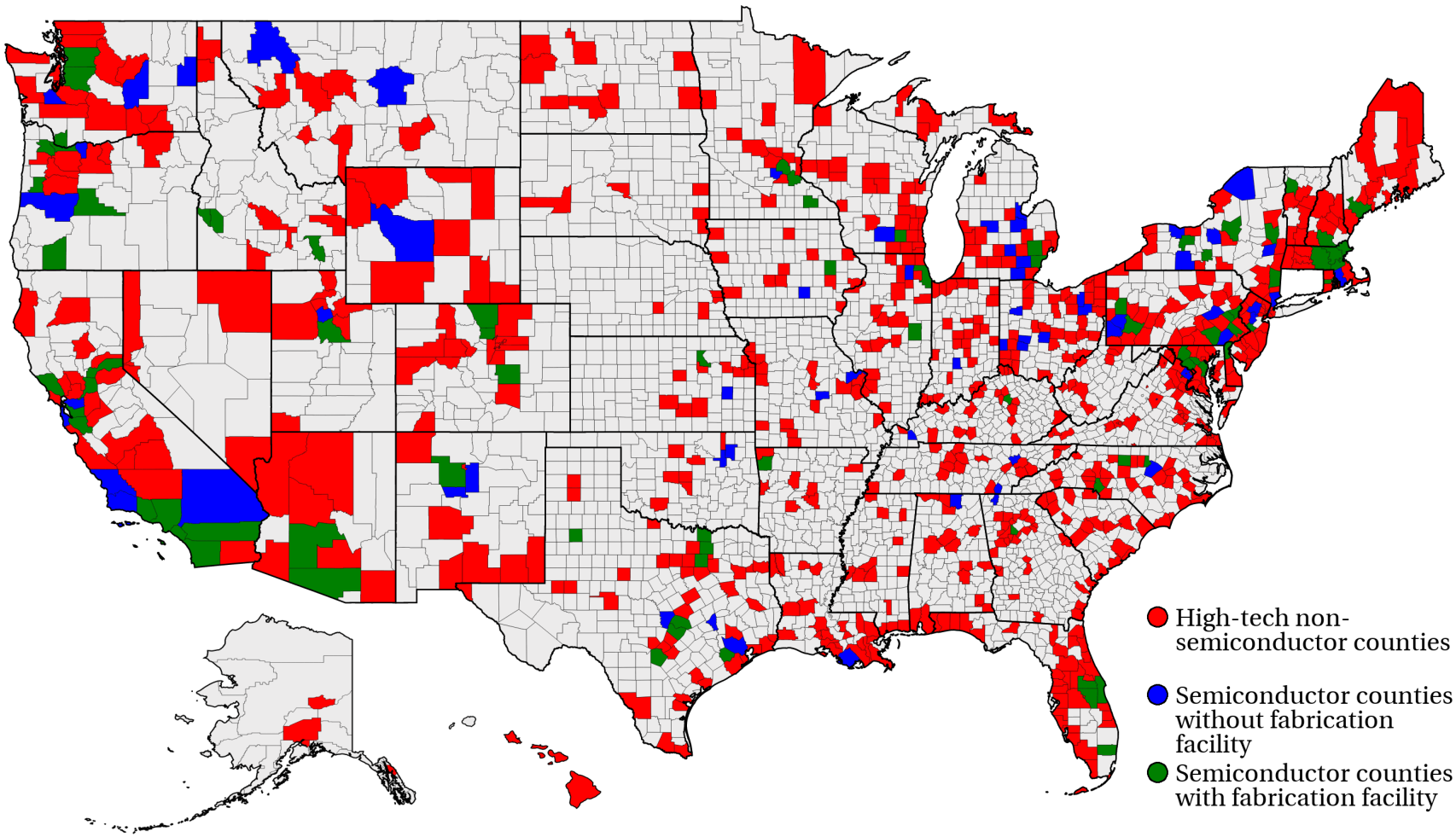
Data

- Main datasets:
  - Quarterly Census of Employment and Wages (QCEW)
    - Draws on administrative records from unemployment systems.
    - 6-digit industry (e.g. NAICS 334413), county, quarter level.
    - Extensive suppression/non-disclosure to preserve confidentiality.
    - Main estimates: impute zeros for missings. Robustness: drop missings.
  - Semiconductor Industry Association (SIA) Ecosystem Map
    - Indicates locations of facilities of members (99% of industry).
    - Indicates type of facility (e.g. production, design, R&D).
- Secondary datasets:
  - Quarterly Workforce Indicators (QWI).
  - Bureau of Economic Analysis (BEA) County GDP series.
  - Current Employment Survey.

Difference-in-Difference Strategies

- Semiconductor vs. high-tech non-semiconductor counties.
  - Treated group: counties with existing, non-university semiconductor facilities. (149 counties.)
  - Control group: counties with >100 employment (total) in 11 4-digit sectors identified by Census Bureau as high-tech. (752 counties.)
- Semiconductor fab vs. fabless counties.
  - Treated group: counties with existing fabrication facility for semiconductors (83 counties.)
  - Control group: counties with existing semiconductor facility but no fab (66 counties).

Treatment and Control Groups



Source: Semiconductor Industry Association's (SIA) U.S. Semiconductor Ecosystem Map. Counties with employment >100 in 11 high-tech sectors (defined by Census Bureau (2024)) but no private semiconductor production facility ("non-semiconductor counties") are marked in red. Counties with a semiconductor fabrication facility ("fab counties") are marked in green. Counties with a semiconductor facility but no fabrication facility ("fabless counties") are marked in blue.

Specifications

- Simple D-in-D:

$$Y_{it} = \mu + \alpha_i + \gamma_t + \beta \cdot \text{Treated}_i \cdot \text{Post}_t + \varepsilon_{it}$$

- D-in-D event study:

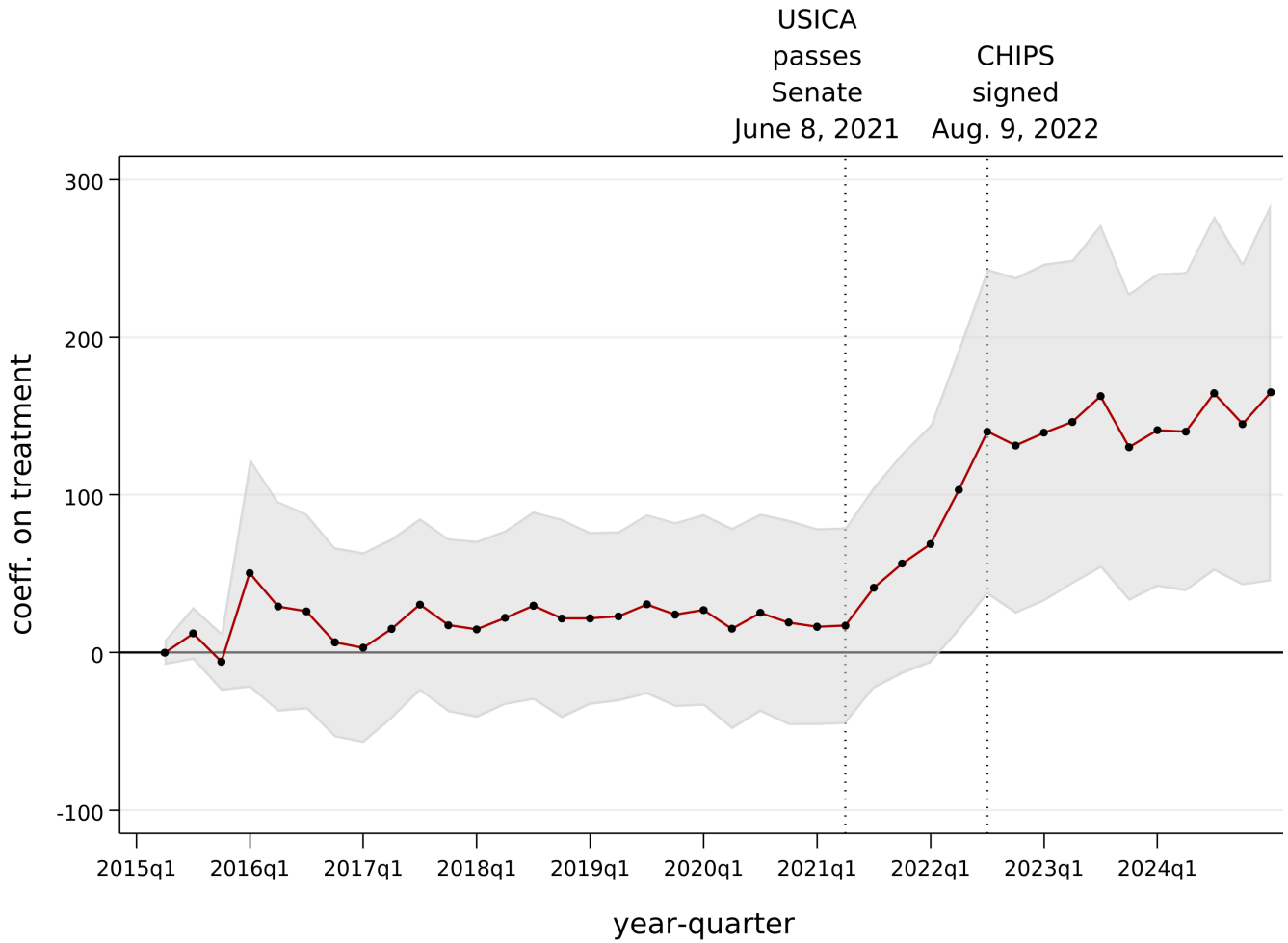
$$Y_{it} = \mu + \alpha_i + \gamma_t + \sum_{\tau=2015q2}^{2024q4} \beta_\tau \cdot D_{i,t}^{\tau} + \varepsilon_{it}$$

- Synthetic D-in-D (Arkhangelsky et al. 2021):

$$\left(\hat{\beta}, \hat{\mu}, \hat{\alpha}, \hat{\gamma}\right) = \underset{\beta,\mu,\alpha,\gamma}{\arg\min} \left\{ \sum_{i=1}^{n} \sum_{t=2015q1}^{2024q4} \left(Y_{it} - \mu - \alpha_i - \gamma_t - W_{it}\beta\right)^2 \hat{\omega}_i \hat{\lambda}_t \right\}$$

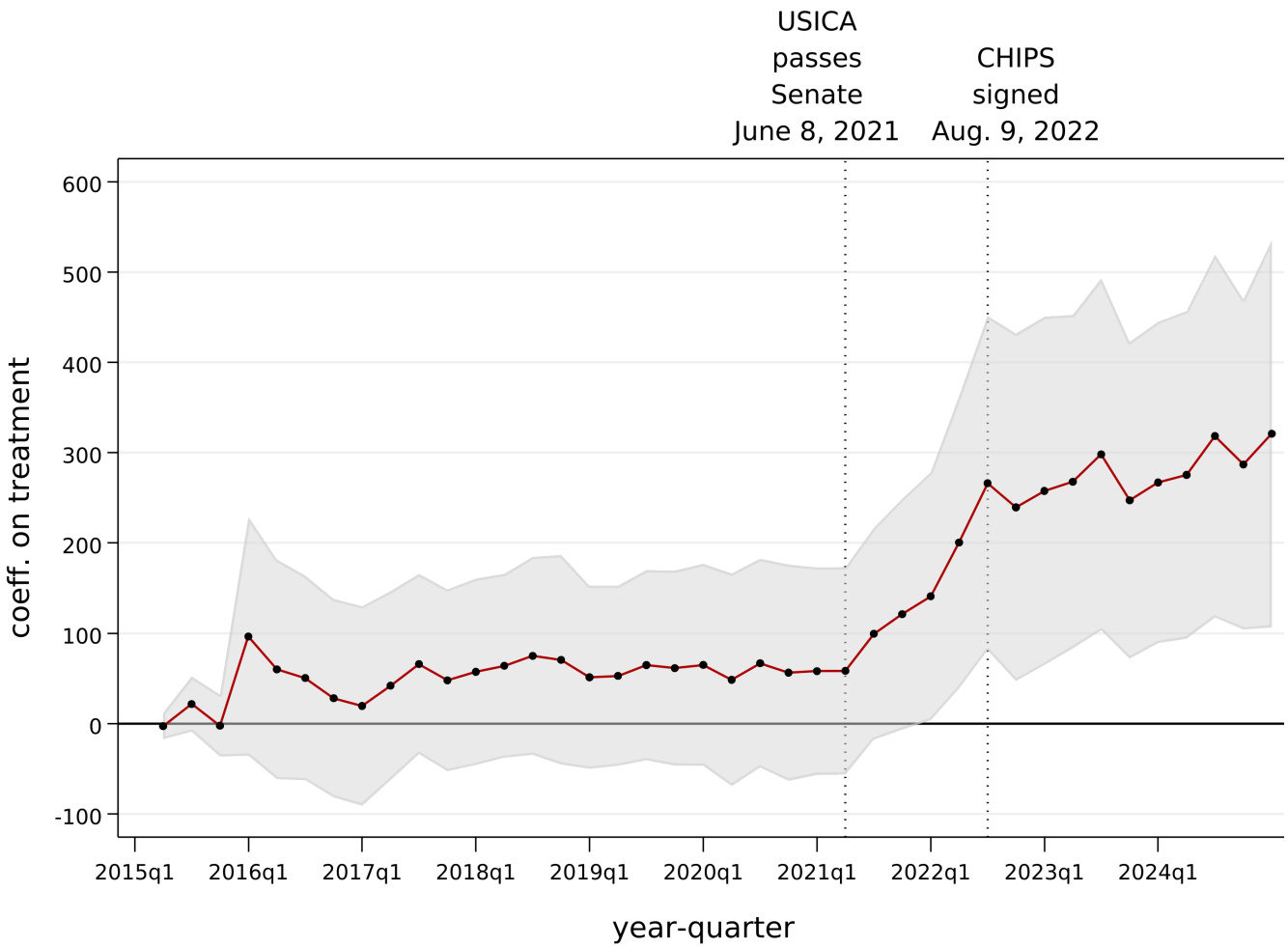
- Key assumption: Treatment & control groups (possibly with reweighting) would have been on parallel trends in absence of CHIPS.

Employment, Simple D-in-D, Semi vs High-Tech



Notes: Event-study specification. Outcome is the number of workers employed in the semiconductor sector (NAICS industry code 334413). Source is QCEW 6-digit data. Sample includes all counties with at least 100 workers in 11 high-tech sectors, as defined in Census Bureau (2024), as of 2021Q1. Shaded area is 95% confidence interval. Standard errors are clustered at the county level.

Employment, Simple D-in-D, Fab vs Fabless



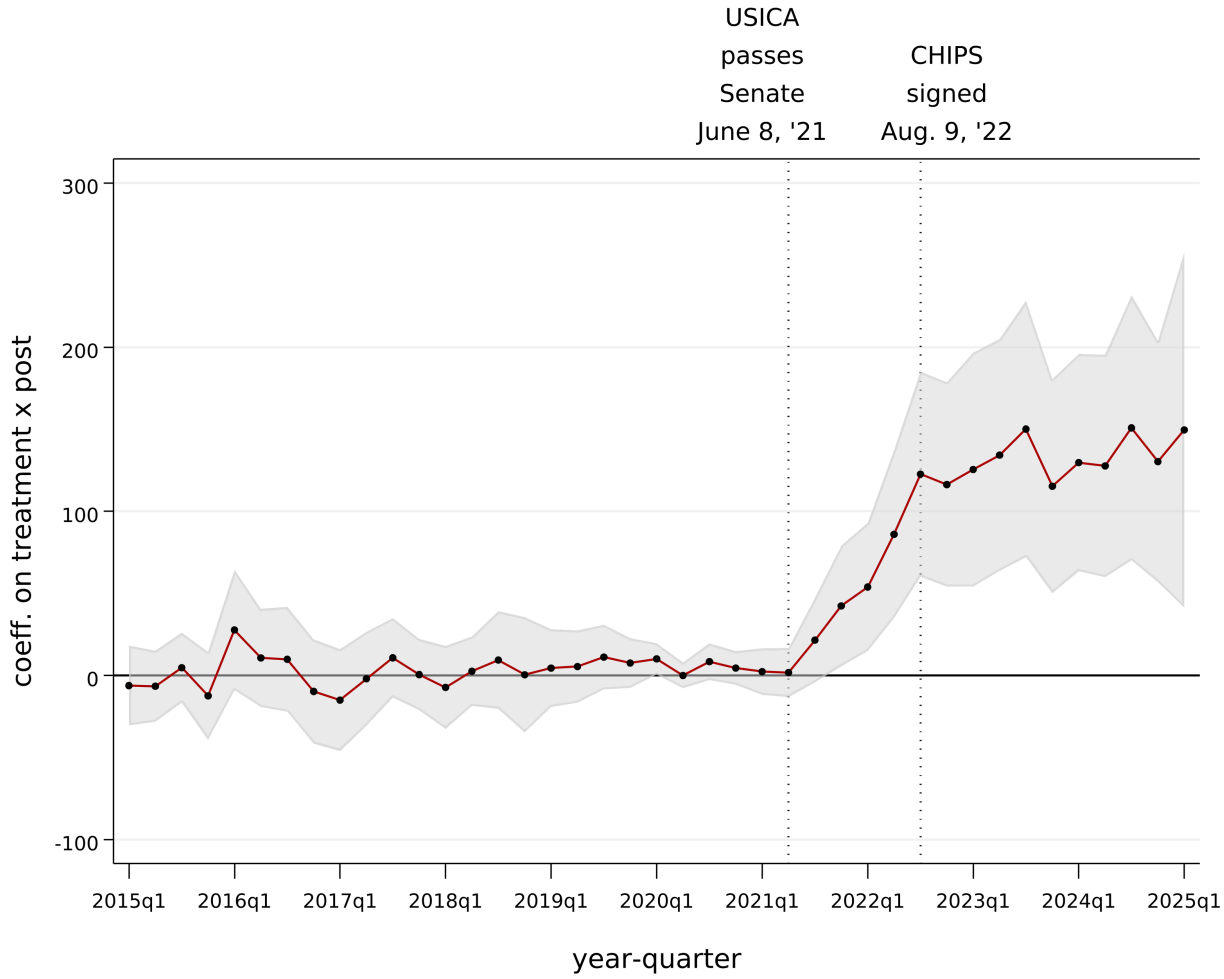
Notes: Event-study specification. Outcome is the number of workers employed in the semiconductor sector (NAICS industry code 334413). Source is QCEW 6-digit data. Treated counties are ones that have a semiconductor production facility; control counties are ones that have a semiconductor facility but not a production facility (e.g., are fabless). Shaded area is 95% confidence interval. Standard errors are clustered at the county level.

Employment in Semiconductors: Simple DID

	Semiconductor production employment (1)	Semiconductor equipment & materials employment (2)	Semiconductor production, equipment & materials employment (3)
Panel A: Semiconductor vs. Non-Semiconductor Counties			
Treated x Post-USICA	106.09***	34.81**	140.90***
	(39.90)	(16.82)	(50.17)
Observations	36941	36941	36941
Pre-USICA outcome mean (treated counties)	868.7	165.3	1034.0
County FE	Y	Y	Y
Year-Quarter FE	Y	Y	Y
Panel B: Fab vs. Fabless Counties			
Treated x Post-USICA	191.35***	78.53**	269.88***
	(70.80)	(31.21)	(88.81)
Observations	6109	6109	6109
Pre-USICA outcome mean (treated counties)	1523.6	239.4	1763.0
County FE	Y	Y	Y
Year-Quarter FE	Y	Y	Y

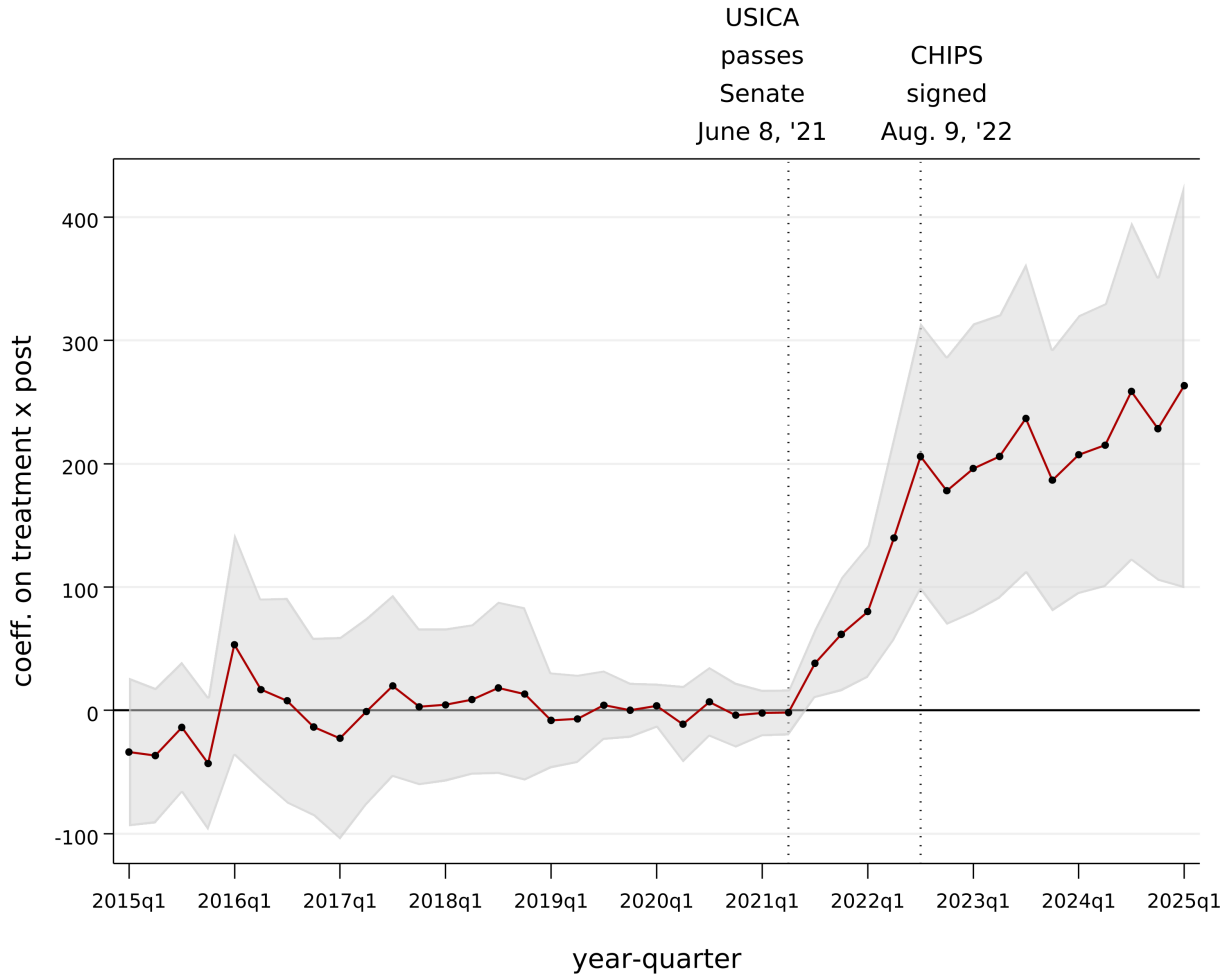
Notes: QCEW 6-digit data 2015Q1-2025Q1. Outcome in Column 1 is the number of workers employed in the semiconductor sector (NAICS industry code 334413). Outcome in Column 2 is the number of workers employed in the manufacturing of equipment (NAICS 333242) or material inputs (NAICS 325120, 325180) for semiconductors. Outcome in Column 3 is the number of workers employed in either the semiconductor industry or the manufacturing of equipment (NAICS 333242) or material inputs (NAICS 325120, 325180) for semiconductors. Standard errors clustered at county level. *p $<$0.10; **p $<$0.05; ***p $<$0.01.

Employment, Synthetic D-in-D, Semi vs High-Tech



Notes: QCEW 6-digit data. Outcome is the number of workers employed in the semiconductor sector (NAICS industry code 334413). Estimated treatment effects produced by implementing the event-study estimator proposed by Clarke et al. (2024). Sample includes all counties with at least 100 workers in 11 high-tech sectors, as defined in Census Bureau (2024), as of 2021Q1. Shaded area is confidence interval at the 95% level. Standard errors are clustered at the county level.

Employment, Synthetic D-in-D, Fab vs Fabless



Notes: QCEW 6-digit data. Outcome is the number of workers employed in the semiconductor sector (NAICS industry code 334413). Estimated treatment effects produced by implementing the event-study estimator proposed by Clarke et al. (2024). Treated counties are ones that have a semiconductor production facility; control counties are ones that have a semiconductor facility but not a production facility (e.g., are fabless). Shaded area is confidence interval at the 95% level. Standard errors are clustered at the county level.

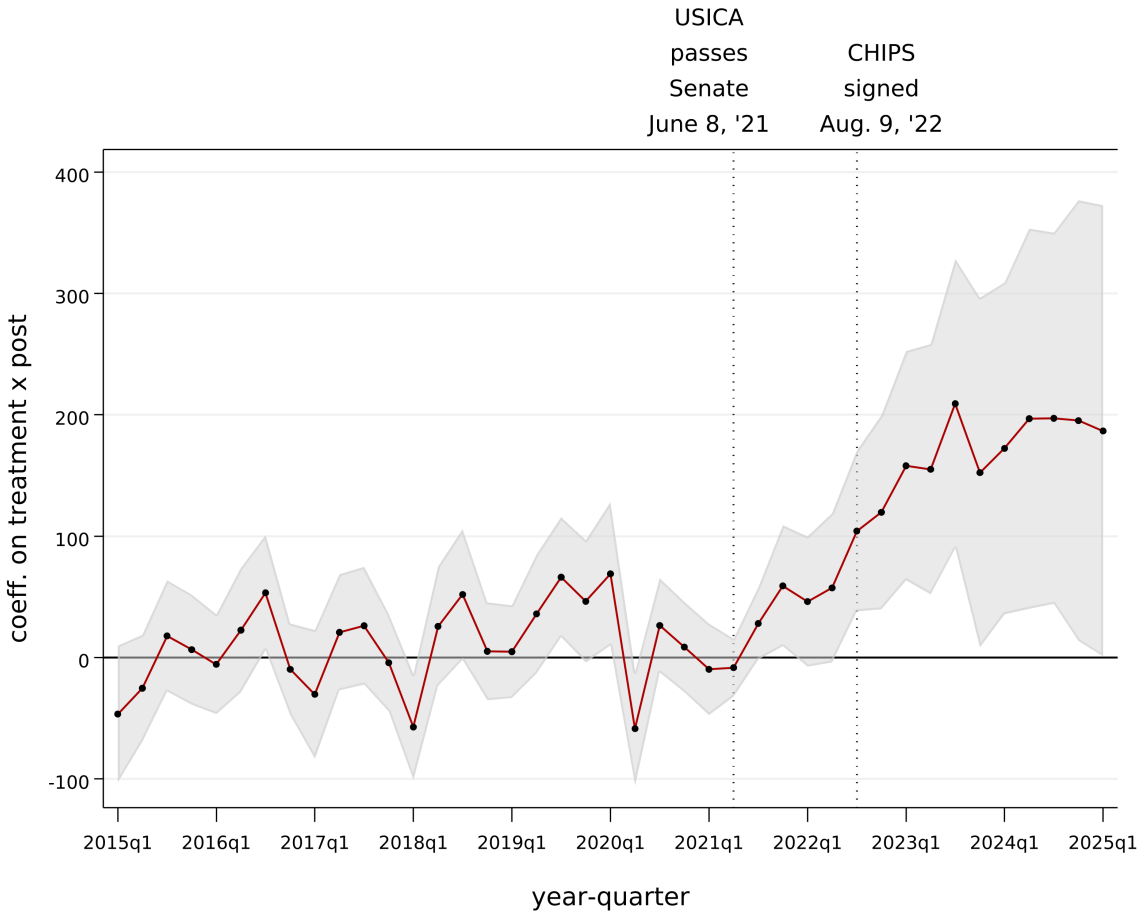
Employment in Semiconductors: Synthetic DID

	Semiconductor production employment (1)	Semiconductor equipment & materials employment (2)	Semiconductor production, equipment & materials employment (3)
Panel A: Semiconductor vs. Non-Semiconductor Counties			
Treated x Post-USICA	110.41***	15.75	124.08***
	(35.19)	(12.00)	(38.53)
Observations	36941	36941	36941
Pre-USICA outcome mean (treated counties)	868.7	165.3	1034.0
Panel B: Fab vs. Fabless Counties			
Treated x Post-USICA	180.13***	27.27	210.94***
	(52.48)	(18.31)	(64.34)
Observations	6109	6109	6109
Pre-USICA outcome mean (treated counties)	1523.6	239.4	1763.0

Notes: QCEW 6-digit data 2015Q1-2025Q1. Outcome in Column 1 is the number of workers employed in the semiconductor sector (NAICS industry code 334413). Outcome in Column 2 is the number of workers employed in the manufacturing of equipment (NAICS 333242) or material inputs (NAICS 325120, 325180) for semiconductors. Outcome in Column 3 is the number of workers employed in either the semiconductor industry or the manufacturing of equipment (NAICS 333242) or material inputs (NAICS 325120, 325180) for semiconductors. Standard errors clustered at county level. *p $<$0.10; **p $<$0.05; ***p $<$0.01.

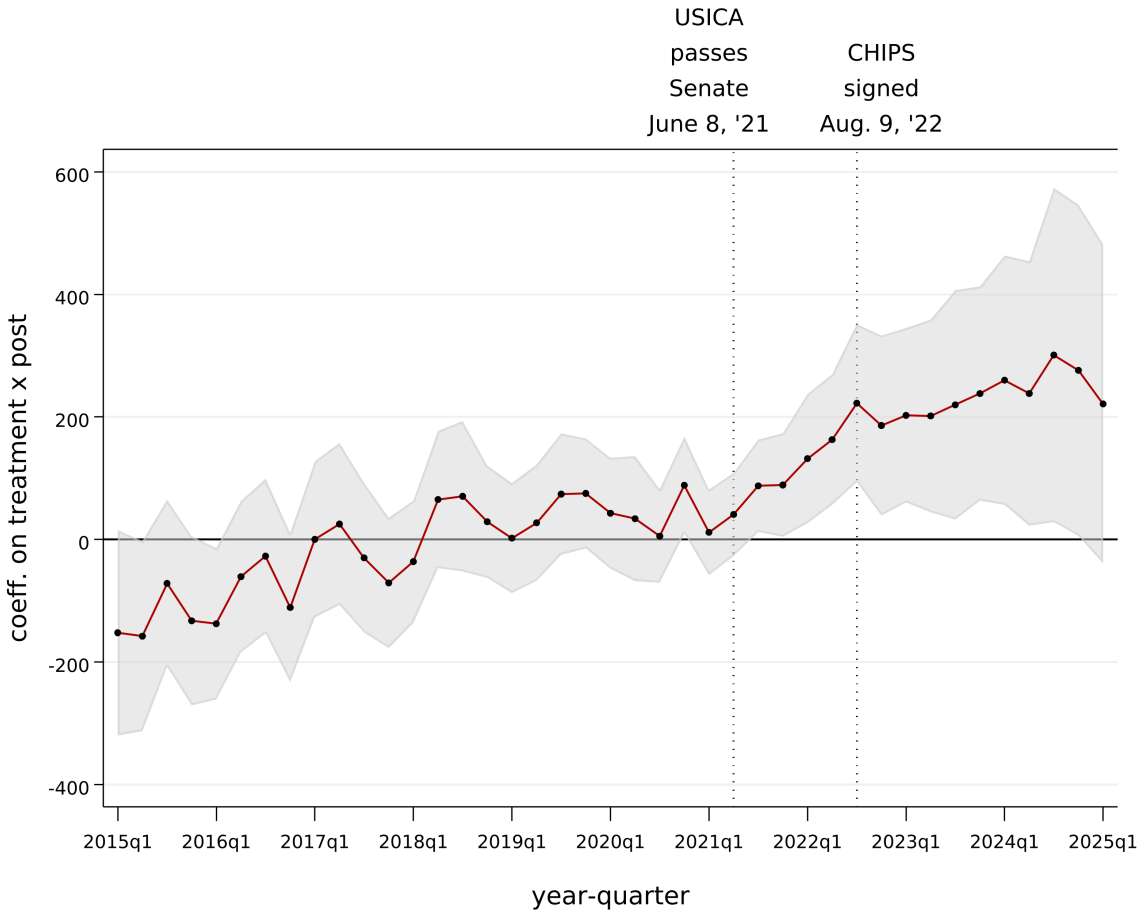
Additional robustness

Non-Residential Construction, Synthetic DID, Semi vs High-Tech



Notes: Synthetic difference-in-difference (SDID) specification. Outcome is the number of workers employed in either industrial building construction (NAICS 236210) or commercial and institutional building construction (NAICS 236220). Source is QCEW 6-digit data. Sample includes all counties with at least 100 workers in 11 high-tech sectors, as defined in Census Bureau (2024), as of 2021Q1. The shaded area represents the confidence interval at the 95% level.

Non-Residential Construction, Synthetic DID, Fab vs. Fabless



Notes: Synthetic difference-in-difference (SDID) specification. Outcome is the number of workers employed in either industrial building construction (NAICS 236210) or commercial and institutional building construction (NAICS 236220). Source is QCEW 6-digit data. Treated counties are ones that have a semiconductor production facility; control counties are ones that have a semiconductor facility but not a production facility (e.g. are fabless). The shaded area represents the confidence interval at the 95% level.

Weekly Wages in Semiconductors, Synthetic DID

	Semiconductor production employment (1)	Semiconductor equipment & materials employment (2)	Semiconductor production, equipment & materials employment (3)
Panel A: Semiconductor vs. Non-Semiconductor Counties			
Treated x Post-USICA	223.48**	95.39**	199.97**
	(91.05)	(47.41)	(79.84)
Observations	36941	36941	36941
Pre-USICA outcome mean (treated counties)	829.2	411.0	931.0
Panel B: Fab vs. Fabless Counties			
Treated x Post-USICA	166.22	77.75	234.75*
	(144.59)	(77.49)	(140.20)
Observations	6109	6109	6109
Pre-USICA outcome mean (treated counties)	1085.7	535.7	1191.4

Notes: Post-USICA indicator identifies quarters after USICA passed in the U.S. Senate (2021Q3 or later). Outcome in Column 1 is the average weekly wage for workers employed in the semiconductor sector (NAICS industry code 334413). Outcome in Column 2 is the average weekly wage for workers employed in either the manufacturing of equipment (NAICS 333242) or material inputs (NAICS 325120, 325180) for semiconductors. Outcome in Column 3 is the average weekly wage for workers employed in either the semiconductor industry or the manufacturing of equipment or material inputs for semiconductors. The pre-USICA outcome mean is the outcome mean for treated counties for the 2015Q1-2021Q2 period. *p $<$0.10; **p $<$0.05; ***p $<$0.01.

Local Spillovers, Synthetic D-in-D

	Semiconductor inputs employment (1)	Non-residential construction employment (2)	Total county employment (3)	County GDP (00,000s USD) (4)
Panel A: Semiconductor vs. Non-Semiconductor Counties				
Treated x Post-USICA	53.81**	135.78**	-2246.02	-4.59
	(25.69)	(56.64)	(2643.47)	(5.06)
Observations	36941	36941	36941	7920
Pre-USICA outcome mean (treated counties)	1067.6	1800.1	307465.5	590.9
Panel B: Fab vs. Fabless Counties				
Treated x Post-USICA	-48.10	202.61**	8503.87*	13.20
	(55.70)	(101.87)	(5089.69)	(8.49)
Observations	6109	6109	6109	1314
Pre-USICA outcome mean (treated counties)	1516.4	2058.4	386371.7	706.2

Estimates are from synthetic difference-in-difference (SDID) specification, equation (1) in text. Post-USICA indicator identifies quarters after USICA passed in the U.S. Senate (2021Q3 or later). Outcome in Column 1 is the aggregate number of workers employed in the input sectors for semiconductors (NAICS codes 331410, 334418, 334412, 334416, 334417, 334419, 326112, 326113, 334118, 334515 and 811310.). Outcome in Column 2 is the number of workers employed in non-residential construction building construction (NAICS 541713 and 541715). Outcome in Column 3 is the total county employment (All 6-digit NAICS industries aggregated). The pre-USICA outcome mean is the outcome mean for treated counties for the 2015Q1-2021Q1 period. Outcome in Column 4 is the yearly county GDP in hundred thousands of chained US dollars (from the Bureau of Economic Analysis, available only through 2023; data can be accessed at `https://apps.bea.gov/regional/downloadzip.htm`). *p $<$0.10; **p $<$0.05; ***p $<$0.01.

Aggregation

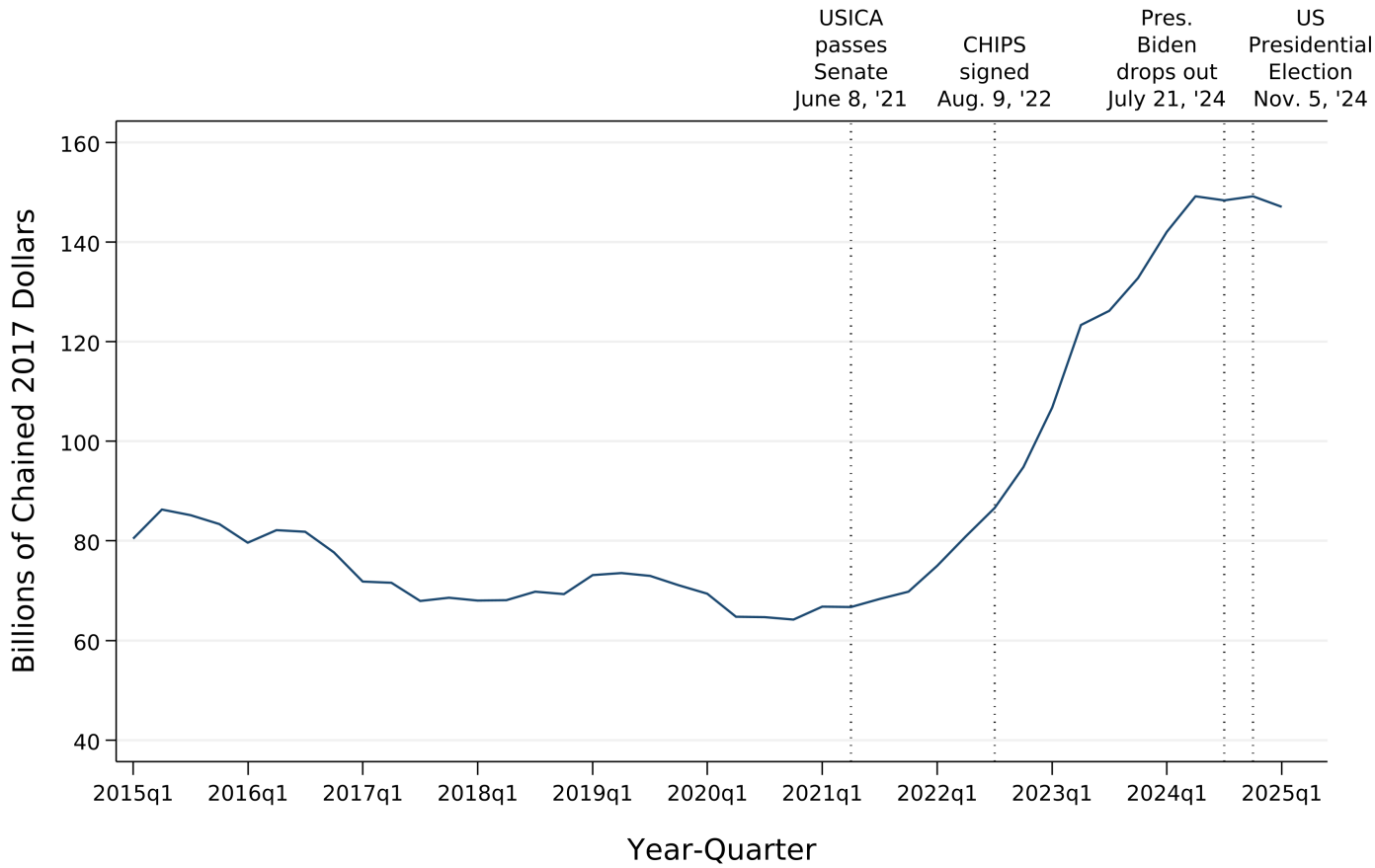
- D-in-D estimates *relative* impacts.
- Part of absolute impact of CHIPS may be absorbed by intercept term ("missing intercept" problem).
- Most widely accepted solution is to structurally estimate a model of macro-economy, which is beyond the scope of our paper.
- Following Chodorow-Reich (2020), we argue that scaled-up D-in-D is reasonable estimate of aggregate effect in our setting.
  - Counties are small relative to macro-economy.
  - Labor mobility between treated and control counties within semiconductors is likely small.
  - CHIPS funding is modest relative to macro-economy.
- Scaling up D-in-D estimate gives a similar increase observable in raw time-series data.
  - Estimate from raw time series: 18,000.
  - Estimate from scaling up D-in-D estimate (semi vs. high-tech): 14,490-16,390.

Conclusion

- Main findings:
  1. Strong anticipation effects.
  2. Robust positive impacts on semiconductor employment.
  3. Spillover effects on employment in non-residential construction.
- Employment impacts (from semi vs high-tech strategy):
  - Direct: 15,000-16,000 jobs.
  - Indirect: 28,000-35,000 jobs.
- Need more research ...
  - ... on other outcomes (output, productivity, profits).
  - ... on longer-term impacts.

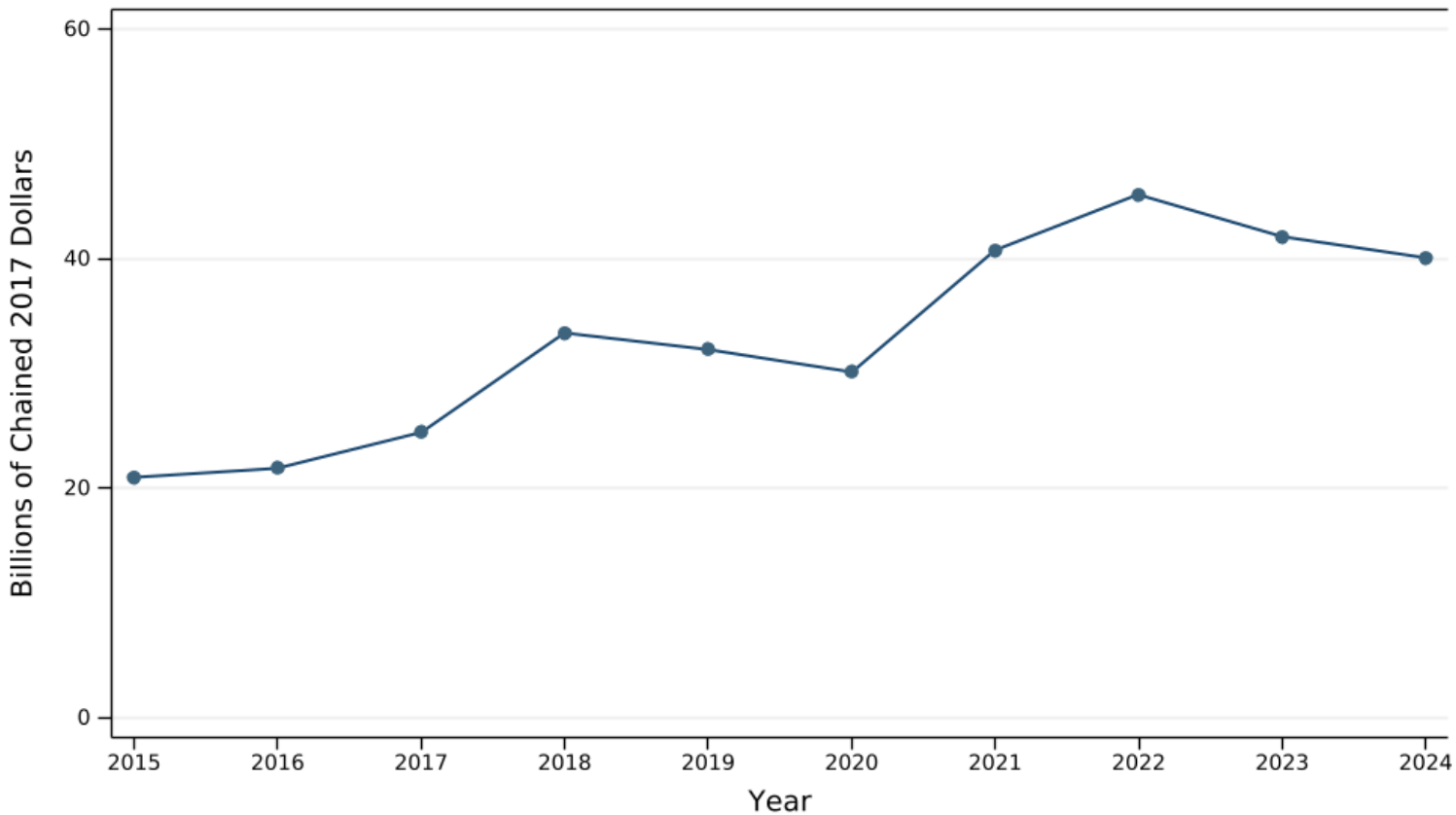
  Will have to wait for data (e.g. Annual Survey of Manufacturers) to become available.
- CHIPS Act raises important issues about design of industrial policy:
  - Targeted subsidies vs. tax credits?
  - How can government claim part of upside?
  - Should social policy be embedded in industrial policy?

Real Private Fixed Investment in Nonresidential Manufacturing Structures



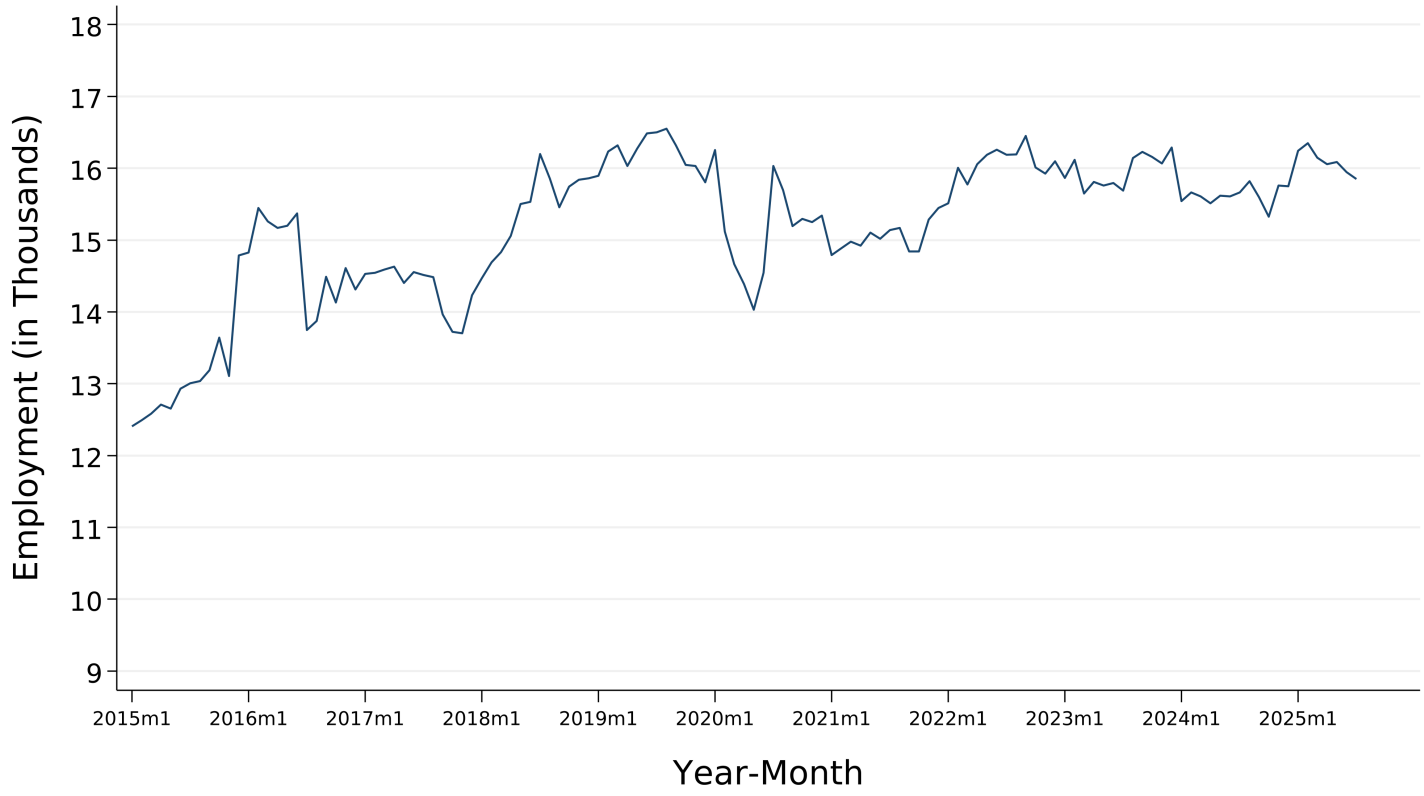
Notes: Source is U.S. Bureau of Economic Analysis, Gross Private Domestic Investment and Capital Transfers: Private Fixed Investment in Structures by Type, Chained dollars: Manufacturing. Data are seasonally adjusted and annualized (by BEA). The dotted vertical lines indicate (from left to right) Q2 of 2022, when the USICA was passed; Q3 of 2022 when the CHIPS Act and Inflation Reduction Act (IRA) were passed; Q3 of 2024, when Biden dropped out of the presidential race; and Q4 of 2024 when the presidential election occurred. Y-axis is investment per quarter. Data can be accessed at `https://apps.bea.gov/iTable/?isuri=1&reqid=19&step=4&categories=flatfiles&`

Real Purchases of Property, Plant and Equipment



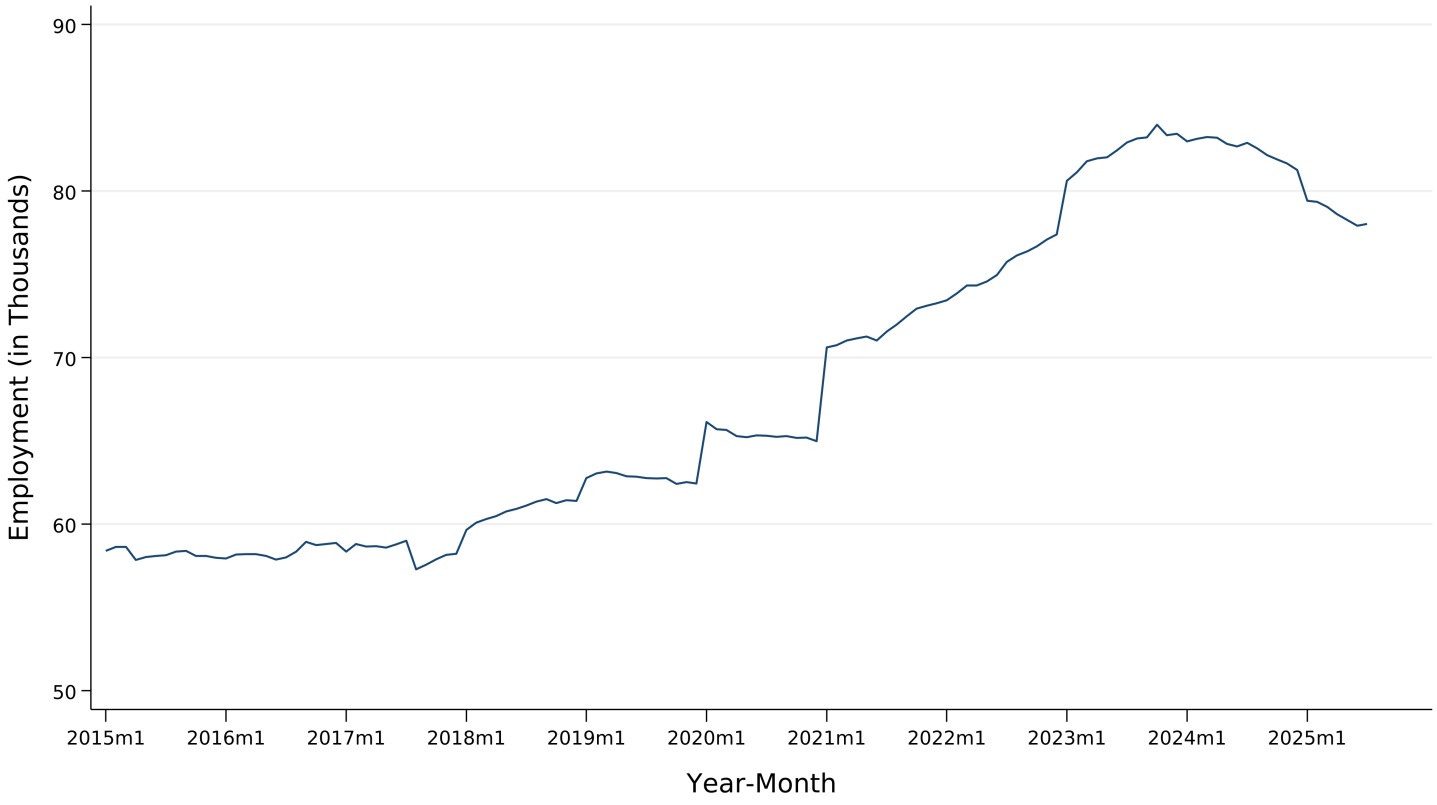
Notes: Source is Security and Exchange Commission Form 10-K filings by semiconductor firms. Following the Semiconductor Industry Association, the following firms are included: Akoustis, AMD, Analog Devices, Broadcom, Cirrus Logic, Global Foundaries, Intel, Lattice Semiconductor, Littelfuse, Luminar, Marvell, Microchip, Micron, Nvidia, ONSEMI, Qorvo, Qualcomm, Silicon Labs, Skywater, SkyWorks, Texas Instruments, Western Digital, and Wolfspeed. The y-axis variable is total purchases of property, plant and equipment for the above firms in billions of 2017 dollars. The 10-K forms report purchases for entire calendar year; 2021 thus includes more than six months following the Senate passage of USICA on June 8, 2021.

Employment in Semiconductors: Canada



Notes: Source is Survey of Employment, Payroll and Hours (SEPH) conducted by Statistics Canada, for semiconductor and other electronic component manufacturing (NAICS 3344). Data can be accessed at `https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1410020101`

Employment in Electronic Components: Germany



Notes: Source is Monthly Report on Manufacturing, generated by the Federal Statistical Office of Germany (Statisches Bundesamt), for industry WZ 2611: Manufacture of Electronic Components (equivalent of ISIC rev 4 industry 2610). Data can be accessed at `https://www-genesis.destatis.de/datenbank/online/url/937eb0e8`.

Cumulative Abnormal Returns

Event Window								
(-1,1)			(-3,3)			(-5,5)		
CAAR	SE	p-val	CAAR	SE	p-val	CAAR	SE	p-val
Panel A: USICA Introduction (May 18, 2021)								
0.0273***	0.4848	0.0000	0.0338***	0.4002	0.0000	0.0430***	0.4698	0.0000
Panel B: USICA Senate Passage (June 8, 2021)								
-0.0117***	0.5856	0.0070	-0.0105	0.6266	0.1440	0.0014	0.6169	0.5490
Panel C: CHIPS Senate Passage (July 28, 2022)								
-0.0152	1.5295	0.1580	-0.0016	0.9623	0.6600	-0.0107	0.9821	0.3940

Notes: Cumulative Average Abnormal Returns (CAARs) around major semiconductor policy events are calculated as follows (using the Stata estudy command). We first calculate Abnormal Returns (ARs) by estimating the regression $R_{it} = \gamma_i R_{mt} + \alpha_i + \varepsilon_{it}$, where R_{it} is firm i's return and R_{mt} is the S&P 500's return, over the period 250 days to 30 days before the event, and then defining $AR_{it} = R_{it} - \widehat{\gamma}_i R_{mt} - \widehat{\alpha}_i$ for the indicated event window. The ARs are averaged across firms and then summed across the event window to get CAARs. Inference is based on the Boehmer–Musumeci–Poulsen (BMP) test. Windows are indicated in days. The sample excludes Global Foundries and Skywater, who began trading on October 28, 2021 and April 21, 2021, respectively. *p <0.10; **p <0.05; ***p <0.01.

Return Sample

Employment in Semiconductors: Simple DID, No Imputation

	Semiconductor production employment (1)	Semiconductor equipment & materials employment (2)	Semiconductor production, equipment & materials employment (3)
Panel A: Semiconductor vs. Non-Semiconductor Counties			
Treated x Post-USICA	176.68**	68.04**	244.72**
	(75.98)	(33.37)	(97.15)
Observations	27157	27157	27157
Pre-USICA outcome mean (treated counties)	1596.5	287.8	1884.3
County FE	Y	Y	Y
Year-Quarter FE	Y	Y	Y
Panel B: Fab vs. Fabless Counties			
Treated x Post-USICA	374.80**	190.15***	564.95***
	(157.47)	(66.03)	(196.92)
Observations	3314	3314	3314
Pre-USICA outcome mean (treated counties)	3161.4	471.8	3633.2
County FE	Y	Y	Y
Year-Quarter FE	Y	Y	Y

Notes: QCEW 6-digit data 2015Q1-2025Q1. Outcome in Column 1 is the number of workers employed in the semiconductor sector (NAICS industry code 334413). Outcome in Column 2 is the number of workers employed in the manufacturing of equipment (NAICS 333242) or material inputs (NAICS 325120, 325180) for semiconductors. Outcome in Column 3 is the number of workers employed in either the semiconductor industry or the manufacturing of equipment (NAICS 333242) or material inputs (NAICS 325120, 325180) for semiconductors. Standard errors clustered at county level. County-industry-quarters with data suppressed for confidentiality are omitted from regressions. *p $<$0.10; **p $<$0.05; ***p $<$0.01.

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Employment in Semiconductors: Simple DID, Post-CHIPS

	Semiconductor production employment (1)	Semiconductor equipment & materials employment (2)	Semiconductor production, equipment & materials employment (3)
Panel A: Semiconductor vs. Non-Semiconductor Counties			
Treated x Post-CHIPS	127.54***	36.09**	163.63***
	(46.91)	(18.25)	(58.00)
Observations	31535	31535	31535
Pre-USICA outcome mean (treated counties)	868.7	165.3	1034.0
County FE	Y	Y	Y
Year-Quarter FE	Y	Y	Y
Panel B: Fab vs. Fabless Counties			
Treated x Post-CHIPS	229.12***	82.93**	312.05***
	(83.15)	(34.25)	(102.71)
Observations	5215	5215	5215
Pre-USICA outcome mean (treated counties)	1523.6	239.4	1763.0
County FE	Y	Y	Y
Year-Quarter FE	Y	Y	Y

Notes: QCEW 6-digit data 2015Q1-2025Q1. Post-CHIPS indicator identifies quarters after CHIPS passed in the U.S. House (2022Q4 or later). Quarters from 2021Q3-2022Q3 are omitted. Outcome in Column 1 is the number of workers employed in the semiconductor sector (NAICS industry code 334413). Outcome in Column 2 is the number of workers employed in the manufacturing of equipment (NAICS 333242) or material inputs (NAICS 325120, 325180) for semiconductors. Outcome in Column 3 is the number of workers employed in either the semiconductor industry or the manufacturing of equipment (NAICS 333242) or material inputs (NAICS 325120, 325180) for semiconductors. Standard errors clustered at county level. *p $<$0.10; **p $<$0.05; ***p $<$0.01.

Employment in Semiconductors: Synthetic DID, Post-CHIPS

	Semiconductor production employment (1)	Semiconductor equipment & materials employment (2)	Semiconductor production, equipment & materials employment (3)
Panel A: Semiconductor vs. Non-Semiconductor Counties			
Treated x Post-CHIPS	133.06***	13.84	142.39***
	(43.52)	(15.05)	(48.34)
Observations	31535	31535	31535
Pre-USICA outcome mean (treated counties)	868.8	164.5	1033.3
Panel B: Fab vs. Fabless Counties			
Treated x Post-CHIPS	217.93***	28.45	252.68***
	(62.16)	(20.64)	(76.55)
Observations	5215	5215	5215
Pre-USICA outcome mean (treated counties)	1523.5	238.1	1761.6

Notes: QCEW 6-digit data 2015Q1-2025Q1. Post-CHIPS indicator identifies quarters after CHIPS passed in the U.S. House (2022Q4 or later). Quarters from 2021Q3-2022Q3 are omitted. Outcome in Column 1 is the number of workers employed in the semiconductor sector (NAICS industry code 334413). Outcome in Column 2 is the number of workers employed in the manufacturing of equipment (NAICS 333242) or material inputs (NAICS 325120, 325180) for semiconductors. Outcome in Column 3 is the number of workers employed in either the semiconductor industry or the manufacturing of equipment (NAICS 333242) or material inputs (NAICS 325120, 325180) for semiconductors. Standard errors clustered at county level. *p <0.10; **p <0.05; ***p <0.01.

Robustness Using QWI/QCEW 4-Digit Data

	Semiconductor production employment (1)	Semiconductor equipment & materials employment (2)	Semiconductor production, equipment & materials employment (3)
Panel A: Semiconductor vs. Non-Semiconductor Counties, Synthetic DID			
Treated x Post-USICA	104.38**	59.95***	173.38***
	(44.72)	(17.18)	(52.18)
Observations	36040	36040	36040
Pre-USICA outcome mean (treated counties)	1716.4	552.6	2269
Panel B: Fab vs. Fabless Counties, Synthetic DID			
Treated x Post-USICA	177.37***	86.18***	262.07***
	(54.15)	(31.39)	(75.80)
Observations	5960	5960	5960
Pre-USICA outcome mean (treated counties)	2892	646.3	3538.3

Notes: Data are from QWI/QCEW combined data at 4-digit level. Post-USICA indicator identifies quarters after USICA passed in the U.S. Senate (2021Q3 or later). Outcome in Column 1 is the number of workers employed in the semiconductor sector (NAICS industry code 3344). Outcome in Column 2 is the number of workers employed the manufacturing of equipment (NAICS 3332) or material inputs (NAICS 3251) for semiconductors. Outcome in Column 3 is the number of workers employed in either the semiconductor industry or the manufacturing of equipment (NAICS 3332) or material inputs (NAICS 3251) for semiconductors. The pre-USICA outcome mean is the outcome mean for treated counties for the 2015Q1-2021Q1 period. The standard errors included in parentheses are clustered at the county level. *p $<$0.10; **p $<$0.05; ***p $<$0.01.

Robustness: Including Demographic Controls

	Semiconductor production employment (1)	Semiconductor equipment & materials employment (2)	Semiconductor production, equipment & materials employment (3)
i. Semiconductor vs. Non-Semiconductor			
Treated x Post-USICA	110.31***	15.55	123.91***
	(40.58)	(14.02)	(43.64)
Observations	36900	36900	36900
Pre-USICA outcome mean (treated counties)	868.7	165.3	1034.0
ii. Fab vs. Fabless			
Treated x Post-USICA	179.83***	25.19	209.79***
	(52.48)	(16.82)	(63.11)
Observations	6109	6109	6109
Pre-USICA outcome mean (treated counties)	1523.6	239.4	1763.0

Notes: The demographic controls include percent of county population that is female, white, black, asian, hispanic, younger than 19, between ages 20 to 24, 25 to 34, 35 to 44, 45 to 54, and 55 to 64. County demographic data from SEER U.S. County Population Data, 1969-2023 (`https://seer.cancer.gov/popdata/download.html`). *p $<$0.10; **p $<$0.05; ***p $<$0.01.

Robustness: Alternative Cutoffs for High-Tech Emp.

	Semiconductor production employment	Semiconductor equipment & materials employment	Semiconductor production, equipment & materials employment
	(1)	(2)	(3)
	(1)	(2)	(3)
Panel A: High Tech Employment > 0			
Treated x Post-USICA	110.67***	14.35	122.05***
	(34.66)	(12.63)	(38.54)
Observations	70807	70807	70807
Pre-USICA outcome mean (treated counties)	868.7	165.3	1034.0
Panel B: High Tech Employment > 500			
Treated x Post-USICA	110.06***	15.51	124.36***
	(40.20)	(15.08)	(46.92)
Observations	21566	21566	21566
Pre-USICA outcome mean (treated counties)	868.7	165.3	1034.0
Panel C: High Tech Employment > 1000			
Treated x Post-USICA	109.88***	13.13	118.63***
	(36.02)	(12.33)	(39.16)
Observations	16810	16810	16810
Pre-USICA outcome mean (treated counties)	868.7	165.3	1034.0

Notes: Synthetic DID regressions using different values of the cutoff for a country to be a high-tech county (and hence included in the control group if it does not have a semiconductor facility). *p <0.10; **p <0.05; ***p <0.01.

Local Spillovers, Synthetic D-in-D

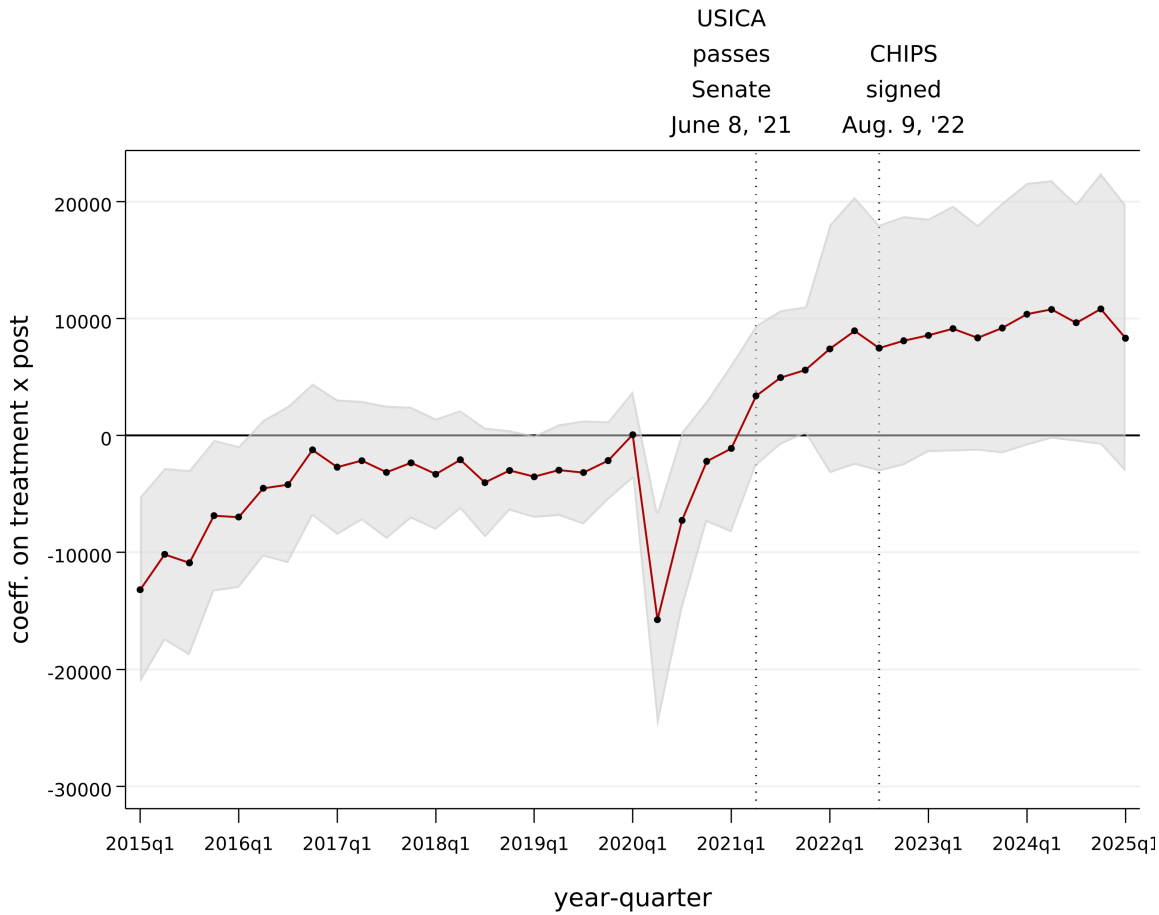
	Semiconductor inputs employment (1)	Non-residential construction employment (2)	Total county employment (3)	County GDP (00,000s USD) (4)
Panel A: Semiconductor vs. Non-Semiconductor Counties				
Treated x Post-CHIPS	59.48*	159.82**	-3238.83	-5.38
	(34.65)	(78.21)	(3155.70)	(5.95)
Observations	31535	31535	31535	7040
Pre-USICA outcome mean (treated counties)	1069.3	1800.3	307456.4	590.9
Panel B: Fab vs. Fabless Counties				
Treated x Post-CHIPS	-56.56	250.03*	11471.05*	12.98
	(63.85)	(138.99)	(6709.18)	(9.93)
Observations	5215	5215	5215	1168
Pre-USICA outcome mean (treated counties)	1519.2	2056.8	386279.3	706.2

Estimates are from synthetic difference-in-difference (SDID) specification, equation (1) in text. Post-CHIPS indicator identifies quarters after CHIPS passed in the U.S. House (2022Q4 or later). Quarters from 2021Q3-2022Q3 are omitted. Outcome in Column 1 is the aggregate number of workers employed in the input sectors for semiconductors (NAICS codes 331410, 334418, 334412, 334416, 334417, 334419, 326112, 326113, 334118, 334515 and 811310). Outcome in Column 2 is the number of workers employed in non-residential construction building construction (NAICS 541713 and 541715). Outcome in Column 3 is the total county employment (All 6-digit NAICS industries aggregated). The pre-USICA outcome mean is the outcome mean for treated counties for the 2015Q1-2021Q1 period. Outcome in Column 4 is the yearly county GDP in hundred thousands of chained US dollars (from the Bureau of Economic Analysis, available only through 2023). *p $<$0.10; **p $<$0.05; ***p $<$0.01.

Total County Emp., Synthetic DID, Semi vs High-Tech

Notes: Synthetic difference-in-difference (SDID) specification. Outcome is the number of workers employed in all NAICS 6-digit sectors. Source is QCEW 6-digit data. Sample includes all counties with at least 100 workers in 11 high-tech sectors, as defined in Census Bureau (2024), as of 2021Q1. The shaded area represents the confidence interval at the 95% level.

Total County Emp., Synthetic DID, Fab vs Fabless



Notes: Synthetic difference-in-difference (SDID) specification. Outcome is the number of workers employed in all NAICS 6-digit sectors. Source is QCEW 6-digit data. Treated counties are ones that have a semiconductor production facility; control counties are ones that have a semiconductor facility but not a production facility (e.g., are fabless). The shaded area represents the confidence interval at the 95% level.