

Corporate Tax Incentives Retraction: Evidence from Puerto Rico*

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Abstract

Corporate tax incentives are intended to revitalize economically distressed regions, yet their sustainability remain an open question. In this paper, we examine whether these policies generate lasting labor market benefits beyond their elimination. We exploit the phaseout and elimination of a generous corporate tax incentive targeted for Puerto Rico's manufacturing industry. Using a synthetic differences-in-differences (SDiD), we estimate the effect of lifting this policy on local labor market outcomes. Our findings reveal that the phaseout (of 1996) and eventual elimination (of 2006) led to significant job losses. Specifically, results indicate that the phaseout generated a statewide average decrease of approximately 9.2% in manufacturing jobs by 2000, and an average decrease of 28% decrease following the elimination by 2019, relative to a scenario in which the policy had remained. After the phaseout and elimination, at the island level, we also find continuous declines in the level of employment and working age population. Together, these findings indicate that decades of tax incentives failed to create long-term employment gains and broader negative consequences for the local economy.

Keywords: Place-Based Policies, Tax Incentives, Employment, Poverty

JEL Codes: J23, J38, R12, R38

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1 Introduction

Place-based tax incentives represent a substantial public investment, with the United States spending roughly \$47 billion annually in state and local business tax incentives and an additional \$1.6 billion in federal programs, such as Opportunity Zones (Bartik, 2020)¹. Given its importance, extensive research has examined the implementation of these policies (Neumark and Simpson, 2015; Bartik, 2020; Slattery and Zidar, 2020; Corinth and Feldman, 2024; Ehrlich and Overman, 2020). However, we know virtually nothing about what happens when these incentives are withdrawn. This paper provides the first causal evidence on this policy decision by examining the labor market consequences of eliminating Section 936 of the Internal Revenue Code (IRS). This major place-based tax incentive was in place from 1976 to 2005 and offered U.S. corporations operating in Puerto Rico a full federal corporate income tax write-off on island-generated profits.

Puerto Rico presents a unique setting for identifying the effects of this policy’s withdrawal. The implementation and elimination of Section 936 were determined by the U.S. Congress, which lacks voting representation for Puerto Rico, thereby eliminating endogeneity concerns that arise when local political demand drives policy adoption (an effect documented by (Hanson, 2009)). Additionally, the island’s geographic isolation minimizes commuter flows and spillover effects that typically contaminate control groups in place-based policy research (an issue documented by Neumark and Simpson (2015); Slattery and Zidar (2020)), while its population of 3.8 million in 2005 (World Bank, 2024b) ensures aggregate relevance.

Puerto Rico’s subsidy-dependent economy also allows us to examine whether such economies can persist once support ends. The policy operated in a region with persistently high poverty rates (64% in 1970 and 45% in 2010 (Ruggles et al., 2023)) and where manufacturing -which received 98% of Section 936 tax credits (Holik, 2009)- comprised 45.52% of GDP². Given manufacturing’s dependence on subsidies and the economy’s dependence on manufacturing,

¹figures in 2019 USD

²Between 1997 and 2021, Puerto Rico’s median manufacturing value added was 45.52% of GDP, compared to 11.95% in the United States (World Bank, 2023).

we can examine whether this structure persists after withdrawal. Moreover, the decade-long phaseout (from 1996 to 2005) should minimize disruption if the industry proves unsustainable, providing a conservative outcome for this scenario.

Our hypothesis aligns with the theoretical predictions of Kline and Moretti (2014), who argue that place-based policies generate welfare gains primarily when targeting immobile, poor populations— a feature consistent with Puerto Rico’s demographics. To examine these questions in this unique setting, this paper builds upon the work of Feliciano and Green (2017), who provide initial evidence on Section 936’s repeal using aggregate effects and broad control groups. We benefit from using more granular, higher-frequency data, which enables us to adopt a more robust identification strategy. While recent work by Chen and Feliciano (2024) and Romero-Ramírez (2024) explores sector-specific mechanisms, open questions still remain about how phaseout effects vary across different contexts and about the long-term consequences for the broader economy—both of which this paper addresses.

Using quarterly state-industry-level data, we use a synthetic differences-in-differences (SDiD) framework to estimate the effect of the policy’s phaseout on Puerto Rico’s manufacturing employment. Our estimates indicate that the phaseout led to an average decline of roughly 9.2 percent in manufacturing employment by 2000, and a statistically significant decrease of 13.3% for the whole phaseout period (until 2005), this is consistent with Feliciano and Green (2017)’s estimate of a 10.8% decrease ³. We further examine the additional effect of elimination, long-term effects, heterogeneity across counties and manufacturing sub-industries, the effects on wages and establishments, and broader implications for the overall labor market. Our findings contribute not only to the place-based policy literature but also inform debates about corporate tax incentives and local labor markets (Kline and Moretti, 2014; Hyman et al., 2022), as well as regional adaptation to the decline of a dominant industry.

³This compares to Feliciano and Green (2017)’s estimate using employment levels of all U.S. industries as the control group, which most closely resembles our specification using U.S. manufacturing employment levels as the donor pool for our synthetic control.

The remainder of the paper is organized as follows. Section 2 develops a spatial-equilibrium framework that clarifies mechanisms. Section 3 provides the background on Sec. 936. Section 4 describes the data. Section 5 outlines our identification strategy. Section 6 presents our findings. Section 7 reports results across our robustness checks. Section 8 outlines our conclusions.

2 Theoretical Framework

We adapt Kline and Moretti (2014)'s spatial equilibrium framework, designating Puerto Rico as location a and the mainland United States as location b . Workers choose locations to maximize utility:

$$U_{ic} = w_c - r_c + A_c - t + \epsilon_{ic} \quad (1)$$

where w_c denotes nominal wages, r_c represents housing costs, A_c local amenities, t is a lump-sum tax, and ϵ_{ic} reflects worker i 's idiosyncratic attachment to location c , with parameter σ denoting mobility elasticity.

Section 936 provided firms in Puerto Rico a tax credit τ_a on profits, effectively reducing all operational costs by factor $(1 - \tau_a)$. With Cobb-Douglas production $Y_a = X_a N_a^\alpha K_a^{1-\alpha}$ and capital supplied elastically at price r , profit-maximizing firms equate marginal products to subsidized costs:

$$w_a(1 - \tau_a) = \alpha \frac{Y_a}{N_a} \quad (2)$$

$$r(1 - \tau_a) = (1 - \alpha) \frac{Y_a}{K_a} \quad (3)$$

where α is labor's share in production. Since the subsidy reduces costs for both labor and capital proportionally, firms expand employment of both inputs. The spatial distribution of workers depends on the utility differential between locations:

$$N_a = \Lambda \left(\frac{v_a - v_b}{\sigma} \right) \quad \text{where} \quad v_c = w_c - r_c + A_c - t \quad (4)$$

where v_c is the systematic utility component and $\Lambda(\cdot)$ is the logistic cumulative distribution function.

The elimination of Section 936 ($\tau_a \rightarrow 0$) triggers employment declines through two channels. First, the *direct effect*: firms face higher costs for all inputs, reducing demand for both labor and capital, which lowers wages. Second, the *mobility response*: lower wages and labor demand induce out-migration, though strong locational attachments may delay this adjustment.

3 IRS Sec. 936

IRS Section 936, enacted through the Tax Reform Act of 1976, restructured the federal tax treatment of U.S. corporations operating in U.S. possessions⁴. Before 1976, possession corporations could exclude island-source income from federal taxation, but repatriating profits to mainland parent firms triggered full corporate tax without deductions—creating a “tax cliff” that trapped capital in subsidiaries and decreased investment incentives. Section 936 replaced this exclusion with a tax credit mechanism granting qualifying corporations a credit against U.S. corporate income tax on possession-source earnings, effectively eliminating federal taxation while allowing tax-free repatriation to parent companies (United States Congress, 1976). However, even though it was intended to benefit all possessions, Section 936 operated primarily in Puerto Rico⁵: by 1995, firms there claimed 99% of all Section 936 tax credits, with manufacturing alone accounting for 95% of these benefits (Miller, 1995). Even in 2005, the program’s final year, 94 of 102 beneficiaries were located in Puerto Rico (Holik, 2009) .

Eligibility required that at least 80% of a firm’s gross income over three years originate

⁴As of 2025, these include Puerto Rico, Guam, the U.S. Virgin Islands, American Samoa, and the Northern Mariana Islands.

⁵Major beneficiaries included pharmaceutical giants (Abbott Laboratories, American Home Products, Bristol-Myers Squibb, Johnson & Johnson, Eli Lilly, Marion Merrell Dow, Merck, Pfizer, Schering-Plough, Syntex, Upjohn, Warner-Lambert), electronics manufacturers (General Electric, Westinghouse Electric, Motorola), and consumer goods companies (Sara Lee, PepsiCo) (Wu, 1994).

from a possession and 50% from active business operations⁶. Participating firms were prohibited from filing consolidated returns with related entities for at least nine years and had to reaffirm eligibility annually through tax filings (Joint Committee on Taxation, 1976).

Incremental restrictions during the 1980s and early 1990s narrowed the program’s scope but preserved its structure. The active business income threshold rose from 50% to 65% in 1982 (United States Congress, 1982) and to 75% in 1986, which also introduced limits on intangible income (United States Congress, 1986). The 1993 Omnibus Budget Reconciliation Act further tightened the definition of active income (United States Congress, 1993). Then, the Small Business Job Protection Act of 1996 initiated a sudden ten-year phaseout culminating in full elimination on January 1, 2006 (United States Congress, 1996). The reform barred new entrants after January 1, 1996, permitting only existing beneficiaries to continue claiming credits and capping credit values using base-period income formulas indexed to the CPI. Of 335 corporations receiving benefits in 1995, about 310 renewed in 1996, but participation declined to 102 firms by 2005 (Holik, 2009).

The magnitude of Section 936’s withdrawal was sizable, with annual benefits ranging from \$1.2 to \$8.14 billion between 1983 and 2005⁷, making it substantially larger than the \$1.6 billion⁸ spent annually on all federal place-based programs combined reported by Bartik (2020). Moreover, suggestive evidence indicates that the policy’s withdrawal had negative consequences for the local labor market. In Figure 1 Panel (a), we observe a sharp decrease in manufacturing employment immediately at the start of the phaseout, and Panel (b) which shows the decline in employment (adjusted to population levels) in Puerto Rico following the elimination. Moreover, the policy’s importance can be further emphasized by the fact that it subsidized nearly half of all manufacturing employment and payroll⁹.

⁶For example, active business income includes revenues from production, assembly, and direct sales of goods manufactured in the possession. Passive income—such as interest, dividends, royalties, or rents—did not qualify.

⁷These are nominal figures reported by (Holik, 2009), converted to 2019 dollars.

⁸2019 USD

⁹U.S. Bureau of the Census (1994) shows that for Puerto Rico, the 273 manufacturing establishments that benefited from this policy (12% of total manufacturing establishments) employed 66,732 workers (42.2% of total manufacturing employment) and paid 48.6% of total manufacturing payroll by 1992.

4 Data

Our analysis draws on three primary data sources. First, we use the Quarterly Census of Employment and Wages (QCEW) retrieved from the U.S. Bureau of Labor Statistics (BLS), which provides near-universal coverage ($>95\%$) of U.S. wage and salary employment through mandatory employer filings with state unemployment insurance programs, as explained in U.S. Bureau of Labor Statistics (2024e). From the QCEW, we extract: (i) quarterly industry-state level data for our main analysis from U.S. Bureau of Labor Statistics (2024f), (ii) annual size-classified establishment data (first quarter only) to examine heterogeneous effects by firm size from U.S. Bureau of Labor Statistics (2024g), and (iii) quarterly industry-county level data from U.S. Bureau of Labor Statistics (2024f) to test for more localized geographic effects. We restrict our sample to private-sector establishments from 1990 onward and maintain a balanced panel by excluding any geographic unit with incomplete time series coverage or have a value of 0.

The QCEW provides employment levels, establishment counts, and wage bills for each industry-geography-time observation. The wage bill covers total quarterly compensation including bonuses, stock options, severance pay, tips, and the cash value of non-monetary benefits. We convert nominal values to real terms using the BLS regional Consumer Price Index (1982-84 base period) (U.S. Bureau of Labor Statistics, 2024d,b,c,a). To protect employer confidentiality, the BLS suppresses data cells that could reveal information about individual establishments, particularly when a single large employer dominates an industry-area combination. While suppressed observations are excluded from our analysis, published higher-level aggregations incorporate these suppressed values, preserving the representativeness of our state-level estimates.

Afterwards, we incorporate state-level macroeconomic indicators from multiple sources. Annual state population data (1950-2024) (Federal Reserve Bank of St. Louis, 2025) retrieved from the Federal Reserve Economic Data (FRED) and seasonally-adjusted monthly labor force statistics from the BLS (U.S. Bureau of Labor Statistics, 2025). We compute

quarterly averages unemployment rates from the monthly series. For mainland states, we derive working-age population by dividing the labor force by the labor force participation rate. For Puerto Rico, where BLS data does not include labor force participation rates, we calculate this metric by dividing the labor force by the working-age population (ages 15-64) obtained from the World Bank (2024a).

To construct county-level heterogeneity estimates, we compiled data from several sources. We obtained land area measurements from the Census 2000 Gazetteer Files (?), population estimates from the Rural-Urban Continuum Codes (Economic Research Service, U.S. Department of Agriculture, 2003), educational attainment statistics from the USDA Economic Research Service county-level datasets (Economic Research Service, U.S. Department of Agriculture, 2025), and poverty rates from the Census 2000 poverty data (U.S. Census Bureau, 2000).

Table 1 presents descriptive statistics for our final dataset spanning 1990-2023 for all 52 jurisdictions (50 states, Washington D.C., and Puerto Rico) and 3,165 counties and county equivalents. After balancing the panel, our state-level analysis retains between 47-51 U.S. states (depending on the time horizon). At the county level, we retain between 2,355 and 2,643 counties depending on the variable, representing 73.1% to 82.0% of all 3,222 U.S. counties and county-equivalents, including Puerto Rico’s 78 municipalities.

5 Empirical Framework

To estimate the effect of Section 936’s phaseout on manufacturing employment, we define the treatment group as Puerto Rico’s manufacturing industry and the control group as manufacturing in all U.S. states and Washington D.C.. We adopt a synthetic difference-in-differences (SDiD) approach as proposed by Arkhangelsky et al. (2021), which provides a

robust estimator suitable for this setting¹⁰. The SDiD estimator follows:

$$(\hat{\tau}_{sdid}, \hat{\mu}, \hat{\alpha}, \hat{\beta}) = \arg \min_{\tau, \mu, \alpha, \beta} \left\{ \sum_{s=1}^N \sum_{t=1}^T (Y_{st} - \mu - \alpha_s - \beta_t - W_{st}\tau)^2 \hat{\omega}_s \hat{\lambda}_t \right\} \quad (5)$$

where Y_{st} denotes the outcome for state s at time t , and W_{st} is a binary indicator equal to one if state s is Puerto Rico following the phaseout. The parameter $\hat{\tau}_{sdid}$ represents the estimated average treatment effect, $\hat{\mu}$ is the intercept, and $\hat{\alpha}_s$ and $\hat{\beta}_t$ are state and time fixed effects. The weights $\hat{\omega}_s$ and $\hat{\lambda}_t$ are optimized to ensure balance in pre-treatment outcomes between treated and synthetic control units. For inference, we implement placebo-based permutation tests, conducting 500 simulations where treatment assignment is randomly permuted across control units.

The SDiD coefficient $\hat{\tau}_{sdid}$ represents the Average Treatment Effect on the Treated (ATT), capturing the average post-phaseout difference between Puerto Rico’s manufacturing employment and its counterfactual trajectory had Section 936 remained in place.

To examine dynamic treatment effects, we implement the SDiD event study framework proposed by Clarke et al. (2024):

$$\tau_t = (\bar{Y}_t^{\text{Tr}} - \bar{Y}_t^{\text{Co}}) - (\bar{Y}_{\text{baseline}}^{\text{Tr}} - \bar{Y}_{\text{baseline}}^{\text{Co}}) \quad (6)$$

where baseline outcomes are computed as weighted averages over the pre-treatment period using the optimal SDiD time weights λ_t^{SDiD} . We construct 95% confidence intervals from the 2.5th and 97.5th percentiles of the placebo distribution across 500 iterations.

¹⁰A standard differences-in-differences (DiD) approach is inadequate for two key reasons. First, parallel pre-trends fail for several outcome variables (see Appendix Figure A1 for event study results showing violations of parallel trends). This violation of DiD’s identifying assumption biases the estimator. Second, with only one treated unit (Puerto Rico) at each time period, DiD estimates are vulnerable to idiosyncratic shocks. For example, if Puerto Rico experienced a hurricane or unrelated policy change contemporaneous with the phaseout, DiD would incorrectly attribute these effects to Section 936’s elimination. This single-unit problem means we cannot average treatment effects across multiple treated units to attenuate unit-specific confounders, making the DiD estimate unreliable even if parallel trends were satisfied. SDiD addresses both concerns by constructing a synthetic control that satisfies parallel pre-trends by design and optimally weights control units to minimize pre-treatment imbalance.

6 Results

6.1 Short-Term Phaseout Effect on Manufacturing

We focus on the first five years following the 1996 phaseout (1996-2000) for three reasons. First, our balanced panel includes six years of pre-treatment data (1990-1995), providing a clean identification window. Second, this immediate post-policy period captures the direct effects of the phaseout. This can be evidenced by the event studies of Figure 2, which indicate that manufacturing employment and wage bills began declining sharply in 1996.

Table 2 presents the synthetic difference-in-differences estimates. Manufacturing employment in Puerto Rico fell 9.2 percent relative to the synthetic control (significant at the 5 percent level), equivalent to roughly 6,400 jobs given the pre-period mean of 69,584 workers. The wage bill declined by 13.5 percent—about \$26 million relative to the pre-period mean of \$195 million. The larger wage bill decline suggests the employment losses were concentrated among higher-wage workers or that remaining workers faced wage cuts. Wages per employee rose 3.0 percent, though this estimate is not statistically significant.

The number of establishments shows no significant change (point estimate of 4.5 percent, not statistically different from zero). Since we have stable establishment counts and declining employment, we interpret that changes occurred on the intensive margin: firms first reduce labor costs before incurring the larger fixed costs of moving elsewhere. The event studies in Figure 2 confirm this timing. Panel (a) shows employment remained flat through 1995 before dropping consistently from 1996 onward. Panel (b) shows establishments fluctuating around zero throughout. Panel (c) tracks employment closely, with the wage bill falling steadily post-1996. Panel (d) shows wages per employee trending slightly upward with wide confidence intervals.

6.1.1 Across Counties

Table 3 examines heterogeneity in the phaseout’s effects across Puerto Rico’s counties. While the aggregate results demonstrate a decline in manufacturing jobs, its important to understand the conditions that worsened or mitigated these effects across different towns. This informs questions about distributional consequences and targeted policy responses. This is why we examine whether counties with denser populations, higher educational attainment, greater manufacturing specialization, or lower poverty rates experienced smaller employment losses.

The baseline estimate shows manufacturing employment fell 13.6 percent at the county level, somewhat larger than the 9.2 percent decline at the state level. This difference likely reflects different treatment (63 of 78 total municipalities) and the different control groups (2,494 of 3,165 total counties) used in county versus state analyses.

Counties with higher poverty rates experienced larger employment losses with 18.2 percent compared to 9.1 percent in lower-poverty counties. Similarly, counties with lower college attainment saw employment fall 17.2 percent versus 9.9 percent in more educated counties. These patterns suggest the policy shock hit hardest in places with fewer labor market alternatives. Workers in poorer, less-educated counties likely faced greater difficulty transitioning to other sectors, amplifying the employment decline. This distributional pattern is particularly concerning: the counties least equipped to absorb economic shocks experienced the largest losses. Ironically, these high-poverty, low-education counties are precisely the type of distressed areas that place-based policies like Section 936 were designed to help.

Surprisingly, more densely populated counties experienced larger losses (15.4 percent) than less metropolitan counties (9.9 percent). If agglomeration economies or better infrastructure mitigated the shock, we would expect the opposite. Instead, this pattern likely reflects where manufacturing was concentrated: denser counties housed more 936-dependent plants, creating larger absolute exposure to the policy change. This finding challenges the notion that urban density automatically mitigates sector-specific shocks. Manufacturing

intensity also shows a counterintuitive result. Counties with high manufacturing concentration (above-median location quotients) lost 8.4 percent of employment compared to 11.8 percent in low-manufacturing counties. This suggests counties more specialized in manufacturing may have had stronger supplier networks or industry-specific infrastructure that provided some buffer, though all counties still experienced significant losses. Alternatively, low-manufacturing counties may have contained marginal plants more sensitive to cost changes.

Establishment growth appears across most subgroups—ranging from 3.2 to 7.6 percent—except in low-poverty counties where the estimate is statistically insignificant. This pattern signals that the adjustment occurred primarily through downsizing existing plants rather than closures. However, the establishment increase is larger in high-poverty, high-density counties, suggesting a compositional shift toward smaller operations in precisely the areas hit hardest by employment losses.

Wages per employee remain largely unchanged across all subgroups, with only high-manufacturing counties showing a marginally significant 1.7 percent increase. Since we saw falling employment and wage bills, we interpret that the phaseout generated job losses rather than wage cuts for remaining workers.

6.1.2 Across Manufacturing Sub-Industries

Table 4 examines whether subsidy magnitude affected employment losses by grouping industries according to their Section 936 tax credits.¹¹ The credit distribution was highly concentrated. Chemicals alone claimed 59.3% of the \$1.91 billion in total credits (over \$1.1 billion), driven primarily by pharmaceuticals, with 21,862 Section 936 workers across 61 establishments, averaging 358 workers per plant and \$39,404 per worker. In contrast, apparel employed more workers overall but claimed just 1.6% of credits, with 110 workers per establishment averaging \$10,938 in wages (U.S. Bureau of the Census, 1994; Miller, 1995).

¹¹Table A1 provides an alternative classification based on the share of industry employment covered by Section 936, yielding similar results lack of statistically significant relationship between 936 exposure and employment effects.

The results show no clear relationship between credit exposure and job losses. Chemical manufacturing, despite losing the largest subsidies, experienced a statistically insignificant 9.7% employment decline. Similarly, the 166-227 million range—electronics, instruments, and food manufacturing, collectively claiming 32.2% of credits—shows no significant employment or wage bill effects. The largest effects appear in the mid-subsidy range. Industries receiving 8-12 million in credits (motor vehicles and miscellaneous manufacturing) lost 18.7% of employment (significant at 5%) and saw wage bills fall 24.7% (significant at 1%). This same group shows a marginally significant 7.6% increase in wages per employee. No other credit range exhibits significant employment or wage bill changes. This pattern is inconsistent with subsidy magnitude driving adjustment costs.

A hypothesis that we have is that large multinational pharmaceutical plants could reallocate production globally or absorb losses through consolidated operations, maintaining employment levels in Puerto Rico even as their share of total manufacturing declined. Mid-sized industries lacked these margins. Motor vehicle plants, faced binding constraints when subsidies disappeared—too small for global diversification but too specialized to pivot easily.

6.2 Long-Term Phaseout Effects

Figure 3 shows manufacturing never recovered from the Section 936 phaseout. Panel (a) tracks the synthetic control closely through 1995, then drops sharply starting in 1996 and continues declining through 2023. The gap between Puerto Rico and its counterfactual widens throughout with no sign of convergence even two decades later.¹² Panel (c) shows wage bills mirror these employment trends. Panel (d) shows wages per employee fluctuating around zero with wide confidence bands, suggesting little change for remaining workers. Panel (b) shows establishments follow a different pattern—they track the counterfactual through the early 2000s before declining around 2008. This lagged response coinciding with the Great Recession makes it difficult to attribute the establishment decline to the phaseout.

¹²Table A2 shows manufacturing employment losses of 13.3% by 2005 and 28% by 2019 (both significant at 10%).

Figure 4 shows the broader economy adjusted more gradually. Panel (a) shows total employment remains near the counterfactual through the mid-2000s before beginning a slow decline around 2010, which is much slower than manufacturing and not statistically significant. Panel (c) shows wage bills follow this same pattern, while Panel (d) shows wages per employee drifting gradually lower. Panel (f) shows working-age population began declining in 1998, became statistically significant in 2004, and never recovered through 2023.¹³ Panel (e) shows unemployment declined throughout most periods.¹⁴

Together, these results suggest manufacturing jobs decreased immediately after 1996, workers initially shifted to other sectors through the mid-2000s, then began leaving Puerto Rico when better opportunities failed to materialize. The falling unemployment combined with non-significant total employment changes confirms that those who remained found work rather than staying jobless.

7 Robustness Checks

Table 5 presents two placebo tests to validate our results. Column 1 runs the estimates for other industries while maintaining Puerto Rico as the treated state. If our results simply captured Puerto Rico-wide trends unrelated to Section 936, we'd expect significant effects here too. Instead, all estimates are small and statistically insignificant: 4.2% for employment, 5.4% for establishments, 5.4% for wage bills, and 1.8% for wages per employee. None differ from zero at conventional significance levels. Column 2 treats another U.S. state's manufacturing sector as if it experienced the phaseout. If our synthetic control poorly matched Puerto Rico or if national manufacturing trends drove our results, this placebo would show spurious effects. Again, all estimates lack statistical significance at conventional levels.

These null results contrast sharply with our actual manufacturing estimates: 9.2% em-

¹³Table A2 shows working-age population fell 5.6% by 2010, 9.4% by 2015, and 13.2% by 2019 (all significant). Refer to Figure A3 to see migration patterns to the United States.

¹⁴All unemployment estimates highly significant at 1%.

ployment decline and 13.5% wage bill drop, both significant at 5%.¹⁵ The placebos confirm that our results are specific to Puerto Rico’s manufacturing.

8 Conclusion

This paper provides the first causal evidence on the consequences of withdrawing place-based corporate tax incentives. Our findings of consistent manufacturing employment and wages decline following the phaseout, indicate that discontinuing these policies generates irreversible damage to local labor markets. Our estimates reveal that Puerto Rico’s manufacturing sector contracted persistently following the policy’s withdrawal, with no evidence of recovery even fifteen years later.

The empirical patterns validate our theoretical framework’s predictions about spatial equilibrium adjustments under high mobility costs. Consistent with equation 2, firms immediately reduced employment when labor costs rose as $\tau_a \rightarrow 0$. The two-stage worker response, initial absorption through wage declines and industrial reallocation (followed by out-migration), confirms that strong locational attachments temporarily constrained geographic adjustment. County-level effects exceeding state-level effects by threefold demonstrate that local labor markets with limited reallocation options experience even more severe consequences, as workers exhaust alternatives before migrating.

These results challenge two assumptions underlying place-based policies. First, the absence of self-sustainable agglomeration economies after three decades of subsidies contradicts the premise that temporary incentives can spark self-growth. Since the sector never recovered, we believe that no self-sustaining agglomeration economies emerged, challenging the premise that tax incentives spark self-reinforcing growth. Second, the permanence of these effects raises questions about whether targeting immobile, poor populations yields lasting welfare gains. While Section 936 could have temporarily raised employment and wages, its

¹⁵Using DiD instead of SDiD produces similar results. Table A3 shows that Manufacturing employment fell 9.4% by 2000, 14.4% by 2005, and 30.3% by 2019 (all significant at 1%). Longer-run SDiD estimates shown in Table A2 show similar employment losses reaching 28.0% by 2019.

elimination left Puerto Rico without the subsidized manufacturing jobs, and without them the industry contracted and never recovered.

The policy implications extend beyond Puerto Rico. Current place-based programs—from Opportunity Zones to state-level tax competitions—rest on similar assumptions about creating sustainable employment. Our evidence suggests that without mechanisms to build competitive advantages, such policies merely rent economic activity at substantial fiscal cost. The 13.2% population decline we document represents a disadvantage for those unable to migrate—precisely the populations these policies purport to help.

Future place-based interventions should incorporate explicit sustainability criteria: requirements for technology transfer, workforce development, and a gradual subsidy reduction that forces productivity improvements. The Section 936 experience demonstrates that political economy considerations create policy lock-in: once firms, workers, and communities organize around subsidies, withdrawing benefits becomes infeasible, leading to perpetual subsidization. For policymakers confronting existing programs, our results document how a decade-long phaseout disrupted a whole industry, with firms exiting and workers separating from their jobs well before official elimination. Our evidence shows that gradual withdrawal still imposed severe transitional costs on workers and communities despite allowing many years for adjustment. The fact that one of the United States' longest-running and most generous place-based policies failed to create durable benefits should temper enthusiasm for using tax incentives as the primary tool for local development, particularly in persistently economically distressed areas where the costs of eventual withdrawal may prove irreparable.

Tables and Figures

Table 1: Descriptive Statistics by Year

	Puerto Rico						All States					
	Pre		Phase Out		Elimination		Pre		Phase Out		Elimination	
	1990	1995	1996	2005	2006	2010	1990	1995	1996	2005	2006	2010
Panel A: Total, All Industries (State)												
Employment Level (in millions)	0.57 (0.00)	0.64 (0.02)	0.67 (0.02)	0.75 (0.01)	0.74 (0.01)	0.67 (0.01)	1.78 (2.01)	1.90 (2.01)	1.94 (2.06)	2.17 (2.35)	2.21 (2.40)	2.08 (2.25)
Establishments	39,048 (79)	41,818 (330)	43,100 (313)	54,896 (1,062)	58,572 (851)	47,347 (466)	114,911 (125,623)	133,219 (154,238)	135,878 (154,787)	162,640 (194,020)	166,774 (200,216)	170,502 (210,016)
Wage Bill (in billions)	1.26 (0.24)	1.51 (0.12)	1.59 (0.13)	1.95 (0.11)	1.92 (0.14)	1.76 (0.13)	7.94 (9.82)	8.75 (10.30)	8.89 (10.29)	11.28 (13.45)	11.66 (13.98)	11.11 (13.32)
Wage Bill per Employee	2,204 (418)	2,374 (119)	2,380 (131)	2,592 (102)	2,583 (146)	2,650 (156)	4,173 (627)	4,287 (1,076)	4,277 (687)	4,833 (882)	4,910 (921)	4,993 (903)
Unemployment Rate (%)	14.38 (0.33)	13.70 (0.15)	13.44 (0.80)	11.27 (0.28)	10.59 (0.24)	16.35 (0.44)	5.40 (1.23)	5.22 (1.26)	5.13 (1.21)	4.96 (1.16)	4.50 (1.07)	8.76 (2.04)
Labor Force Participation Rate (%) ^a	51.3 (0)	53.2 (0)	54.2 (0)	55.8 (0)	57.5 (0)	52.7 (0)	67.2 (3.6)	67.7 (4.0)	67.7 (4.0)	66.9 (3.7)	67.1 (3.8)	65.4 (4.0)
Working Age Population ^a (in millions)	2.22 (0)	2.34 (0)	2.37 (0)	2.47 (0)	2.47 (0)	2.40 (0)	3.77 (4.18)	3.99 (4.34)	4.04 (4.38)	4.49 (4.96)	4.55 (5.03)	4.75 (5.28)
Panel B: Manufacturing (State)												
Employment Level	71,794 (72,163)	69,745 (72,824)	68,949 (72,156)	44,342 (50,479)	42,833 (47,831)	33,324 (37,301)	153,535 (278,776)	148,975 (257,548)	148,855 (259,153)	105,810 (199,797)	105,419 (198,442)	85,361 (162,113)
Employment Share (%) ^b	28.33 (0.21)	25.25 (0.46)	23.81 (0.48)	15.48 (0.23)	14.92 (0.23)	13.00 (0.21)	18.42 (7.16)	16.84 (6.68)	16.42 (6.42)	12.44 (5.28)	12.33 (4.94)	10.67 (4.26)
Establishments	1,285 (1,405)	1,227 (1,357)	1,226 (1,358)	1,150 (1,330)	1,175 (1,361)	828 (948)	3,229 (6,423)	3,360 (6,871)	3,373 (6,853)	2,785 (5,501)	2,767 (5,441)	2,612 (5,088)
Establishment Share (%) ^b	7.81 (0.04)	7.01 (0.08)	6.80 (0.04)	5.46 (0.04)	5.22 (0.04)	4.55 (0.03)	5.99 (1.66)	5.49 (1.50)	5.40 (1.46)	4.33 (1.17)	4.22 (1.14)	3.95 (1.08)
Wage Bill (in millions)	165.34 (200.29)	204.29 (215.46)	204.50 (217.22)	163.09 (186.09)	159.28 (178.65)	124.87 (140.82)	822.59 (1,596.17)	821.80 (1,513.86)	831.44 (1,542.99)	671.27 (1,374.47)	681.39 (1,390.65)	564.49 (1,183.89)
Wage Bill Share (%) ^b	31.23 (4.80)	31.12 (0.20)	29.69 (0.52)	21.85 (0.38)	21.34 (0.50)	18.38 (0.84)	22.72 (8.78)	20.97 (8.39)	20.60 (8.11)	15.56 (6.84)	15.34 (6.46)	13.52 (5.67)
Wage Bill per Employee	1,992 (762)	2,677 (577)	2,739 (497)	3,464 (860)	3,350 (1,047)	3,331 (1,227)	4,726 (1,087)	4,871 (1,188)	4,940 (1,251)	5,577 (1,642)	5,734 (1,641)	5,847 (1,895)
Panel C: Manufacturing (County)												
Employment Level	2,221 (2,395)	2,230 (2,404)	2,177 (2,433)	1,420 (1,665)	1,348 (1,557)	1,038 (1,243)	6,739 (24,151)	6,490 (20,175)	6,489 (20,350)	4,567 (14,503)	4,532 (14,412)	3,681 (11,828)
Establishments	43 (74)	42 (65)	41 (64)	38 (55)	39 (56)	28 (39)	145 (574)	149 (599)	150 (592)	116 (430)	115 (425)	108 (379)
Wage Bill (in millions)	5.59 (6.09)	6.62 (7.79)	6.56 (7.95)	5.23 (7.26)	5.03 (6.89)	3.94 (5.52)	36.35 (145.07)	35.99 (125.47)	36.45 (128.19)	29.02 (107.05)	29.15 (109.35)	24.45 (95.20)
Wage Bill per Employee	2,327 (661)	2,592 (882)	2,638 (964)	2,847 (1,283)	2,856 (1,257)	2,956 (1,386)	4,202 (1,235)	4,325 (1,286)	4,376 (1,293)	4,788 (1,518)	4,840 (1,530)	5,011 (1,556)
Location Quotient (LQ) ^c	1.80 (0.94)	1.80 (1.00)	1.72 (1.01)	1.33 (1.14)	1.29 (1.18)	1.25 (1.19)	1.29 (0.81)	1.35 (0.86)	1.34 (0.85)	1.26 (1.02)	1.27 (1.03)	1.24 (1.05)
States	1	1	1	1	1	1	51	51	51	51	51	51
Counties	78	78	78	78	78	78	3.165	3.165	3.165	3.165	3.165	3.165

The mean is shown for each variable. Standard deviations are in parentheses. The Wage Bill is deflated with the BLS' regional CPI (base period is 1982-84). The observation units are composed of the 50 U.S. states, Washington D.C. and Puerto Rico. For the year 2000, the mean (sd) across counties for the poverty rate is: Puerto Rico 52.9 (8.5) and All States 14.2 (6.5); For the percentage of the population with a bachelor's degree or higher: Puerto Rico 14.5 (4.58) and All States 16.5 (7.79); For population density (persons per mi²): Puerto Rico 1,265 (1,402) and All States 243 (1,669). ^a Denotes annual frequency, all other variables are at the quarterly frequency. ^b Share variables are calculated as the proportion relative to Total, all industries. ^cManufacturing Employment Location Quotient, interpreted as the county's manufacturing share of total employment relative to the national share.

Table 2: Effect of the Phaseout on Puerto Rico's Manufacturing

	Log(Employment Level) (1)	Log(Establishments) (2)	Log(Wage Bill) (3)	Log(Wage Bill per Employee) (4)
Puerto Rico x Phaseout	-0.0920** (0.0429)	0.0448 (0.0368)	-0.1352** (0.0647)	0.0297 (0.0384)
Treated Mean	69,584	1,262	194,734,366	2,521
Control Mean	147,371	3,284	800,233,285	4,759
Treated States	1	1	1	1
Control States	51	51	51	51

Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Data spans from 1990–2000. The mean is calculated using the unlogged (level) values from the pre-period (1990–1995). Control States refers to the total used for the donor pool of the synthetic control.

Table 3: Effect of the Phaseout on Puerto Rico’s Manufacturing Counties

	Baseline (1)	≤LQ (2)	>LQ (3)	≤Poverty (4)	>Poverty (5)	≤%College (6)	>%College (7)	≤Persons/mi ² (8)	>Persons/mi ² (9)
I. Log(Employment Level)									
Puerto Rico x Phaseout	-0.1362*** (0.0208)	-0.1181*** (0.0258)	-0.0839*** (0.0257)	-0.0910*** (0.0308)	-0.1823*** (0.0294)	-0.1724*** (0.0385)	-0.0993*** (0.0253)	-0.0985*** (0.0335)	-0.1538*** (0.0176)
Treated Mean	2,308	2,215	2,327	3,244	1,457	1,301	3,114	1,260	3,094
Control Mean	6,748	6,967	5,464	6,748	6,748	2,306	9,682	4,322	47,837
II. Log(Establishments)									
Puerto Rico x Phaseout	0.0320** (0.0125)	0.0457*** (0.0147)	0.0551*** (0.0145)	-0.0220 (0.0169)	0.0764*** (0.0161)	0.0599*** (0.0207)	0.0213 (0.0139)	0.0548*** (0.0186)	0.0763*** (0.0123)
Treated Mean	45	55	27	68	25	18	67	21	64
Control Mean	154	175	78	154	154	38	230	87	1,280
III. Log(Wage Bill)									
Puerto Rico x Phaseout	-0.1376*** (0.0225)	-0.1212*** (0.0281)	-0.0802*** (0.0246)	-0.1054*** (0.0334)	-0.1570*** (0.0318)	-0.1447*** (0.0384)	-0.1197*** (0.0270)	-0.0840** (0.0354)	-0.1742*** (0.0244)
Treated Mean	6,713,424	5,943,657	7,026,382	9,590,195	4,098,178	3,783,216	9,057,591	3,283,904	9,285,565
Control Mean	36,993,833	39,490,991	27,501,905	36,993,833	36,993,833	9,476,445	55,167,767	21,777,779	294,791,006
IV. Log(Wage Bill per Employee)									
Puerto Rico x Phaseout	0.0107 (0.0090)	0.0031 (0.0109)	0.0167* (0.0094)	0.0089 (0.0123)	0.0161 (0.0119)	0.0050 (0.0138)	0.0124 (0.0109)	0.0067 (0.0120)	-0.0162 (0.0145)
Treated Mean	2,589	2,410	2,775	2,940	2,271	2,303	2,819	2,283	2,819
Control Mean	4,297	4,325	4,200	4,297	4,297	3,799	4,626	4,209	5,788
Treated Counties	63	43	37	30	33	28	35	27	36
Control Counties	2,494	1,952	913	2,494	2,494	992	1,502	2,355	139

Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Data spans from 1990–2000. Each subset includes counties that met the specified criteria at any point during the relevant period. For LQ subsets, counties are classified based on whether their manufacturing location quotient was above or below Puerto Rico’s median (1.74) at any time before 1996. For college degree, population density, and low poverty subsets, counties are classified based on whether they were above or below Puerto Rico’s 2000 median values (13.2%, 825.6 persons/mi², and 52.2% respectively) in the year 2000. The high poverty subset uses special logic: it includes all non-Puerto Rico counties regardless of poverty rate, plus Puerto Rico counties with poverty rates above 52.2% in 2000, ensuring a complete control group given Puerto Rico’s uniquely high poverty levels. Pre-period means are calculated using unlogged values from 1990–1995. Control States refers to the total used for the donor pool of the synthetic control.

Table 4: Effect of the Phaseout on Puerto Rico’s Manufacturing (by Sec. 936 Tax Credits)

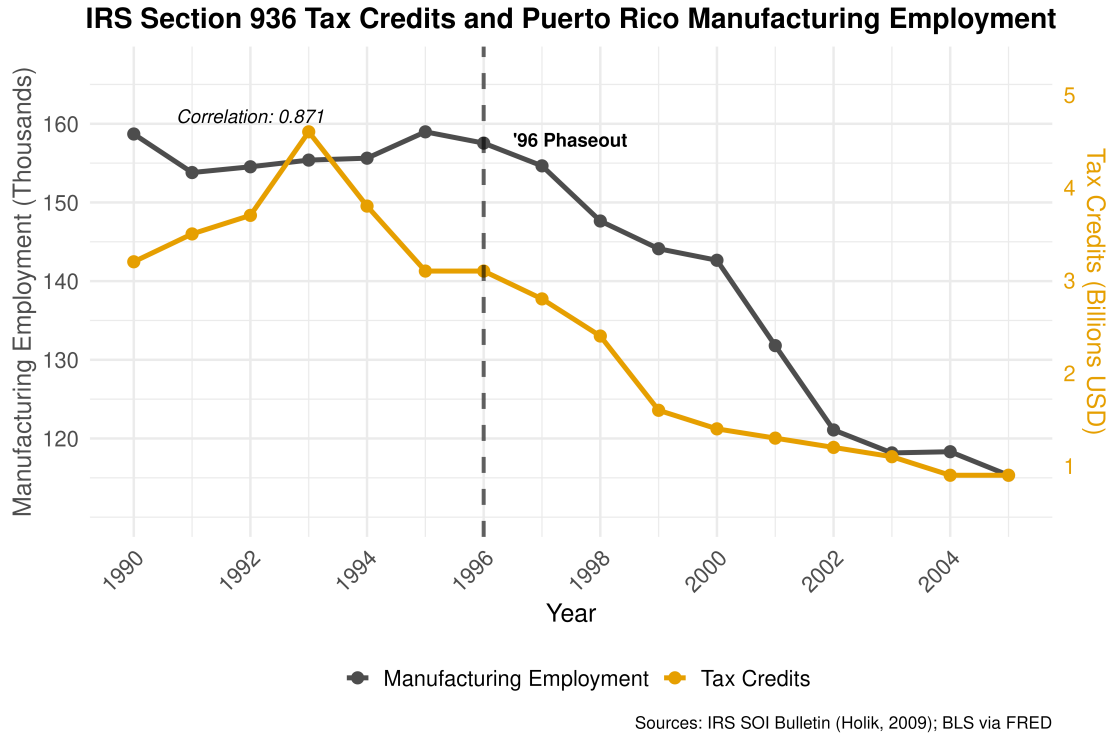
	By Tax Credits of Sec. 936 (millions USD)						
	≤3 (1)	4-6 (2)	8-12 (3)	26-30 (4)	51 (5)	166-227 (6)	>1,100 (7)
I. Log(Employment Level)							
Puerto Rico x Phaseout	0.0276 (0.0388)	-0.1118 (0.0902)	-0.1872** (0.0852)	-0.0381 (0.1339)	0.0179 (0.0657)	-0.0415 (0.0621)	-0.0970 (0.1071)
Treated Mean	3,297	3,177	14,848	15,809	2,082	14,204	27,873
Control Mean	21,324	11,278	13,858	15,834	28,407	26,055	20,900
II. Log(Establishments)							
Puerto Rico x Phaseout	0.0539 (0.0363)	0.0298 (0.0690)	0.0216 (0.0673)	0.1217 (0.1091)	0.0651 (0.0699)	-0.0126 (0.0467)	-0.0036 (0.0459)
Treated Mean	175	63	182	152	91	295	179
Control Mean	595	206	621	315	716	398	292
III. Log(Wage Bill)							
Puerto Rico x Phaseout	-0.0037	-0.1077 (0.1001)	-0.2472*** (0.0925)	-0.0986 (0.1469)	0.0294 (0.0878)	-0.0685 (0.0721)	-0.1575 (0.1248)
Treated Mean	8,092,335	9,942,662	44,545,009	24,710,289	6,033,490	39,931,895	131,918,075
Control Mean	121,041,376	60,408,857	63,575,564	51,294,309	172,438,558	146,350,168	155,030,331
IV. Log(Wage Bill per Employee)							
Puerto Rico x Phaseout		-0.0182 (0.0305)	0.0764* (0.0431)	-0.0728 (0.0550)	0.0012 (0.0380)	-0.0412 (0.0400)	0.0015 (0.0644)
Treated Mean	2,436	3,529	2,992	2,072	2,903	2,883	4,713
Control Mean	4,934	5,717	4,203	3,456	5,449	5,014	6,661
Treated States	1	1	1	1	1	1	1
Control States	49	45	51	46	48	51	48

Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Years included: 1990–2000. Industries by Sec. 936 tax credit ranges (millions of 1982-84 dollars, % of total Sec. 936 tax credits): ≤3: Transportation equipment, except motor vehicles (0.3, 0.02%); Furniture and fixtures (0.5, 0.03%); Printing and publishing (1.8, 0.09%); Stone, clay, and glass products (1.8, 0.10%); Fabricated metal products (2.4, 0.12%); Paper and allied products (2.8, 0.14%). 4-6: Petroleum and coal products (4.4, 0.23%); Rubber and miscellaneous plastics products (5.8, 0.30%). 8-12: Motor vehicles and equipment (8.1, 0.42%); Miscellaneous manufacturing and manufacturing not allocable (12.4, 0.65%). 26-30: Textile mill products (26.0, 1.36%); Apparel and other textile products (29.7, 1.56%). 51: Machinery, except electrical (50.9, 2.66%). 166-227: Electronic and other electric equipment (166.2, 8.69%); Instruments and related products (222.9, 11.66%); Food and kindred products (226.5, 11.85%). >1,100: Chemicals and allied products (1,133.3, 59.26%). Industries with NA values—including Tobacco products, Lumber and wood products, Leather and leather products, and Primary metal industries—reported no available data. Total credits: \$1,912.4 million. Sec. 936 Tax Credits retrieved from the U.S. IRS SOI Tax Stats - Table 16 - Returns of active corporations, Form 1120 for 1995. Values deflated using the Consumer Price Index for All Urban Consumers (CPI-U), U.S. City Average, All Items (1982-84=100), which averaged 152.4 in 1995. The mean is calculated using the unlogged (level) values from the pre-period (1990–1995). Control States refers to the total used for the donor pool of the synthetic control.

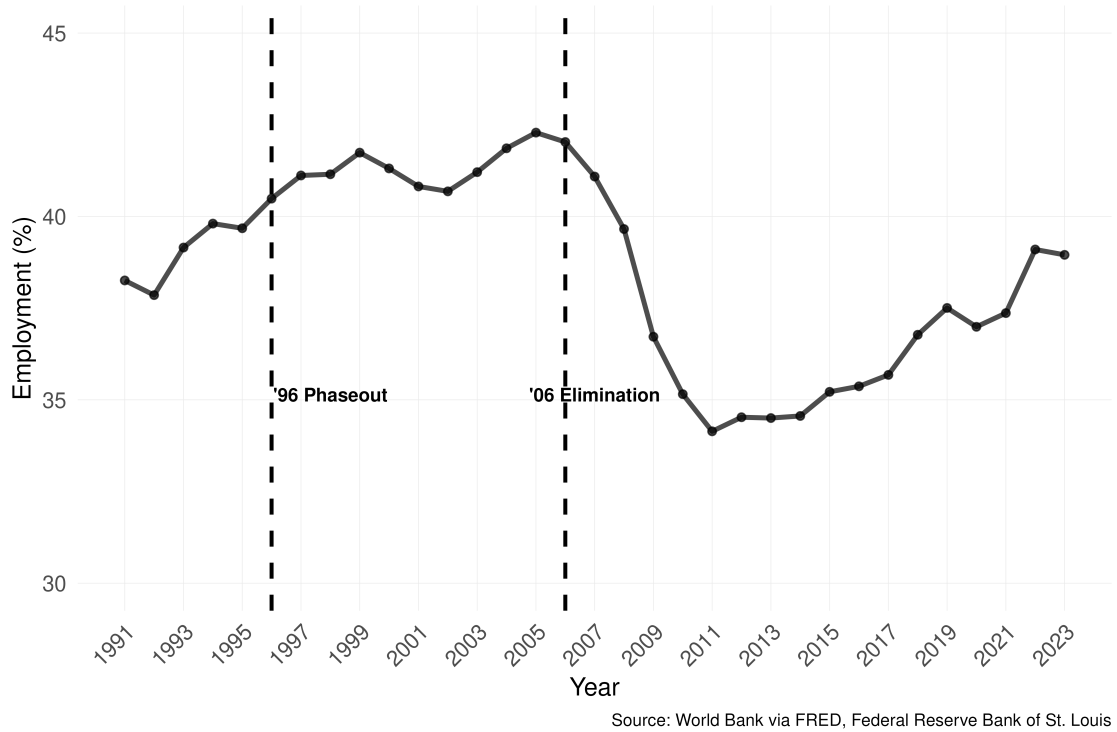
Table 5: Placebo Tests

	Industry (1)	Geography (2)
I. Log(Employment Level)		
Puerto Rico x Phaseout	0.0424 (0.0651)	
Other State x Phaseout		0.0026 (0.0495)
II. Log(Establishments)		
Puerto Rico x Phaseout	0.0537 (0.0563)	
Other State x Phaseout		0.0090 (0.0367)
III. Log(Wage Bill)		
Puerto Rico x Phaseout	0.0544 (0.0860)	
Other State x Phaseout		-0.0039 (0.0757)
IV. Log(Wage Bill per Employee)		
Puerto Rico x Phaseout	0.0181 (0.0502)	
Other State x Phaseout		-0.0051 (0.0375)

Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Data spans 1990–2000. Placebo tests: Industry uses Puerto Rico subsetted by any 2-digit NAICS industry as treated, except 31-33 (Manufacturing), 51 (Information), and 62 (Health Care and Social Assistance). Geography uses any other U.S. state subsetted for Manufacturing as treated.

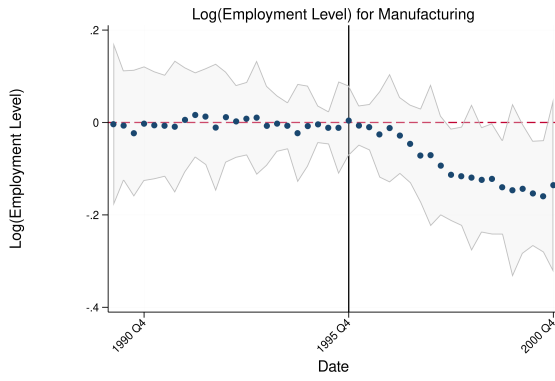


(a) Sec. 936 Tax Credits and Manufacturing Employment
Employment to Population Ratio for Puerto Rico

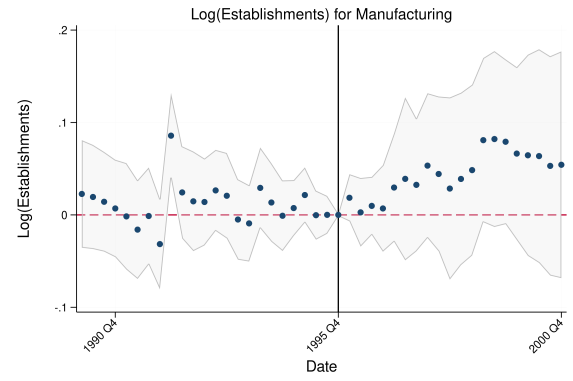


(b) Employment to Population Ratio

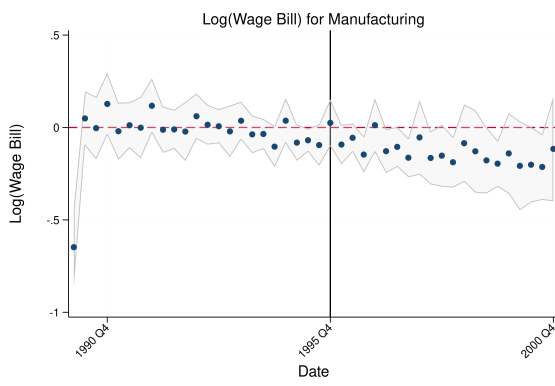
Figure 1: Section 936 Tax Credits and Employment Trends



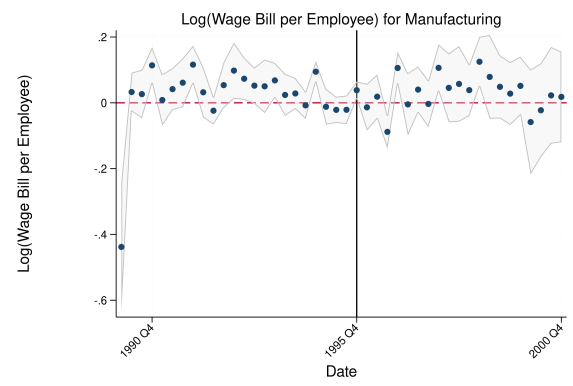
(a) Log(Employment Level)



(b) Log(Establishments)

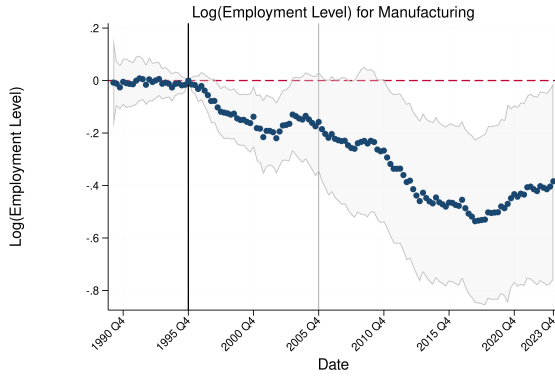


(c) Log(Wage Bill)

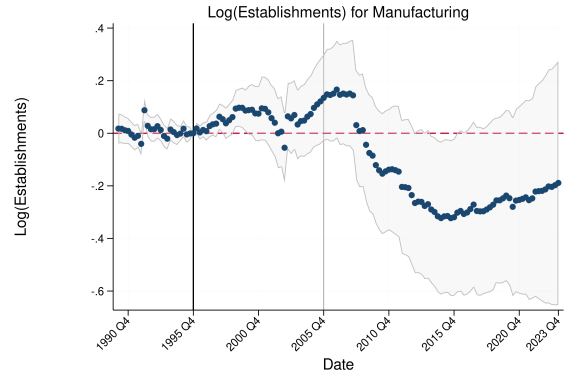


(d) Log(Wage Bill per Employee)

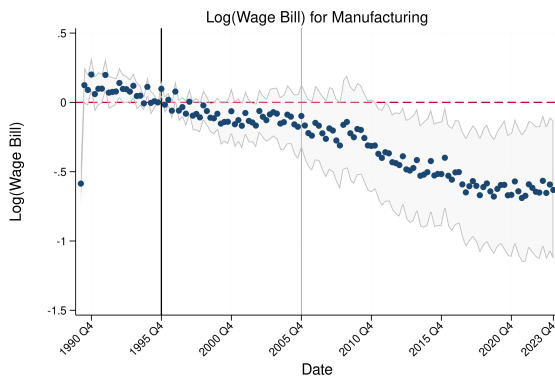
Figure 2: SDiD Event Studies (Manufacturing, until 2000)



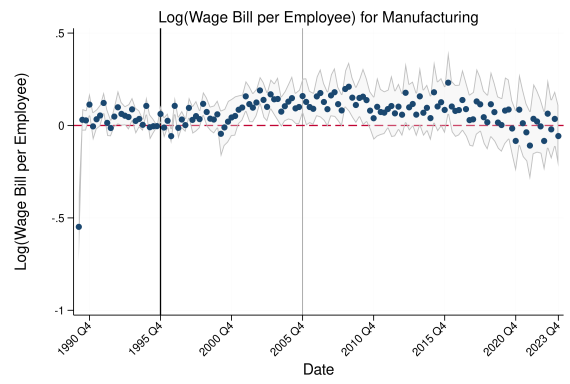
(a) Log(Employment Level)



(b) Log(Establishments)

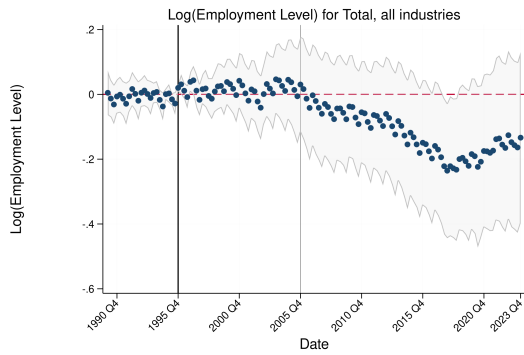


(c) Log(Wage Bill)

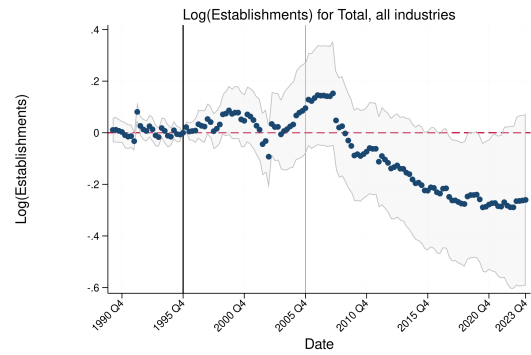


(d) Log(Wage Bill per Employee)

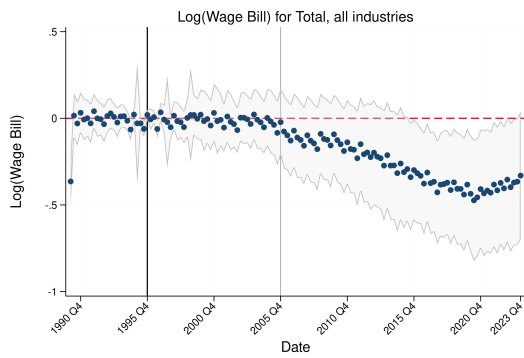
Figure 3: SDiD Event Studies (Manufacturing, until 2023)



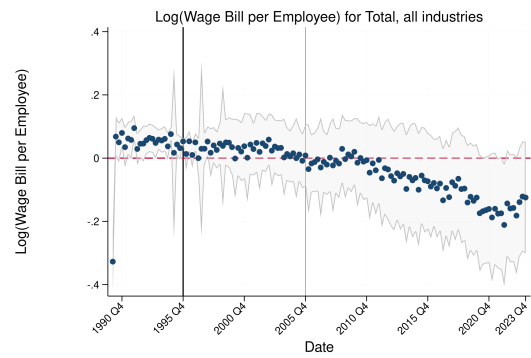
(a) Log(Employment Level)



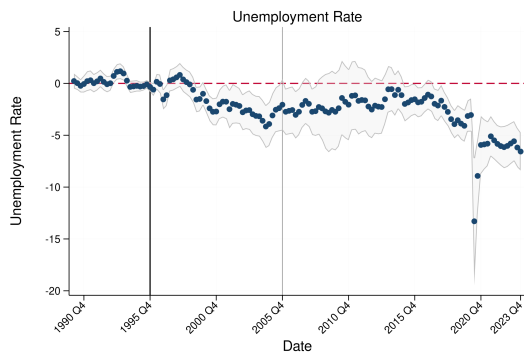
(b) Log(Establishments)



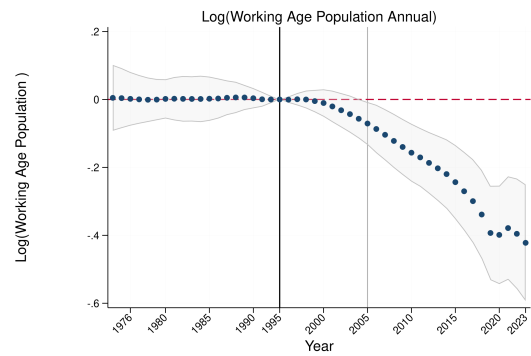
(c) Log(Wage Bill)



(d) Log(Wage Bill per Employee)



(e) Unemployment Rate



(f) Log(Working Age Population)

Figure 4: SDiD Event Studies (All industries, until 2023)

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Appendix

Table A1: Effect of the Phaseout on Puerto Rico’s Manufacturing (by Percentage of Sec. 936 Employees)

	By percentage of employees contracted under Sec. 936						
	≤0.3%	0.4%-0.5%	0.6%-0.7%	0.8%-1.2%	2.0%-2.2%	4.7%-6.1%	8.0%-13.8%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
I. Log(Employment Level)							
Puerto Rico x Phaseout	-0.1178 (0.0751)	-0.0217 (0.0601)		-0.0868 (0.1671)	-0.0134 (0.0464)	-0.0196 (0.0866)	-0.0629 (0.1187)
Treated Mean	6,133	2,982		1,677	6,925	12,108	24,299
Control Mean	6,363	6,679		1,482	16,498	9,468	6,041
II. Log(Establishments)							
Puerto Rico x Phaseout	0.0781 (0.0613)	0.0519 (0.0550)		0.0793 (0.1077)	0.0913* (0.0478)	-0.1239* (0.0692)	0.0543 (0.1011)
Treated Mean	226	78		19	287	64	186
Control Mean	331	154		46	396	138	151
III. Log(Wage Bill)							
Puerto Rico x Phaseout	-0.1282 (0.0791)	-0.0713 (0.0790)		-0.1481 (0.1670)	-0.0476 (0.0507)	-0.0835 (0.0955)	-0.1224 (0.1280)
Treated Mean	14,579,106	9,411,096		3,485,772	18,294,298	37,430,633	73,441,520
Control Mean	26,706,032	40,237,099		5,740,174	79,621,921	56,649,856	27,790,367
IV. Log(Wage Bill per Employee)							
Puerto Rico x Phaseout	0.0073 (0.0284)	-0.0401* (0.0213)		-0.0345 (0.0703)	-0.0180 (0.0240)	-0.0626 (0.0485)	0.0161 (0.0428)
Treated Mean	2,377	3,155		2,079	2,641	3,092	3,022
Control Mean	4,197	6,024		3,873	4,827	5,983	4,600
Treated States	1	1	1	1	1	1	1
Control States	49	52	47	50	51	38	30

Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Years included: 1990–2000. Industries by percentage of Sec. 936 employment (total employees, % of total manufacturing): ≤0.3%: Miscellaneous manufacturing industries (342, 0.22%); Furniture and fixtures (367, 0.23%). 0.4%-0.5%: Petroleum and coal products (720, 0.46%); Paper and allied products (726, 0.46%); Fabricated metal products (792, 0.5%). 0.6%-0.7%: Stone, clay, and glass products (110, 0.7%); all other sectors—including Tobacco products, Lumber and wood products, Printing and publishing, Rubber and miscellaneous plastics products, Primary metal industries, and Transportation equipment reported “D” or no available data. 0.8%-1.2%: Textile mill products (1,270, 0.8%); Leather and leather products (1,873, 1.18%). 2.0%-2.2%: Industrial machinery and equipment (3,095, 1.96%); Food and kindred products (3,502, 2.22%). 4.7%-6.1%: Instruments and related products (7,439, 4.7%); Electronic and other electric equipment (9,581, 6.06%). 8.0%-13.8%: Apparel and other textile products (12,620, 7.98%); Chemicals and allied products (21,862, 13.82%). Total manufacturing Sec. 936 employment: 66,732 (42.19%). Sec. 936 Employment retrieved from the U.S. Economic Census of 1992 for Outlying Areas. The mean is calculated using the unlogged (level) values from the pre-period (1990–1995). Control States refers to the total used for the donor pool of the synthetic control.

Table A2: Effect of the Phaseout on Puerto Rico (additional years)

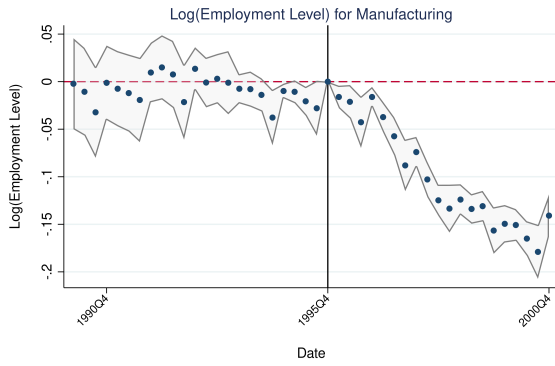
	Manufacturing				Total, all industries			
	2005 (1)	2010 (2)	2015 (3)	2019 (4)	2005 (5)	2010 (6)	2015 (7)	2019 (8)
I. Log(Employment Level)								
Puerto Rico × Phaseout	-0.1337** (0.0633)	-0.1679* (0.0899)	-0.2282** (0.1106)	-0.2798** (0.1218)	0.0013 (0.0353)	-0.0083 (0.0490)	-0.0261 (0.0591)	-0.0567 (0.0675)
Treated Mean	158,604	158,604	158,604	158,604	593,618	593,618	593,618	593,618
Control Mean	354,578	354,578	354,578	360,303	1,801,068	1,801,068	1,801,068	1,801,068
II. Log(Establishments)								
Puerto Rico × Phaseout	0.0591 (0.0473)	0.0471 (0.0645)	-0.0294 (0.0829)	-0.0709 (0.0952)	0.0311 (0.0487)	0.0339 (0.0604)	-0.0092 (0.0682)	-0.0474 (0.0757)
Treated Mean	3,013	3,013	3,013	3,013	40,717	40,717	40,717	40,717
Control Mean	8,020	8,020	8,020	8,020	124,628	124,628	124,628	124,628
III. Log(Wage Bill)								
Puerto Rico × Phaseout	-0.1703** (0.0769)	-0.1998* (0.1129)	-0.2625** (0.1301)	-0.3200** (0.1447)	-0.0340 (0.0558)	-0.0622 (0.0730)	-0.0966 (0.0896)	-0.1453 (0.1007)
Treated Mean	451,614,340	451,614,340	451,614,340	451,614,340	1,404,540,422	1,404,540,422	1,404,540,422	1,404,540,422
Control Mean	1,939,750,914	1,939,750,914	1,939,750,914	1,972,835,674	8,129,039,774	8,129,039,774	8,129,039,774	8,129,039,774
IV. Log(Wage Bill per Employee)								
Puerto Rico × Phaseout	0.0415 (0.2300)	0.0832 (0.1558)	0.1222 (0.1783)	0.0963 (0.2217)	-0.0070 (0.0609)	-0.0020 (0.0421)	-0.0041 (0.0468)	-0.0230 (0.0513)
Treated Mean	2,848	2,848	2,848	2,848	2,363	2,363	2,363	2,363
Control Mean	5,139	5,139	5,139	5,152	4,219	4,219	4,219	4,219
V. Unemployment Rate								
Puerto Rico × Phaseout					-1.6225*** (0.5525)	-1.9236*** (0.7258)	-1.9390** (0.7883)	-1.9918*** (0.7327)
Treated Mean					15	15	15	15
Control Mean					6	6	6	6
VI. Log(Working Age Population)								
Puerto Rico × Phaseout					-0.0236 (0.0182)	-0.0564** (0.0239)	-0.0936*** (0.0293)	-0.1321*** (0.0348)
Treated Mean					2,277,226	2,277,226	2,277,226	2,277,226
Control Mean					3,877,592	3,877,592	3,877,592	3,877,592
Treated States	1	1	1	1	1	1	1	1
Control States	48	48	48	47	51	51	51	51

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. 2005 models use 1990–2005 data; 2010 models use 1990–2010 data; similarly for later years. The mean is calculated using the unlogged (level) values from the pre-period (1990–1995) for each specific data subset. Control States refers to the total used for the donor pool of the synthetic control.

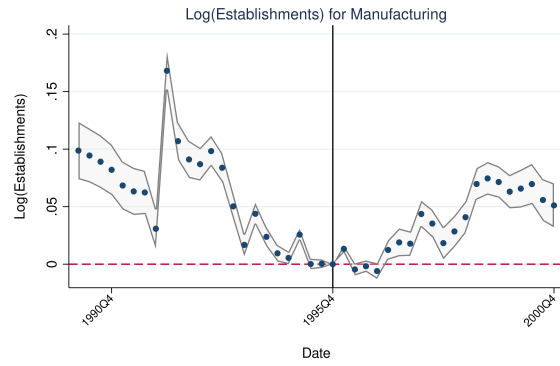
Table A3: Effect of the Phaseout on Puerto Rico’s Manufacturing (with DiD)

	2000	2005	2010		2015		2019	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I. Log(Employment Level)								
Puerto Rico × Phaseout	-0.0940*** (0.0150)	-0.1437*** (0.0182)	-0.1825*** (0.0221)	-0.1437*** (0.0182)	-0.2470*** (0.0251)	-0.1437*** (0.0182)	-0.3026*** (0.0268)	-0.1484*** (0.0180)
Puerto Rico × Elimination				-0.1164*** (0.0153)		-0.2066*** (0.0179)		-0.2644*** (0.0190)
Treated Mean	158,604	158,604	158,604	158,604	158,604	158,604	158,604	158,604
Control Mean	334,872	354,578	354,578	354,578	354,578	354,578	360,303	360,303
II. Log(Establishments)								
Puerto Rico × Phaseout	-0.0215** (0.0098)	-0.0270** (0.0115)	-0.0505*** (0.0149)	-0.0270** (0.0115)	-0.1259*** (0.0178)	-0.0270** (0.0115)	-0.1760*** (0.0201)	-0.0270** (0.0115)
Puerto Rico × Elimination				-0.0704*** (0.0126)		-0.1977*** (0.0150)		-0.2555*** (0.0168)
Treated Mean	3,013	3,013	3,013	3,013	3,013	3,013	3,013	3,013
Control Mean	7,726	8,020	8,020	8,020	8,020	8,020	8,020	8,020
III. Log(Wage Bill)								
Puerto Rico × Phaseout	-0.0485*** (0.0164)	-0.0599*** (0.0200)	-0.0812*** (0.0233)	-0.0599*** (0.0200)	-0.1443*** (0.0262)	-0.0599*** (0.0200)	-0.2028*** (0.0279)	-0.0647*** (0.0199)
Puerto Rico × Elimination				-0.0639*** (0.0161)		-0.1689*** (0.0188)		-0.2367*** (0.0201)
Treated Mean	451,614,340	451,614,340	451,614,340	451,614,340	451,614,340	451,614,340	451,614,340	451,614,340
Control Mean	1,832,871,764	1,939,750,914	1,939,750,914	1,939,750,914	1,939,750,914	1,939,750,914	1,972,835,674	1,972,835,674
IV. Log(Wage Bill per Employee)								
Puerto Rico × Phaseout	0.0456*** (0.0066)	0.1369*** (0.0324)	0.1371*** (0.0224)	0.0838*** (0.0072)	0.1425*** (0.0254)	0.0838*** (0.0072)	0.1519*** (0.0304)	0.0837*** (0.0073)
Puerto Rico × Elimination				0.0526*** (0.0046)		0.0377*** (0.0055)		0.0277*** (0.0061)
Treated Mean	2,848	2,848	2,848	2,848	2,848	2,848	2,848	2,848
Control Mean	5,211	5,139	5,139	5,139	5,139	5,139	5,152	5,152
Treated States	1	1	1	1	1	1	1	1
Control States	51	48	48	48	48	48	47	47

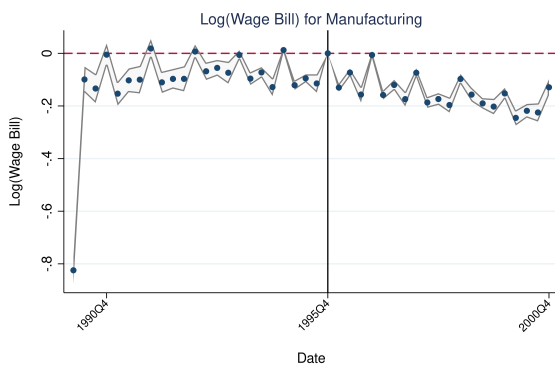
Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Results shown for Manufacturing. 2000 models use 1990–2000 data; 2005 models use 1990–2005 data; 2010 models use 1990–2010 data; similarly for later years. The mean is calculated using the unlogged (level) values from the pre-period (1990–1995). Control States refers to the total used for the donor pool of the synthetic control. Phaseout is a binary variable that’s 1 if the year follows 1995. Elimination is a binary variable that’s 1 if the year follows 2005.



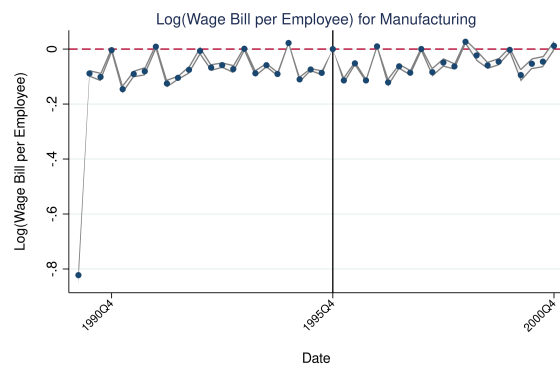
(a) Log(Employment Level)



(b) Log(Establishments)

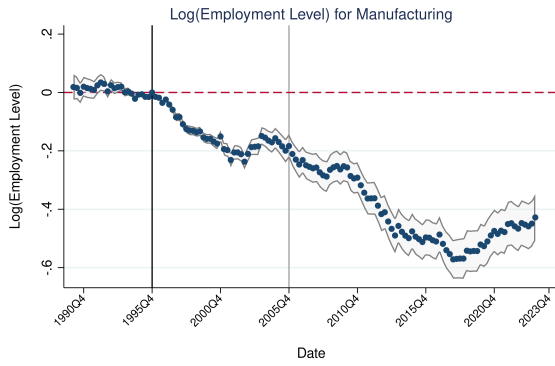


(c) Log(Wage Bill)

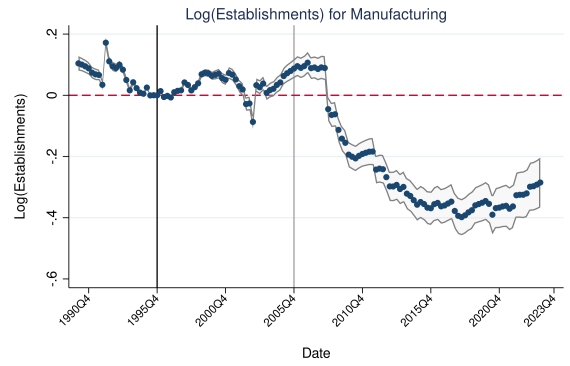


(d) Log(Wage Bill per Employee)

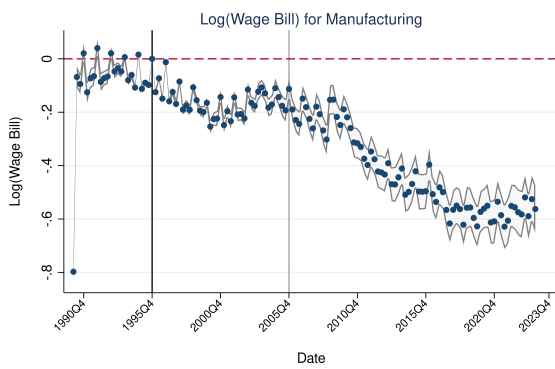
Figure A1: DiD Event Studies (Manufacturing, until 2000)



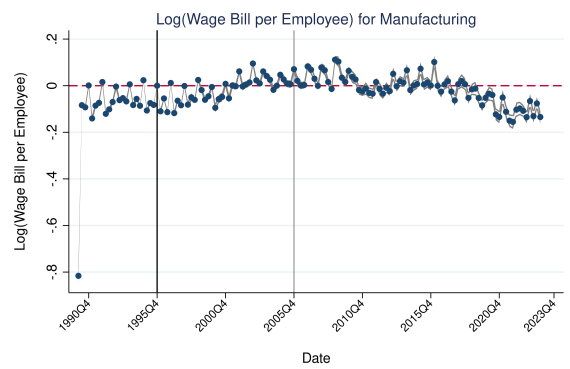
(a) Log(Employment Level)



(b) Log(Establishments)



(c) Log(Wage Bill)

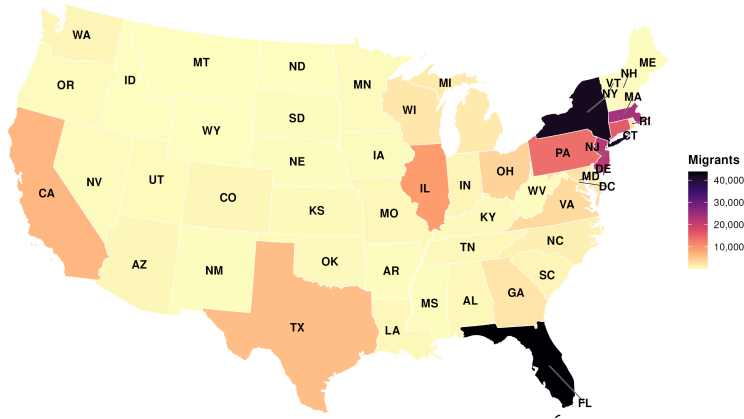


(d) Log(Wage Bill per Employee)

Figure A2: DiD Event Studies (Manufacturing, until 2023)

Migration from Puerto Rico to U.S. States, 1985-1990

Total migration flow (contiguous U.S.)

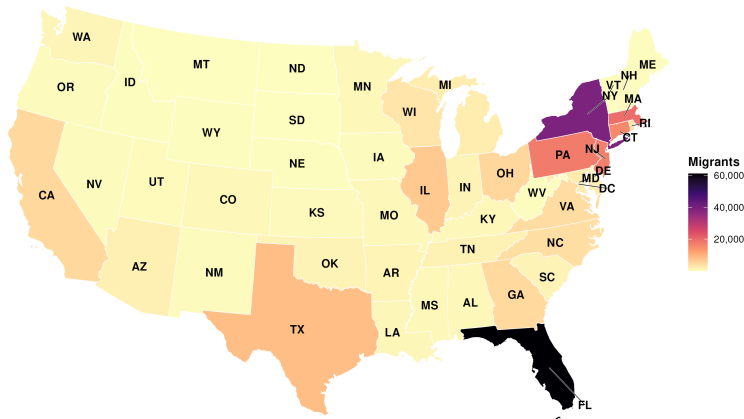


Top 5 destination states: Florida (43,884); New York (41,794); Massachusetts (23,749); New Jersey (21,624); Connecticut (15,820).

(a) 1985-1990

Migration from Puerto Rico to U.S. States, 1995-2000

Total migration flow (contiguous U.S.)

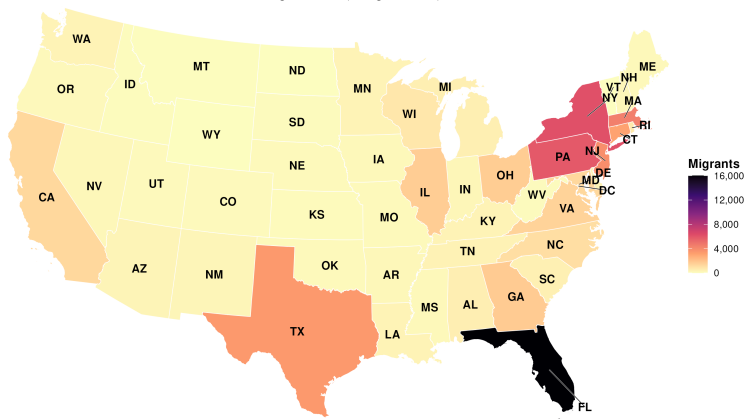


Top 5 destination states: Florida (61,179); New York (39,318); Massachusetts (19,568); Pennsylvania (17,639); New Jersey (16,961).

(b) 1995-2000

Migration from Puerto Rico to U.S. States, 2005-2009

Total migration flow (contiguous U.S.)



Top 5 destination states: Florida (16,015); New York (6,191); Pennsylvania (5,869); Massachusetts (4,483); New Jersey (3,876).

(c) 2005-2009

Figure A3: Migration from Puerto Rico to the Contiguous United States