Subsidizing the Green Transition: Local Labor Market Effects of IRA Incentives

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Abstract

The Inflation Reduction Act (IRA) is the largest industrial and climate policy intervention in modern US history, with hundreds of billions of dollars projected for energy and climate investment incentives. In this paper, I analyze the effects of IRA on local labor markets using Quarterly Census of Employment and Wages data. The reduced-form causal evidence interacts the statutory industry-level IRA exposure with county-level industry structure in a two-way fixed-effects difference-in-differences design. A one-standard-deviation increase in county's IRA exposure raises employment growth by 0.5% and firm growth by 0.12% with no significant wage growth response. Using detailed microdata on recipients of federal US grants, I then show that counties that receive more grants experience higher employment and wage growth. Finally, I evaluate the effectiveness of IRA place-based targeting through energy community designation and find no average post-IRA employment or firm growth effects in energy communities. However, energy communities that receive more direct federal grants experience modest employment and wage increases. These results uncover the role that IRA played in stimulating local labor markets and inform broader debates about the role of different instruments that the government can use in stimulating local economic activity.[1]

Keywords: Inflation Reduction Act, IRA, energy incentives, local labor market effects

JEL: H23, H25, J23, J38, Q52, Q58, R12

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1 Introduction

The Inflation Reduction Act (IRA) represents the most ambitious industrial and climate policy initiative in recent U.S. history, allocating hundreds of billions of dollars in tax credits, loans, and grants to accelerate decarbonization and revitalize domestic manufacturing. The majority of IRA incentives are projected to support energy and climate spending.[2] A central component of this spending is targeted support for private investment through tax credits, direct loans, and project-based grants. These incentives are intended to stimulate not only the adoption of green technologies but also the creation of high-quality jobs in communities across the county.

In this paper, I investigate how the IRA's incentives affect local labor markets through private-sector investment. Using Quarterly Census of Employment and Wages (QCEW), I quantify employment, payroll, firm and wage growth effects of IRA and provide evidence on the effectiveness of place-based incentives for employment embedded in the Act. I also collect micro-level data on federal grants and their recipients that allows me to examine the geographical location, types of recipients, and types of projects that receive federal funding and how effective this funding is.

IRA can affect local labor-market by shifting regional labor demand and the spatial distribution of economic activity in several ways. First, the tax credits and grants can reduce the user cost of capital for qualifying electricity-generation, storage, and clean-energy manufacturing facilities, increasing the likelihood of these otherwise marginal projects being realized. Second, IRA offers targeted manufacturing incentives that can scale up production or plant expansions in places with existing industrial capacity. This can propagate hiring farther upstream in industries like materials, electronics or logistics and downstream in industries such as engineering, installation or consulting through input–output linkages. In addition to these direct channels, capital inflows could induce local consumption as new earnings raise demand for non-tradable services, amplifying local-level hiring even outside credit and grant eligible sectors. Finally, because many incentives are conditional on project siting and local labor compliance, the IRA could also reallocate capital across space.

The specific, often localized, policy design of IRA lends itself to examining its effects using the local labor markets approach. To do that, I use 4-digit industry-county level employment data from QCEW for years 2021-2025 and exploit cross-industry variation in the

[2]See, for example, CBO projections. Note that there is considerable uncertainty regarding the actual fiscal cost of the IRA, with CBO projecting $390 billion USD with other estimates suggesting figures up to three times higher (Aldy, 2025; Bistline et al., 2023b; Della Vigna et al., 2023).

statutory generosity of IRA incentives, interacting this variation with county-level differences in industry concentration—following the approach used by Garrett et al. (2020) to study the local labor market effects of bonus depreciation. This method creates a county-level exposure to industries that stand to benefit more from IRA provisions by the nature of business that they do. These industries are, for example, oil and gas extraction, cement manufacturing, or waste treatment and disposal. Using difference-in-differences method comparing counties with larger and smaller statutory exposure to IRA in 2022 I provide reduced-form causal evidence on how IRA incentives affect employment and wages at the local level. In each specification I control for state by quarter by year fixed effects to account for potential differences in state-level labor market policies and for 4-digit industry by quarter by year fixed effects to account for different employment trends across industries in the US.

I find significant employment, payroll, and firm growth in more exposed counties. A one standard deviation increase in exposure, increases employment and payroll growth by 0.5% and firm growth by 0.12%. I find no significant effect of IRA on average weekly wages growth. The magnitude of the estimated effect is large and economically significant, relative to the effects of other industrial-type policies implemented in the US over the last few decades. For example, Garrett et al. (2020) find that increasing a location's exposure to bonus depreciation from the 25th to the 75th percentile of the distribution increased employment by 1.9% on average over their sample period. In my case, moving from the 25th to 75th percentile of the distribution of exposure to IRA increased employment growth by 0.36%.[3] While my estimates show continued employment growth into first quarter of 2025 (the latest available data), it is possible that this effect will be attenuated in later quarters by the current administration's federal funding freezes and cancellation of specific credits and grants.

In the second part of the paper, using detailed micro-data on federal grants, I show novel descriptives on the firms and communities which these grants were awarded to and examine the geographical distribution of this funding.[4] By October 20205, 71.1 billion USD has been disbursed as part of IRA related grants. Most of this money has been awarded to state

[3]There are several reasons why we would expect the effects of IRA to be smaller. First, while IRA allocation is large in aggregate, its tax credits support specific technology classes, not the full spectrum of investment like bonus depreciation. Further, most credits are conditional: failing to meet labor or domestic-content provisions reduces effective subsidy rates to one-fifth of full value. Second, many IRA credits apply to facilities that come online only after 2024, potentially creating more staggered effects.

[4]This data has been used by Choi et al. (2024); Marin and Chen (2021) who explicitly analyze the data on government grants allocated following 2009 ARRA. Further, many papers use information on government procurement that comes from the same database, e.g., Belenzon and Cioaca (2025); Brogaard et al. (2021); Cox et al. (2024); Goldman (2020); Hebous and Zimmerman (2016); Liebman and Mahoney (2017).

and local governments and funds and non-profits (each received a third of the total funding amount) with 14% going to firms. 14.3% of the total number of grants have been awarded to firms with only 1.6% and 0.6% to government and funds.[5] The vast majority of funded projects mention equity or environment in their description, but the funding mostly goes to those projects that can be classified as technological improvements (43%) or infrastructural projects (16%). For example, among the top 25 recipients of the grants by amounts, FCA and GM, both motor companies, have received around 0.5 billion USD grants for electric drive module production and electric vehicle production, respectively. Finally, the spatial analysis of government grants shows some concentration with largest grants in California and Arizona, but suggests that most communities across the US benefited from the federal funding to some extent.

I combine the grants data with QCEW to analyze whether counties that receive higher amounts of federal funding experienced higher employment, firm, or wage growth. I find that a one standard deviation increase in exposure, increases employment (payroll) growth by 1.2% (1.3%) in counties that receive more than median amount of grants. Further, in more exposed counties that receive more than median amount of grants, I also observe a significant and economically large effect on average wages; a 1 standard deviation increase in exposure for these above median grant receiving counties increases average wage by 1.2%. I find no significant effect on employment, payroll and firm growth in counties that receive below median amount of federal grants. While the baseline estimates aggregate the effects of tax credits, grants, and loans on employment, this analysis shows that the direct federal funding itself plays a substantial role in stimulating local labor markets.[6] These results also support the notion that the growth in employment documented earlier is tied to IRA spending and not simply to growth of green industries.

In the third part of the paper, I examine three potential mechanisms that could be driving these findings: a) place-based incentives, b) direct vs spillover effects, and c) private vs public investment. As IRA includes place-based incentives to support investment in low-income communities or those historically reliant on fossil fuels, such as the energy community bonus, I start by directly examining whether this targeting is effective (Aldy, 2025). To do that,

[5]Note that 75.7% of all recipient names have been redacted due to privacy concerns, but these entities only received 4.7% of the total grants amount. These redacted entities are more likely to be small firms or individuals.

[6]These results do not mean that tax credits themselves did not play a role. While the currently available data does not allow to examine the tax credits directly, it is plausible that firms that benefit from direct government grants are also more likely to receive more credits. Equally, counties that are more likely to benefit from direct grants, could also be more likely to receive more tax credits.

I collect information on which communities were designated by IRA as energy communities and label a county as energy community if it contains at least one census tract that was designated as such a community. I then ask whether employment gains are present in those counties. I find, on average, no change in employment, payroll, firm or average wage growth in the energy community counties after the IRA was implemented relative to non-energy community counties. There is also no significant increase in the amount of grants received by those counties after the IRA. Empirically, I rule out that this is driven by pre-IRA declines in employment growth in those counties. However, energy communities that receive above median government grants experience a significant positive, though very small, employment growth, while energy communities that receive below median government grants experience a negative employment growth. This highlights the importance of government funding for employment growth of those communities.

To understand the impact of IRA incentives on the types of jobs created, I analyze changes in employment and wages across different industries. This also allows me to quantify potential local labor spillovers across industries within counties (Kline and Moretti, 2014a). I find large employment, payroll and firm growth in all industries, not only the ones that stand to benefit more from the statutory IRA provisions. I also observe a significant average weekly wage growth in treated industries in more exposed counties relative to non-treated industries in those counties. This points towards higher quality jobs created in the industries that stand to potentially benefit more from IRA. Industries with largest employment growth are management, transportation, information, mining, accommodation and food and real estate. This suggest strong upstream and downstream industry linkages in job creation as well as strong spillover effects through local consumption.

To understand the potential crowd-out effects of private vs public employment and firm growth, I examine the effects of IRA on public sector employment using QCEW's information on federal, state and local employment. I find no effects of IRA on public sector employment in more exposed counties, in those that received more government grants, or in those that were designated as energy communities. These results suggest that the entire effect of IRA on employment growth comes from private sector employment growth. Given that almost a third all of IRA-related federal grants were awarded to state and local governments, this suggests that these entities likely hire private firms to execute the projects and contracts only stimulating private sector employment.

From policy perspective, understanding the local labor market impacts of such a large-scale industrial intervention as IRA is critical not only for evaluating the effectiveness of

the IRA but also for informing broader debates about the role of government in stimulating economic activity, addressing spatial inequality, and advancing environmental objectives. Further, this paper also contributes to our broader understanding of how federal climate and industrial policy reshapes the spatial distribution of economic opportunity.

Contribution to the Literature This paper contributes to three strands of literature: the effects of the IRA, the effects of place-based policies, and the empirical literature on local labor markets. First, I contribute to the nascent empirical work on the Inflation Reduction Act by quantifying how firm-directed incentives influence employment dynamics in recipient regions. To date, rigorous empirical evaluations of the IRA's economic effects remain limited. Bistline et al. (2023a) show that the IRA could reduce U.S. greenhouse gas emissions by 43–48% below 2005 levels by 2035. Bistline et al. (2023b) assess the IRA's key climate provisions using a representative-agent dynamic model and demonstrate that the legislation is likely to lower headline inflation and generate expansionary supply-side effects relative to a carbon tax. Haskins and Parilla (2024) provide a descriptive account of the geographic and sectoral footprint of the American Rescue Plan Act, Bipartisan Infrastructure Law, CHIPS and Science Act, and IRA, noting that 94% of the funding has been allocated to private-sector recipients. Allcott et al. (2024) focus on a specific aspect of the IRA—electric vehicle tax credits—and find that most of these credits are passed through to consumers. However, none of these studies provide a comprehensive analysis of which firms benefit from the IRA or empirically quantify the policy's effects on local labor markets. This paper aims to fill that gap.

Second, this paper contributes to the broader literature on place-based policies, which has long debated whether targeted direct government transfers to firms generate meaningful and persistent local economic spillovers (Bartik, 2020; Corinth and Feldman, 2024; Kline and Moretti, 2014b). Recent theoretical and empirical work has revived interest in industrial policy as a tool to stimulate innovation and employment (Criscuolo et al., 2019; Decker et al., 2016, 2020; Rodrik, 2022) and some provisions of the IRA represent modern examples of place-based policies. Bartik (2020) and Moretti (2012) show that government subsidies can produce significant localized employment effects, particularly when targeted toward sectors with high multipliers. However, the effects of such policies are heterogeneous: if not carefully designed, place-based industrial policies may exacerbate regional inequality (Gaubert et al., 2025; Neumark and Simpson, 2015). This paper contributes to this literature by providing new evidence on the effectiveness of the place-based incentives aspects of IRA and shows the

role that direct federal grants play in stimulating local economies.

The third strand of literature to which this paper contributes examines how different shocks affect local labor markets. Kline and Moretti (2014a) document large agricultural and manufacturing employment gains following a regional development program in Tennessee, highlighting both direct effects via infrastructure improvements and indirect effects via agglomeration economies. Autor et al. (2013) and Autor et al. (2016) show how import competition from China reduced employment in exposed U.S. regions. Dix-Carneiro and Kovak (2017) analyze the local labor market effects of trade liberalization in Brazil and find that regions more exposed to tariff cuts experienced significant declines in employment and earnings. Garrett et al. (2020) provide evidence of positive local labor market effects from accelerated depreciation policies in the U.S. Serrato (2018) and Bilicka (2024) examine the local labor market impacts of anti-tax avoidance policies in the U.S. and U.K., respectively. Building on this literature, this paper quantifies the local labor market effects of IRA energy and climate spending incentives and shows the channels through which these incentives operate.

2 Inflation Reduction Act and its Implications

This section summarizes the key features of the Inflation Reduction Act of 2022 that are relevant for local labor markets and discusses in detail the main channels through which the law can affect employment, wages, and firm dynamics across places.

2.1 Policy description

The IRA was signed into law on August 16, 2022 as Public Law 117-169. It is a reconciliation bill that combines tax, spending, and prescription-drug provisions; for the purpose of this paper I will focus the discussion on the components that are related to the energy and climate measures, which operate largely through the federal tax code, grants, and credit programs. The Congressional Budget Office's original score projected roughly $270 billion in clean-energy tax incentives over 2022–2031, making the IRA the largest single package of climate-related subsidies in U.S. history.[7] Subsequent CBO updates, using a longer budget window and incorporating regulatory changes that increase credit uptake (e.g., vehicle emissions standards and EV leasing rules), have placed the projected cost of clean-energy tax

[7]See: `https://www.cbo.gov/system/files/2022-09/PL117-169_9-7-22.pdf`

subsidies at about $825 billion over 2025–2035.[8]

The law's main clean-energy tax credits are available for projects placed in service beginning in 2023, with several of the"technology-neutral" credits taking effect for facilities generating power after December 31, 2024. Many of the loan and grant programs funded by IRA appropriations are authorized through the mid-2020s and are currently disbursing funds. IRA incentives are intended not only to reduce emissions but also to attract large-scale private capital and to create "good-paying jobs" in energy manufacturing, construction, and related services.[9]

2.2 Core provisions relevant for local labor markets

The IRA contains a large number of discrete programs; here I group the ones most relevant for local labor-market outcomes into four clusters: (i) clean electricity and storage credits, (ii) clean-energy manufacturing incentives, (iii) public loans and grants, and (iv) transportation and building decarbonization credits.

Clean electricity generation and storage The Act substantially modifies and extends the Investment Tax Credit (ITC) and Production Tax Credit (PTC) for clean electricity. Treasury estimates indicate that, for qualifying projects that meet prevailing-wage and apprenticeship requirements, the ITC can provide up to a 30 percent credit against eligible investment costs in wind, solar, storage, and other qualifying technologies. The parallel PTC offers up to 2.75 cents per kilowatt-hour (in 2022 dollars, indexed for inflation) of electricity generated from qualified facilities that satisfy similar labor conditions. Under IRA, these credits correspond to the Clean Electricity Production Credit (§45Y) and Clean Electricity Investment Credit (§48E) for facilities coming online after 2024 and eligibility is based on emissions intensity rather than a list of specific technologies. In practice, these provisions lower the user cost of capital for utility-scale renewables, storage, and other low-emissions generation, creating strong incentives for new project development and repowering of existing facilities.

Clean-energy manufacturing and industrial decarbonization A core element of the IRA's industrial strategy is the Advanced Manufacturing Production Credit (§45X), which

[8] https://www.reuters.com/business/energy/us-clean-energy-tax-subsidies-cost-825-billion-over-10-year

[9] https://bidenwhitehouse.archives.gov/briefing-room/statements-releases/2023/08/16/fact-sheet-one-year-in-president-bidens-inflation-reduction-act-is-driving-historic-climate-action-and

provides per-unit subsidies for domestically produced components such as solar modules, battery cells, inverters, and certain critical minerals. The IRS catalog of IRA credits lists §45X alongside the Advanced Energy Project Credit (§48C), which subsidizes investments in facilities that manufacture or recycle clean-energy equipment, process critical minerals, or otherwise support low-carbon industrial production.[10] These two credits are designed to pull clean-energy supply chains into the U.S. and to induce new plant construction or retooling in existing industrial regions.

Complementary provisions target emissions-intensive industries. The IRA enhances the credit for carbon oxide sequestration (§45Q), making it more generous and extending eligibility to a wider set of industrial facilities, and establishes a Clean Hydrogen Production Credit (§45V) that subsidizes the output of low-carbon hydrogen. These provisions are expected to generate investment in large capital projects—such as retrofits at refineries, steel mills, cement plants, and chemical facilities—that are unmovable.

Loans and grants The IRA also devotes significant resources to loan guarantees and grant programs. Department of Energy's Loan Programs Office received additional authority to back large clean-energy and advanced technology projects, while USDA, EPA, and other agencies administer grants for rural electric cooperatives, grid upgrades, climate-smart agriculture, forestry, and environmental justice projects.[11] Examples include the Powering Affordable Clean Energy (PACE) program and new support for rural renewables and storage, as well as targeted funds for disadvantaged or underserved communities. These programs can directly finance infrastructure or industrial projects in particular counties, translating federal dollars into localized demand for construction workers, engineers, and operations staff.

Transportation, buildings, and household energy Finally, although in the paper I focus on employer-side incentives, several IRA credits aimed at households and vehicles may have local labor-market implications via induced demand. On the transportation side, the law restructures and extends clean-vehicle tax credits for new and used electric vehicles, with additional support for charging infrastructure through an expanded alternative fuel refueling property credit. On the buildings side, it creates or enhances credits and deductions for residential efficiency upgrades, rooftop solar, and high-efficiency electric equipment (e.g., the updated §25C and §25D home energy credits, and revised §45L and §179D incentives for

[10] https://www.irs.gov/credits-and-deductions-under-the-inflation-reduction-act-of-2022
[11] https://www.energy.gov/lpo/inflation-reduction-act-2022

efficient new homes and commercial buildings). From a local perspective, these provisions can stimulate demand for electricians, HVAC contractors, energy auditors, and building trades, particularly in regions where adoption is high. EPA's summary of IRA-related renewable energy provisions emphasizes that these incentives are intended to reduce the cost of clean energy for businesses, nonprofits, and state and local entities, supporting local labor markets.

2.3 Place-based design: energy communities and labor standards

Two design features are particularly important for understanding spatial heterogeneity in IRA's labor-market impacts: the Energy Community Bonus and the law's labor-standard requirements.

Energy Community Bonus The Act introduces an energy community bonus that increases the value of the ITC and PTC by up to 10 percentage points for projects located in qualifying areas.[12] Treasury and IRS guidance define three ways that a census tract can qualify: (i) the tract contains, or is adjacent to, a coal mine closed after 1999 or a coal-fired power plant retired after 2009; (ii) it lies in a metropolitan or non-metropolitan statistical area with above-average unemployment and a minimum share of employment in fossil fuel industries (including oil, gas, coal, and certain manufacturing activities); or (iii) it includes a brownfield site as defined under environmental statutes. The Department of Energy maintains a mapping tool that identifies potentially qualifying energy communities under these criteria, providing project developers with a geographic menu of sites eligible for bonus credits.[13] I take advantage of this tool to construct an energy community county-level variable that I describe in the next section. From a local labor-market perspective, this provision is intended to skew investment decisions toward historically fossil-dependent or distressed regions, amplifying employment effects where bonus-eligible sites overlap with developable land, transmission access, and permitting capacity.

Labor standards and job quality A second important dimension is the law's linkage between full credit values and compliance with prevailing-wage and registered-apprenticeship requirements. Treasury and the Department of Labor emphasize that developers must pay workers at least local prevailing wages and employ a specified share of apprentices from

[12] https://home.treasury.gov/news/press-releases/jy2203

[13] https://arcgis.netl.doe.gov/portal/apps/experiencebuilder/experience/?id=a2ce47d4721a477a8701bd0e08495e1d

registered programs in order to claim the "bonus" rate of the ITC or PTC; failure to meet these conditions typically reduces the credit to a base rate one-fifth as large. These rules make IRA incentives conditional not only on the quantity of labor demanded but also on the quality of jobs created—particularly in the construction phase. In local markets where such projects cluster, the requirements may raise wage floors, expand apprenticeship opportunities, and strengthen the bargaining position of skilled trades, potentially affecting wage distributions and occupational upgrading even outside directly subsidized firms.

2.4 How can IRA affect local labor markets?

Given its policy design, several mechanisms can transmit IRA incentives into local labor-market outcomes. These mechanisms operate at different margins—capital location, employment, wages, and migration—and their relative strength is likely to vary across regions.

First, IRA lowers the cost of capital for qualifying energy and manufacturing projects, making more projects financially viable and advancing their timelines. For each new utility-scale solar farm, wind facility, battery plant, or hydrogen hub, there is an associated increase in local demand for construction labor during the build-out phase and for technicians, operators, and maintenance workers during the operating phase. Because siting decisions are sticky and tied to physical geography and infrastructure, these jobs are likely to be geographically concentrated in markets exposed to pre-existing industries that are likely to benefit from IRA.

Second, the §45X and §48C incentives are explicitly targeted at domestic manufacturing of clean-energy components and critical minerals. By encouraging firms to locate or expand plants in the U.S., they can create high-wage manufacturing jobs in counties that already host relevant industrial capacity or logistics networks. Input–output linkages imply that upstream suppliers (fabricated metals, electronics, logistics) and downstream service providers (engineering, consulting, finance) may also expand employment in nearby areas as orders from IRA-supported projects rise.

Third, new jobs and higher earnings in IRA-affected sectors increase local disposable income, raising demand for non-tradable goods and services (retail, restaurants, personal services). This can produce secondary employment gains even in industries that are not directly eligible for credits or grants. Estimates cited by the White House—over 170,000 clean-energy jobs created in the first year and projections of more than 1.5 million additional jobs over the next decade—reflect both direct and induced effects of the investment wave

triggered by IRA incentives.[14]

Fourth, because IRA subsidies are tied to project location and, in some cases, to energy-community status, they may reallocate investment across regions rather than simply scaling up existing trends. Areas with suitable renewable resources, available land, and grid interconnection can attract projects away from otherwise similar counties without those advantages. Bonus credits in energy communities can further redirect investment toward regions with historical fossil dependence or labor-market distress. As projects and jobs move, workers may follow, generating migration flows that alter population levels, labor supply, and housing markets across counties.

Finally, IRA may crowd in or crowd out other local investments. On the one hand, improved infrastructure (e.g., transmission, storage, or grid reliability) and a more skilled workforce may attract additional private investment to treated regions. On the other hand, increased demand for land, permitting capacity, or specialized labor could bid up local input costs and displace non-subsidized projects. The net effect on overall employment and wages in unclear.

3 Methodology and Data

3.1 Empirical Approach

To estimate the causal effects of IRA energy and climate incentives on local labor markets, I exploit cross-industry differences in the generosity of statutory IRA provisions, interacted with county-level variation in industry concentration. In doing so, I closely follow the methodology outlined in Garrett et al. (2020) that they use to examine the effects of bonus depreciation. Given the highly localized nature of the IRA provisions discussed above, this empirical approach is particularly suitable to examining the effects of IRA.

First, I use information on projected IRA benefits across 4-digit NAICS industries to classify those industries into either treated or control groups. The mapping I employ relies on statutory eligibility for IRA production (§45X), investment (§48C), clean electricity (§45Y/§48E), carbon-capture (§45Q), hydrogen (§45V), energy-efficient construction (§45L, §179D), and related provisions, complemented by Environmental Protection Agency programs such as the Methane Emissions Reduction Program (MERP). Treated industries encompass upstream resource extraction and energy production (NAICS 2111–2131,

[14]For source, see footnote 8 above.

2211–2213), construction and utilities (2361–2382), and a broad range of manufacturing activities spanning basic materials (3272–3314) to advanced clean-energy equipment (3334–3363). I additionally include select service sectors (5413, 5416, 5417) that are integral to engineering, design, and scientific support for clean-technology deployment, and waste-management services (5622) that benefit from methane-reduction and recycling incentives. I provide a detailed list of all 4-digit NAICS industries I classify as treated in Table A4 in the Appendix. This definition captures the supply-chain segments most likely to experience demand shocks or capital inflows triggered by the IRA's energy incentives. This classification excludes industries indirectly affected by IRA, which means that any employment gains in those industries that I find using this approach can be classified as spillovers.

For each county, I calculate total employment in both public and private sectors in IRA-exposed treated industries relative to total employment in all industries using data on county-level 4-digit industry-level employment composition from the Quarterly Census of Employment and Wages (QCEW). I use 2022 (pre-IRA) employment to construct this continuous IRA exposure measure:

$$Exposure_c = \frac{\sum_j Emp_{ic2022} 1(treated_i = 1)}{\sum_j Emp_{ic2022}} \tag{1}$$

Here, $Exposure_c$ denotes the share of county c's 2022 employment in treated industries i relative to total employment in that county. I plot the geographical distribution of this exposure measure in Panel A of Figure 1. This exposure measure allows me to estimate the differential impact of IRA provisions across counties that *ex ante* stand to differentially benefit from IRA. I then use this exposure measure in an event study framework to estimate the effects of IRA on local labor markets between 2021 and 2025. Years 2021–2022 represent the pre-IRA period; 2023–2025 are post-IRA. In the baseline estimates, I focus on years after the 2020 Covid pandemic shock and in the Appendix I show that the magnitudes of the estimated effects are similar if I include time periods starting in 2018. I estimate the following specification:

$$Empgr_{cit} = \alpha + \sum_{\kappa=2021}^{2025} \delta_\kappa [Exposure_c] \times (t = \kappa) + \gamma_{st} + \eta_{it} + \epsilon_{cit} \tag{2}$$

where c is county, i in industry and t is quarter-year. $Empgr_{cit}$ is sector-county-quarter private sector employment (payroll, firm count or average wage) growth, $Exposure_c$ is defined

using equation (1) above, γ_{st} are state-quarter-year fixed effects, η_{it} are industry-quarter-year fixed effects, and ϵ_{cit} is the error term. The rich set of fixed effects absorbs any variation in employment growth driven by sectoral trends, or state-level labor policies. In each specification I also control for population changes to disentangle job growth coming from migration. I cluster standard errors at the county-level, as the exposure measure is defined at that level.

The coefficients δ_κ identify the causal effect of IRA exposure under the assumption that, absent the legislation, employment in more- and less-exposed county-industries would have followed similar trends. While I cannot directly test this assumption, the event study framework allows to evaluate its plausibility, if I observe no differential pre-trends before the IRA was implemented. To quantify the average employment gains at the local level up to 3 years after the policy was implemented I also compare employment before the IRA introduction to that after estimating a traditional difference-in-differences specification of the form:

$$Empgr_{cit} = \alpha + \beta Exposure_c \times post_t + \gamma_{cs} + \eta_{st} + \delta_{it} + \epsilon_{cit} \tag{3}$$

where $post_t$ is a dummy equal to 1 in 2023- 2025 and 0 in 2021-2022.

Note that while exposure is calculated using the sum of both private and public sector employment, in the baseline specifications, I consider the effects of IRA only on private sector employment, payroll and wages. In the Appendix, I separately show effects of public sector employment to understand which one drives the demand for labor locally.

Who receives the funding? A key limitation of the proposed identification strategy is that, although certain industries are expected to benefit significantly from the IRA *a priori*, it is uncertain whether federal funds will actually flow to these projected industries. To address this, I use data from usaspending.gov, which provides detailed micro-level information on federal grants, loans, and direct payments—including amounts, recipients, recipient locations, disbursement dates, and funding sources. One limitation is that the usaspending.gov dataset does not capture the use of IRA-related corporate tax credits, while the exposure measure I use as a baseline plausibly does.[15]

I use information on the federal grants received by entities located in each county to construct an additional county-level measure of exposure that relies on the amount of grants that each community received. I use a dummy variable that classifies counties as either

[15]While the IRS has published detailed statistics on residential clean energy credits—reporting over $8 billion claimed by 3.4 million households in 2023—comparable data on business tax credits is not yet available.

above or below median grant receivers defined using all federal funding received between 2023-2025. This identification relies on comparing employment growth in communities that receive more grants relative to those that receive less grants that are tied to IRA provisions. Table A1 shows that most of both the high and low exposure counties receive federal grants. In specifications that use the interaction between post and grants exposure measure, I control for logarithm of total federal grants to disentangle the specific effects of IRA-related federal funding.[16]

While the amounts of grants and loans received are potentially endogenous to firm operations, assuming that the geographic location of firms applying for federal funding is exogenous in 2022, this approach allows me to estimate the causal effects of IRA grants exposure on local labor markets. This approach complements the baseline analysis by enabling direct quantification of local labor market effects generated by federal grants.

Energy communities To directly examine the role of energy communities, I use the information on energy communities from the Department of Energy website[17] to examine the evolution of employment growth in places that were classified as those communities relative to those that were not.

As the energy communities are classified based on Census tracts or metro areas, not counties, I construct an indicator for whether a county intersects any qualifying energy community based on DOE's Energy Communities dataset. I use information on tracts that experienced a mine closure, generator closure, were adjacent to either of those or were part of the metropolitan or non-metropolitan statistical area with above-average unemployment and a minimum share of employment in fossil fuel industries. I plot the geographical distribution of energy communities in Panel B of Figure 1 and I plot geographical distribution of each separate classification in Figure A3 in the Appendix. In the map, in darker shades I plot counties that were affected by several of the energy community designations, but in the empirical analysis I only use a dummy for whether a county intersects an energy community or not.

The caveat with this identification strategy is that it is plausible that energy communities employment growth comes at the expense of non-energy communities. In that case, the magnitude of the estimated effects would be inflated in a difference-in-differences method

[16] I do not use a continuous grant exposure measure as a share of all federal grants, as employment growth could be coming from additional non-IRA grants.

[17] `https://arcgis.netl.doe.gov/portal/apps/experiencebuilder/experience/?id=a2ce47d4721a477a8701bd0e08495e1d`

that compares communities classified as energy ones and those that were not. To combat that, as an additional strategy, I interact the energy community dummy with my primary IRA exposure measure—defined from pre-IRA industrial composition and sectoral eligibility for IRA tax incentives. The interaction identifies whether the employment and earnings effects of IRA exposure are amplified in counties eligible for bonus credit rates, consistent with stronger employment responses in regions historically reliant on fossil energy production.

3.2 Datasets

This paper utilizes several datasets that allow for construction of a comprehensive county-industry-quarterly level dataset. I describe each dataset in turn and discuss sample selection criteria I use in the paper.

QCEW and other county level datasets Data on employment, payroll, firm numbers and average weekly wages comes from the Quarterly Census of Employment and Wages provided by the Bureau of Labor Statistics. This dataset provides detailed quarterly coverage of employment and wages at the county-industry level. I use 4-digit NAICS industries at the baseline as they provide most accurate classification of IRA-exposed industries. I provide results using 3-digit NAICS industry code in the Online Appendix.

In QCEW, I only keep data that is reported at the county-industry level, removing all state and national entries. I then remove all county-industry cells that never had any employment and keep only private sector employment. In Appendix, I directly look at public sector employment growth separately. I also remove Hawaii, Alaska and Pacific outer states and hence only consider employment effects for mainland US.

I use this data to create growth variables by benchmarking growth against 2022 respective quarters to account for seasonality. As such, employment growth in Q1 of 2023 is measured relative to employment in Q1 in 2022 and employment growth in Q2 in 2024 is measures relative to employment in Q2 in 2022. This allows me to interpret the event study coefficients as a cumulative growth relative to each relevant quarter. I winsorize these growth rates at 1% at the top and bottom and show robustness to winsorization at 5%.

I supplement QCEW with additional information on local economic conditions, including county-level GDP from the Bureau of Economic Analysis and county-level population from Census.

Government spending Information on federal grants is sourced from usaspending.gov. This dataset contains granular records on all federal contracts, grants, and loans, including the amount disbursed, the recipient and their location, the award date, and the funding source. There are two types of information on the amount of money entities receive; first is the total obligated amount for the entire award, which is summed across all federal actions to date (stock); second is the federal action obligation which is the amount associated with a single federal transaction (flow). In the county-industry level analysis, I use the total obligated amount as this summarizes the stock of awards received. In the analysis of the individual grants distributions, I take advantage of both the stock and the flow-level grants information.

I collect grants and loans information for years 2018 - 2025 and classify these into IRA or non-IRA related using the description of the prime award transaction and program activities funding the grant. If the descriptions include either IRA or "Inflation reduction act" this grant is classified as IRA-related.[18] The entire collected dataset includes information on over 86 million recipients over that time period of which over 82,000, 0.13%, I classify as IRA-related. Of those 82,000 recipients, many entities received multiple grants, so there are only 17,024 unique recipients.

4 Results

4.1 Employment, payroll and firm growth

I summarize the baseline results in Figure 2 and in Table 1. In Figure 2, I plot the evolution of employment, payroll, firm numbers and weekly wages growth using specification outlined in equation (2). In panel a, I show that both employment and payroll growth increase in more exposed counties after the IRA is implemented with no visible difference in employment growth before the IRA. The magnitude of the effect suggests an initial modest increase in employment and payroll growth of similar magnitudes of about 5% when moving from zero exposure to full exposure counties in 2023 which accumulates to the total of around 15% by the first quarter of 2025. As the standard deviation of exposure measure is 0.05, these magnitudes suggest that 1 standard deviation increase in exposure increases employment growth by 0.25% in 2023 and by 0.75% by the first quarter of 2025.

In panel b of Figure 2, I show results for the number of firms growth and similarly find an

[18] In Tables B9 - B11 in the Appendix I list an alternative classification of funding that uses the Catalog of Federal Domestic Assistance codes.

increase in more exposed counties after the IRA. By 2025, one standard deviation increase in exposure of a county increases firm growth by about 0.25%. Finally, in Panel c, I plot the evolution of average weekly wage growth and find no difference between more and less exposed counties either before or after IRA was implemented.

In Panel A of Table 1, I summarize these results using specification outlined in equation (3) to obtain the average effect of IRA in more exposed counties over the analyzed time period. On average, one standard deviation increase in exospore increases firm growth by 0.12%, employment growth by 0.47% and payroll growth by 0.49% with no significant change in wage growth.

In Panel B of Table 1, I report results that use grant exposure instead of baseline exposure measure. Grant exposure is a dummy equal to 1 when a county receives more than median amount of IRA-related federal grants in years 2023- 2025. I find that counties that receive more federal funding experience an increase in firm, employment, payroll and weekly wages growth. This is consistent with the mechanism where firms receive additional funding which eases their financing constraints and allows them to invest in marginal projects. As labor and capital are likely complements in the US (Curtis et al., 2021), this increases firm employment too. The magnitude of the effect suggests that moving from below to above median grants exposure counties increases employment growth by 2.5%. In counties with below median exposure, the mean amount of federal grants is $64.4 million and in counties above median exposure, the mean amount of federal grants is $18.8 billion dollars, orders of magnitude larger. This means that a county needs to receive 300 times more federal grants to increase employment growth by 2.5%, payroll growth by 2.7% and firm growth by 0.5%. However, the standard deviation of federal grants is 113 billion, which indicates substantial dispersion among high-grant counties with some counties receiving a lot of federal support. This is also what we see when looking at the geographical distribution of the IRA-related grants that I present in Figure 3, where some counties in California and Arizona receive between 3.8 billion - 3 trillion of dollars in federal grants.

How do we reconcile the differences in the average weekly wage growth results between panels A and B of Table 1? In more exposed counties, I find no wage growth effect, but in counties that receive more federal IRA-related grants, I find a significant increase in wage growth. It is plausible that the results for baseline exposure hide heterogeneity between treated industries that directly benefit from IRA provisions and which directly receive these federal grants and control industries that do not. In fact, this is what I show in Table 6 in the next section and I discuss this heterogeneity in more detail in the context of the mechanisms

that are driving my findings.

4.2 Government grants

To understand the importance of government grants and their targeting I aggregate these grants by county for all periods starting in January 2023 and I plot the distribution of the sum of grants by county in Figure 3. This figure suggests some geographical concentration of those grants mainly in Arizona and California. However, contrary to some of the early work (Haskins and Parilla, 2024), at least the grants appear to be distributed across many communities in the US, with most counties receiving at least some of the funding.

I validate that this measure picks up IRA-related funding in several ways. First, I plot the total annual amounts of IRA grants distributed in Figure 4. Consistent with the grant application timelines and the fact that a lot of IRA provisions were implemented in 2024, most of the funding starts coming in 2024 and declines in 2025.[19] In total, by October 2025, 71.1 billion USD has been disbursed as part of IRA related grants.[20]

In Table 2 I use information from the grants database on the grant recipients to classify them into categories. I summarize which words were used to classify each firm into a particular category in Table B7 in the Online Appendix.[21] I find that in 76% of cases the information on the recipient of the grant was redacted due to privacy issues, but that those redacted recipients only received 4.7% of all the grants. Of the remaining recipients, the most common category are firms, with over 11,500 recipients of IRA-related grants between 2023-2025. These firms received a total of 10 billion USD in grants (14% of all grants). The largest recipients of the IRA-related grants are funds and nonprofits followed by government (each received around third of the total amounts; 23.66 and 23.3 billion respectively). Governments include state, county and city governments while funds and nonprofits include various conservancy organizations or funds.[22] The remainder of the money was disbursed

[19]We collected this data in October of 2025, so not all of the 2025 funding is included in this version of the paper yet.

[20]This is a bit lower than the report from Reuters `https://www.reuters.com/sustainability/climate-energy/biden-protects-84-ira-clean-energy-grants-being-clawed-back-2025-01-17` which show that in early 2025, this amount was close to 96 million. When I include the cfda numbers that were unique to IRA, this number goes up to 76 billion. This means that I do not capture all of the IRA-related grants.

[21]In Figure B10 I show the histogram of the 25 most commonly occurring words in the recipient names and in Figure B12 I visualize those in a word cloud.

[22]In Figure B11 in the Online Appendix I show the top 25 largest beneficiaries of the IRA-related grants. The largest recipient is the Climate United Fund, followed by Coalition for Green Capital and Opportunity Finance Network. All three of those recipients are classified into 'funds and nonprofits' category.

to agricultural enterprises (e.g. farms), research (e.g. universities and institutes) or native tribes. Each of those received 1.2 billion, 2.2 billion and 2.3 billion USD respectively.

In Table 3 I use the information on the description of activities from the grants database to categorize grants by the type of activity that the recipient proposed to engage in. I summarize which words were used to classify each activity into a particular category in Table B8 in the Online Appendix. The largest number of grants were given to organizations that described their activities as related to equity (e.g., justice, jobs, restoration, conservation). However, these grants amounted only to 2.95 billion, 4.1% of the total. Instead most of the grants were awarded for projects related to tech (43.5% of all grants) and infrastructure (15.9%), followed by environment. Projects related to environment are those that in their description mention energy, renewable, solar, grid or similar, so these could easily be classified as large infrastructure projects. As such, this table suggests that most of the money was invested in large manufacturing or infrastructure related projects that pushed the innovation frontier. Consequently, these grants have potential to directly affect local labor markets through large new projects and project upgrades that were funded. While much of the money was given to nonprofits, funds and government agencies, these entities were likely to realize their projects through private firms. In Appendix C.1.1, I provide the description of selected 6 projects from the list of top 25 grant recipients by amount.

4.3 Place-based incentives: energy communities

I then analyze whether employment growth is concentrated in energy communities that were designated to receive additional IRA bonus if investment was performed there. I summarize these results in Figure 5 estimating an event study model and in Table 4 using a difference-in-differences approach. Across panels a-c in Figure 5, I find no evidence of any significant increase in employment, payroll, firm, or average wage growth. If anything, energy community counties experienced lower growth in 2023 relative to 2022 and relative to non-energy communities. This effect disappeared by 2024. In panels d and e of this figure, I also show that energy communities do not receive more federal funding than non-energy communities. In panel d, I show the IRA grant share in all federal grants actually declines for these communities by 2024, but I observe no change in levels in panel e. Large standard errors in those estimates suggest large heterogeneity in IRA grant estimates.

In Panel a of Table 4, I quantify these event study estimates and show no significant change in any of the employment, payroll, firm, and wage growth in energy communities following the IRA relative to non-energy communities. It is also important to note that

energy communities before IRA were experiencing negative growth in the outcomes of interest relative to non-energy communities (see the coefficient on $energycom_i$) and the IRA did not change that. Estimates from column 5 confirm the negative effect of IRA on IRA grants share I observe in Panel d of Figure 5 is significant over the time period. Because the IRA grants do not see a significant change in levels, this negative effect is likely driven by an increase in overall federal grants to those energy communities.

To explore these results further, in Figure B5 in the Appendix, I analyze the heterogeneity of IRA across different types of energy communities. In each case I compare these energy communities only to non-energy ones, removing counties that are designed as energy communities based on the other criteria. In hollow diamonds I show a baseline for all types of energy communities relative to non-energy communities that I report in Table 4. Across different energy community designations, I find negative significant and large employment growth effects for mine closure counties relative to non-energy communities following the IRA. At the same time, I find positive employment growth effects for generator closure counties and those counties adjacent to mine or generator closure. Finally, I find no significant effect for counties that intersect MSA areas with a minimum share of employment in fossil fuel industries, but find negative employment growth effects for a subset of those MSAs that also have above-average unemployment. This pattern is consistent across all outcome variables of interest: firm growth, payroll and average weekly wage growth. These results suggest that IRA has heterogeneous effects across different disadvantaged community types and that some of those stand to benefit more from the provisions in the Act than others.In Figure B6 I show no heterogeneity across those different community types in terms of the amount of federal grant funding received, which suggests that grants are not driving those results.

In Panel B of Table 4, I interact my baseline exposure measure with the energy community dummy to understand whether energy communities that *ex ante* were likely to benefit more from the IRA experienced any differential employment, payroll, firm or weekly wage growth. I continue to find positive effect on growth of these outcome variables for non-energy community counties, but find that energy communities experienced lower, though still positive, growth relative to non-energy communities after IRA. This is consistent with evidence in panel A of that table where energy communities had negative growth in the outcome variables of interest even before the IRA and the Act did not change that. However, energy communities that had more industries likely to benefit from IRA did experience positive 6.4% employment growth; i.e., a one standard deviation increase in exposure for those counties

increased employment growth by 0.32% relative to 0.59% for non-energy counties (almost half the size). I observe similar patterns for firm and payroll growth. I also find that 1 standard deviation increase in exposure increased average weekly wages by 0.24% in non-energy counties, while I observe no change in average weekly wages in energy communities.

In Table 5, I examine directly whether federal grants play a role in helping energy communities employment, payroll, firm or wage growth. To do that, I interact the energy community dummy with grants exposure dummy. In that I estimate the effect of being an energy community on outcomes and the interaction between being an energy community and receiving above median IRA-related federal grants. I find that while energy communities that receive below median federal grants experience a decline in employment, payroll and weekly wage growth, federal funding reverses that patterns. For energy communities that receive above median federal grants I find a positive effect of IRA on employment, payroll and weekly wage growth. However, the magnitude of that effect is relatively small. These results highlight the importance of federal funding flowing into the disadvantaged energy communities to fuel employment and wage growth.

4.4 Mechanisms

Direct or spillover effects In Table 6 I examine whether the employment, payroll, firm and wage growth comes directly from treated industries or is a spillover effect from non-treated industries. To do that, I interact the exposure share with a dummy for treated industry to estimate the difference in outcome variables growth between these two types of industries. I find that treated industries do not experience significantly different employment and payroll growth than non-treated industries in exposed counties. This suggests that the magnitude of the direct and spillover effects are quite similar and that the IRA creates employment growth in both the industries that stand to directly benefit from its implementation and those supporting ones that benefit from increases in local demand.

In Figure B7 in the Appendix, I examine the effects of IRA across all broad sectors to understand which sectors are driving the increase in employment. Each specification estimates outcome variables growth within the sector, comparing more and less exposed counties. While I find no significant differences between sectors, the magnitudes of coefficients for management, transportation, information, mining, accommodation and food and real estate are the largest for employment and payroll growth suggesting these sectors are driving the findings. It is important to note that these sectors represent both the treated group and the control group industries confirming findings from Table 6 that employment

growth is observed across a wide range of directly and indirectly affected industries.

Results from column (4) of Table 6 suggest heterogeneity in average weekly wage growth between treated and control industries. I find that average weekly wages significantly increase in more exposed counties for treated industries relative to control industries. The magnitude of the wage increase is economically significant suggesting that a one standard deviation increase in exposure, increases weekly wages in treated industries by 0.49% (=0.05*(1.3%+8.4%)). This heterogeneity between treated and control industry wages explains why I find no average effect on wages growth in Table 1.

Public sector employment While baseline estimates focus on employment, payroll, firm, and wage growth in private sector, the exposure measure is constructed using all employment across both private and public sectors. To examine whether public sector employment is not crowding out private sector employment, I evaluate the effects of IRA on public sector employment separately. To do that I aggregate employment, firm counts and payroll from federal, state and local governments at the county level to calculate growth rates. I do not analyze the public sector employment growth using industry level employment data, as most industries do not have any government employees. In Table 7, I find no employment, firm, payroll or wage growth effects for public sector employment. I also find no effects on public sector employment in counties that additionally receive more grants or when considering employment growth in energy communities. In fact, for energy communities I find a reduction in average wage growth in public sector after the IRA was implemented (see Table B6 in the Appendix).

Migration In each specification I control for logarithm of population in each county, as it is plausible that new projects generated by IRA could attract workers from other counties while at the same time shifting local employment mix toward IRA benefiting occupations. As such, without controlling for population changes, employment growth could come from in-migration especially into communities that experience large growth in employment in certain sectors. To examine this labor reallocation directly, I use logarithm of population and population growth as outcome variables in my baseline specifications dropping population as a control and report results in Table B1 in the Appendix. I find that there is an increase in population and population growth in counties more exposed to IRA but no population changes in energy community counties. First, this means that it is crucial to control for population, second it suggests that some of the employment growth in more exposed counties

is likely to be driven by in-migration from other non-exposed counties.[23] Estimations in Figure B1 show that the effect on employment growth without controlling for population is around 0.14. This suggests that around 35% (=1-9.1/14) of the employment effect could be due to in-migration of workers from other counties.

4.5 Robustness tests

In Appendix, I provide a rich set of robustness tests to ensure the validity of the findings presented in this paper. I summarize these briefly here.

I start by showing the that magnitudes of my findings are not significantly different from the baseline if we exclude population as a control (though the magnitude increases from 0.9 to 0.14), if we include both population and county GDP growth as controls, if we exclude just 2020 from the sample, if we include all years 2018 - 2025 and not just 2021-2025, if we weight the results by population rather than controlling for population, if we weight the results using the share of employment in each county-industry as a share of all employment in the US (this follows the baseline that Garrett et al. (2020) estimate), if we change the fixed effects to include instead country, state by quarter by year and NAICS, if we only include large county-industry cells with over 500 observations or if we winsorize the outcome variables at 5% rather than 1% level. The employment and payroll growth results are always significant, while the firm growth results are insignificant in some of the more demanding specifications. I find no effect on average weekly wage growth across all specifications, but the one that excludes population as a control. I summarize these results in Figure B1.

I then test the robustness of my findings to different exposure measures. First, in Figure B2 I show how my results change if I use share of firms or share of payroll as an exposure measure. I continue to find positive effects for employment and payroll using these alternatives, though the magnitude of the effect is much larger when using firm exposure. A one standard deviation increase in firm exposure increases employment growth by 1.23%. This difference in magnitude is plausible, if the channel through which most employment growth occurs is through firms taking advantage of IRA benefits and investing and increasing employment. Places where more firms operate in industries that stand to benefit from IRA, but where the share of employment in those industries is not as high, may have the capacity to employ more people to benefit from the IRA provisions. As a baseline, I choose to use

[23] While I could re-estimate the baseline effects not controlling for population changes, this renders the control group of non-exposed counties not appropriate if some of the employment growth comes from reduction in population in non-exposed counties.

employment exposure, as it offers a more conservative estimate of employment and payroll growth consequences of IRA. Using firm exposure measure, I also find significant effects of IRA on average weekly wage growth. A one standard deviation increase in firm exposure increases weekly wage growth by 0.3%. The results using payroll exposure are similar to the baseline ones that use employment exposure.

Second, in Figure B3 I show the sensitivity of my results to using dummy exposure measures rather than continuous exposure measures. In each panel I show results using a dummy equal 1 for above median exposure defined using employment share (filled circles), firm share (crosses) and payroll share (hollow triangles) and then results using a dummy equal 1 for above 75th percentile of the exposure distribution and comparing these counties to below 25th percentile of the exposure distribution. Across all specifications, I find similar results using dummies for above and below median exposure across different measures of exposure and then slightly larger effects if I compare above 75th percentile exposure counties to those below 25th percentile. The magnitudes of these effects is larger than what I find using the baseline continuous exposure, which suggests that accounting for nonlinearities in exposure is quite important in this context. For example, in case of employment growth, moving from below median to above median employment exposure results in a 3% increase in employment growth. Below median exposure is 4.66% and above median exposure is 10.68% for employment share. This means that a 6pp increase in exposure increases employment growth by 3%. Another notable difference is that using binary exposure measures, I find a significant increase in average weekly wages.

I also continue to find positive effects on employment, payroll, firm and wages growth using annual growth rates rather than cumulative ones (see Table B2), and using industry-level rather than county-level exposure (see Table B3).

5 Discussion

The results presented in this paper indicate that the IRA incentives generated economically significant, though heterogeneous, improvements in local labor market outcomes. Counties with greater pre-IRA employment in eligible industries experienced systematically higher employment, payroll, and firm growth beginning in 2023, suggesting that the Act's provisions stimulated hiring even before many large projects reached completion. Combined with growing employment across both treated and non-treated industries, my findings point to broad general-equilibrium spillovers rather than narrow sectoral responses. At the same

time, counties receiving larger volumes of IRA-related federal grants exhibited substantially higher employment, payroll, and wage growth—indicating that direct funding serves as an important transmission channel, easing financing constraints and accelerating project timelines. By contrast, the Act's place-based Energy Community bonus did not produce average gains in employment or firm growth in designated areas, though energy communities that received above-median federal grants did experience modest but positive employment effects. Together, these patterns suggest that the IRA's aggregate labor-market impact is meaningful, but its spatial distribution is uneven and depends critically on where incentives translate into actual capital flow.

These findings have several implications for ongoing and future industrial and climate policy design. First, the greater responsiveness of counties with high grant inflows implies that streamlining disbursement, reducing administrative frictions, and improving technical assistance for grant applications could enhance the effectiveness of IRA-like programs, especially in disadvantaged regions. Second, because energy communities did not experience employment gains absent substantial federal funding, targeted support may need to pair geographic bonus credits with direct budgetary allocations or complementary investments to ensure that bonus-eligible areas are truly "project ready". Third, the strong spillovers to non-treated industries indicate the importance of local multipliers for IRA's effects on employment growth. Finally, given that wage gains appear concentrated in directly treated industries, my findings suggest that the IRA-embedded focus on jobs quality (in addition to quantity) through apprenticeships appears to have been successful.

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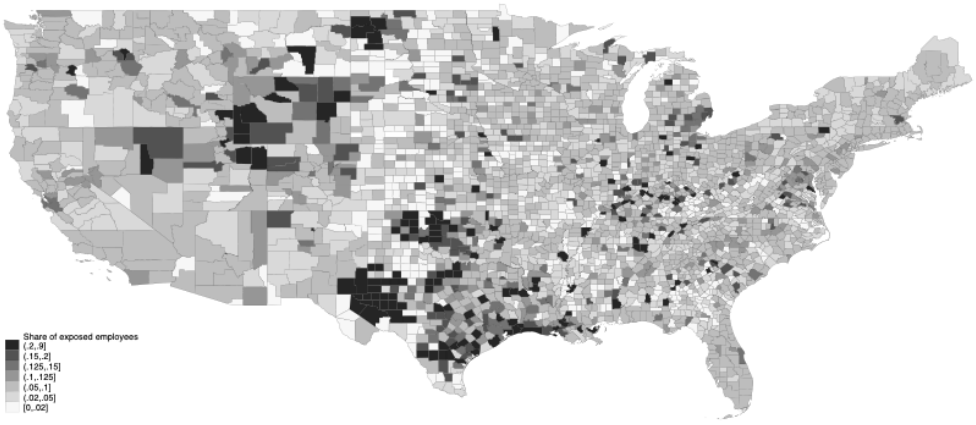
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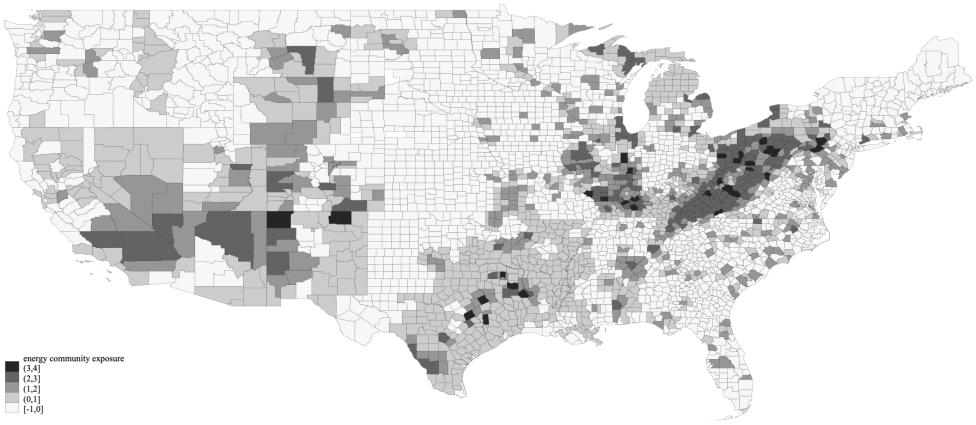
Tables and figures

Figure 1: Geographical distribution of exposure measures.

a employment share

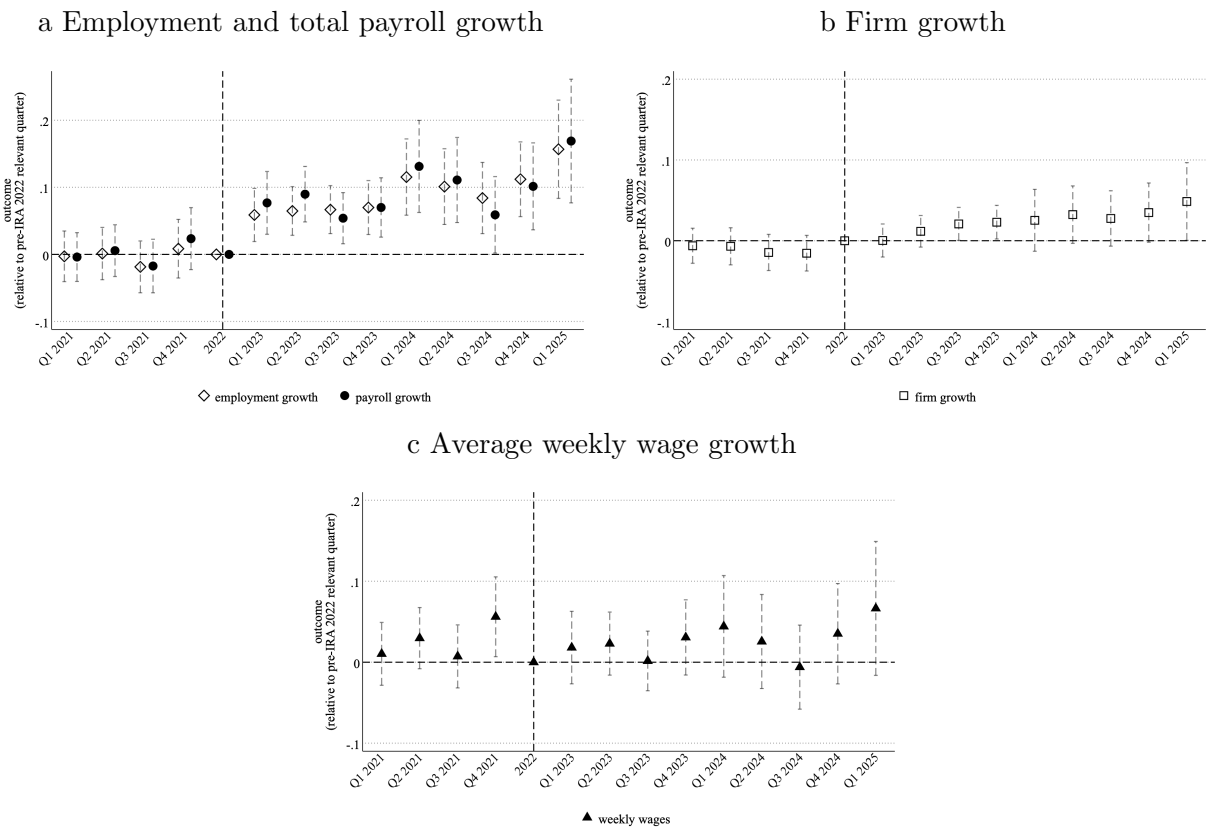


b energy communities



Note: The map in panel a shows the distribution of the exposure measure based on the 2022 share of employees in each county working in industries that potentially stand to benefit from IRA more. We list these industries in Table A4. The map in panel b, demonstrates the distribution of counties that have at least 1 census tract that qualifies as energy community according to IRA. Counties that have tracts that qualify as energy communities based on different criteria are shaded in darker colors. If the county qualified to be energy community based on mine closure, generator closure, having a tract that's adjacent to closure, or intersecting with an MSA area that qualified because of the fossil fuel and employment requirements, it is marked in black. Source: https://edx.netl.doe.gov/dataset/ira-energy-community-data-layers

Figure 2: The effects of IRA on employment, payroll and firm growth, exposure measure.



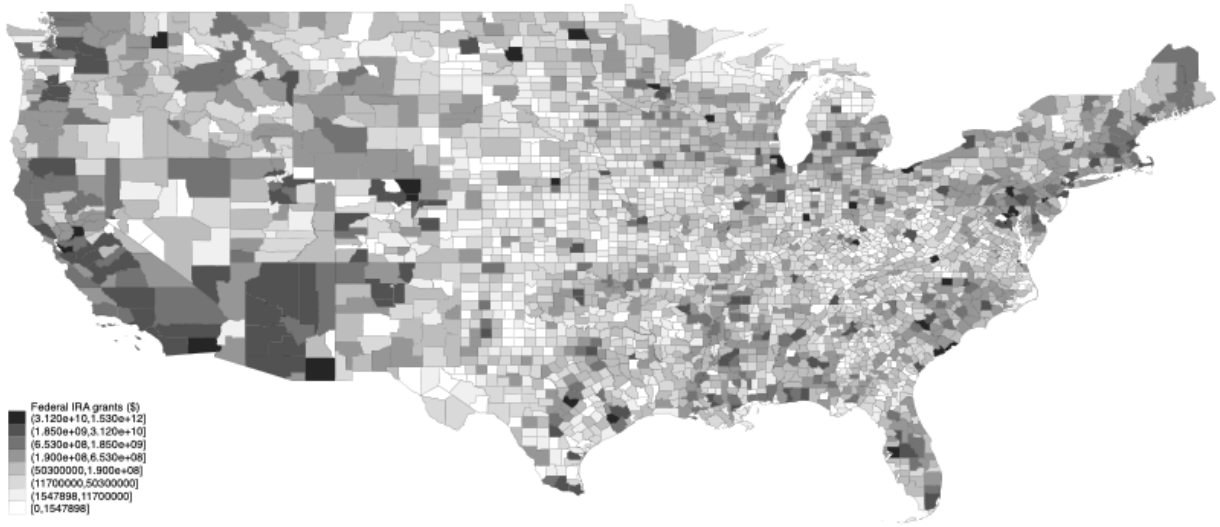
Note: This figure summarizes the effects of IRA on employment, payroll, firm counts, and weekly wages growth for counties that are more exposed to statutory IRA provisions. Exposure is a continuous variable which is the share of employment in 4 digit NAICs industries that were plausibly more exposed to IRA in 2022 relative to total county employment in 2022. In each figure, we plot the outcome variable growth rate relative to 2022 and relative to respective quarters; e.g. for Q1 2023 we compute employment growth relative to Q1 20222 to contorl for the seasonal nature of employment. The different shapes correspond to coefficient estimates from equation (1) and the vertical dashed lines show 95% confidence intervals. In each specification we control for population growth and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

Table 1: The effects of IRA on employment, payroll, firm and wage growth.

	(1) firm growth	(2) empl growth	(3) payroll growth	(4) avg weekly wage growth
	Panel A: employment growth in more exposed regions			
$exposure_i \times$ post	0.024*	0.091***	0.094***	0.025
	(0.014)	(0.024)	(0.028)	(0.021)
Observations	2913954	2913954	2913954	2913954
# Counties	3029	3029	3029	3029
Mean Dep Var.	-0.002	-0.086	-0.111	-0.125
	Panel B: employment growth in high government grant counties			
	(1) firm growth	(2) empl growth	(3) payroll growth	(4) avg weekly wage growth
$exposure_i \times$ post	0.009	0.020	0.016	-0.040*
	(0.013)	(0.025)	(0.029)	(0.023)
$exposure_i \times$ post	0.053***	0.235***	0.256***	0.237***
$\times\ grantexposure_i$	(0.018)	(0.029)	(0.032)	(0.024)
Observations	2876968	2876968	2876964	2876964
# Counties	2919	2919	2919	2919
Mean Dep Var	-0.002	-0.086	-0.111	-0.125
Sector x Year x Quarter FE	✓	✓	✓	✓
State x Year x Quarter FEs	✓	✓	✓	✓

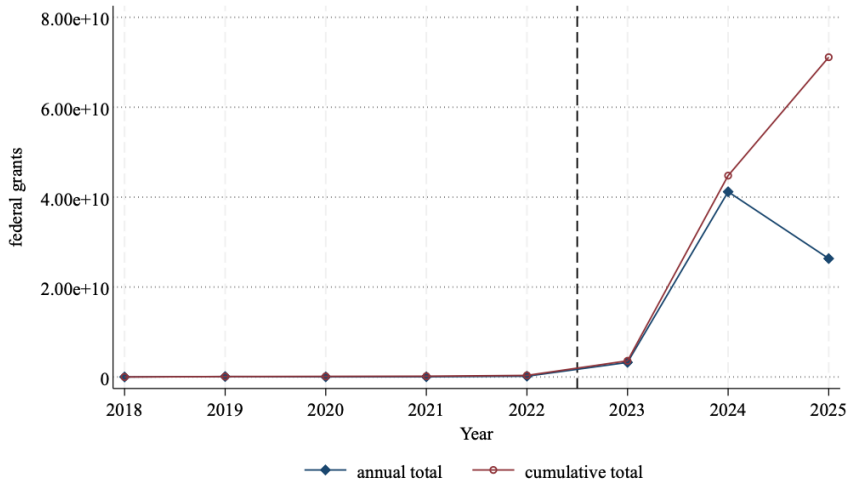
Note: Panel A of this table summarizes the effects of IRA on employment, payroll, firm counts, and weekly wages growth for counties that are more exposed to statutory IRA provisions. Exposure is a continuous variable which is the share of employment in 4 digit NAICs industries that were plausibly more exposed to IRA in 2022 relative to total county employment in 2022. We provide a list of those industries in Table A4. In each specification, we control for log of population and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level. In panel B of this Table, we present results that evaluate the heterogeneity of employment effects for counties that received more IRA related government grants. The dummy $grantexposure_i$ is equal to 1 when a county receives more than median government IRA funding. 95% of all US counties have received some of this funding after 2022. In each specification, we control for log of all government funding and log of population and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

Figure 3: Geographical distribution of government IRA-related direct grants.



Note: This map shows the geographical distribution of total amount of government grants that mention IRA in their description summed across all periods 2022 - 2025. These grants mention either IRA or Inflation Reduction Act in the prime award transaction description or in the program activities funding this grant. Figure 4 in the Appendix shows the evolution over time of these grants and Figure B8 shows the distribution of the alternative grants measure. The scale gives darker shades to more funded counties; the numerical brackets correspond to the following 8 brackets of funding distribution: 0-10%, 10-25%, 25-50%, 50-75%, 75-90%, 90-95%, 95-99% and 99%+. Source: https://www.usaspending.gov

Figure 4: The evolution of government grants over time.



Note: This figure shows the total amount of IRA-related government grants awarded in each year summed for each of the years 2018 - 2025. These grants mention either IRA or Inflation Reduction Act in the prime award transaction description or in the program activities funding this grant. I only include the total obligated amount here and do not track the flow of when this money is disbursed to firms (federal action obligation). These figures are available in the Online Appendix, Figure B9. Source: https://www.usaspending.gov

Table 2: Grant Allocation by Recipient Category

Category	Observations	Share of obs.	Total (USD mn)	Share of total
Agriculture	1,489	0.018	1,180	0.017
Government	1,343	0.016	23,300	0.328
Firms	11,848	0.143	9,890	0.139
Funds and nonprofits	468	0.006	23,600	0.332
Research	504	0.006	2,190	0.031
Tribes	463	0.006	2,280	0.032
Others	3,969	0.048	5,330	0.075
Redacted	62,613	0.757	3,310	0.047
Total	82,697	1.000	71,080	1.000

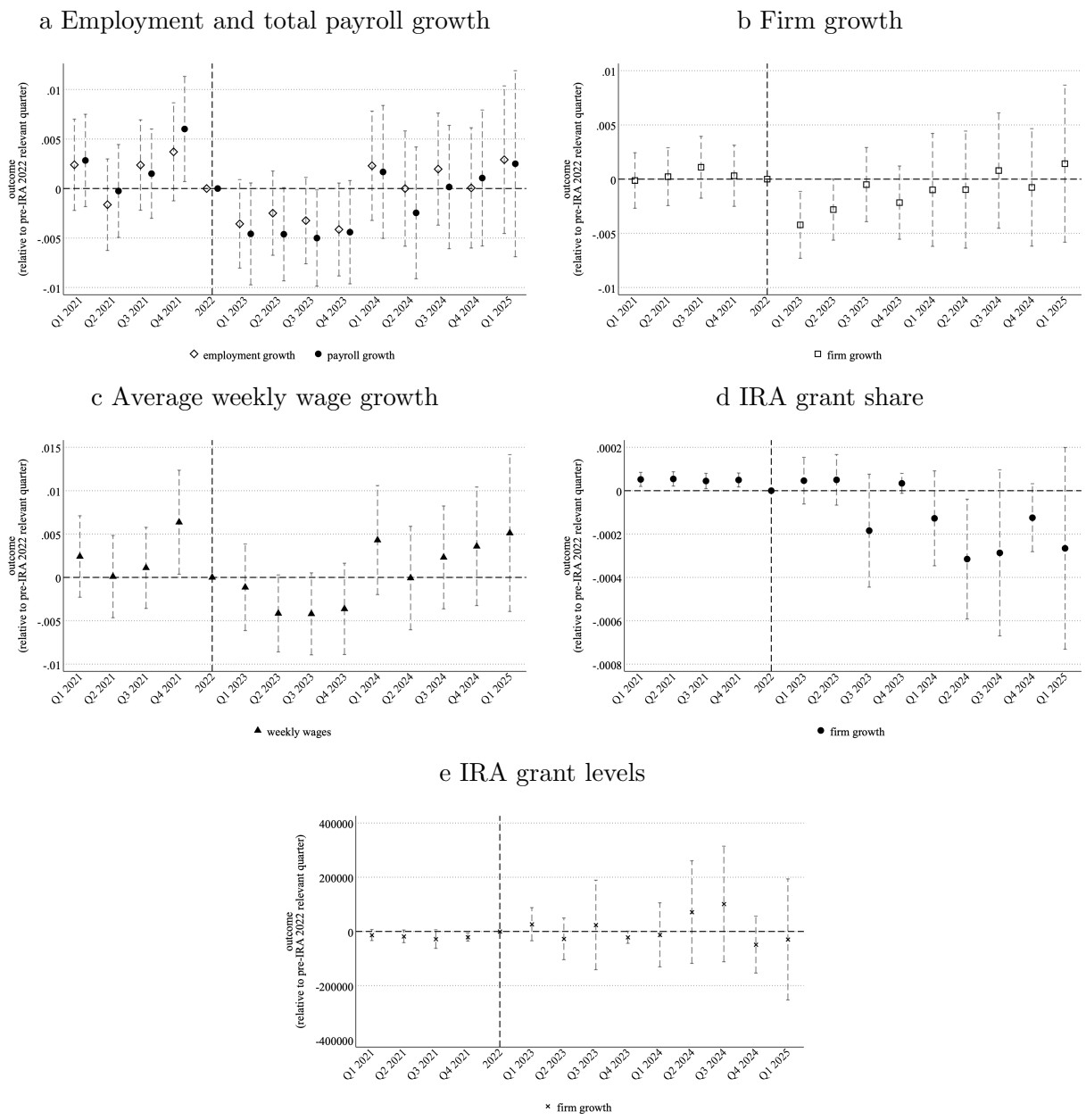
Notes: Recipient categories are based on entity-type classifications as outlined in Table B7 Total grant amounts are expressed in USD millions and equal the sum of obligated amounts within each category.

Table 3: Grant Allocation by description of activities.

Category	Observations	Share of obs.	Total (USD mn)	Share of total
Equity	42,811	0.518	2,950	0.041
Environment	7,640	0.092	14,700	0.207
Infrastructure	618	0.007	11,300	0.159
Tech	1,519	0.018	30,900	0.435
Energy	177	0.002	7,360	0.104
Other	29,932	0.362	3,890	0.055
Total	82,697	1.000	71,080	1.000

Notes: Categories are assigned using keyword matches in grant descriptions and recipient names. I describe how each category is constructed using keywords in Table B8. Observations refers to the number of grant records in each category. Total grant amounts are the sum of obligated amounts within category. Shares of total are computed relative to aggregate funding across all categories. Note that while names of firms are redacted due to PII, we still have the amounts and grant descriptions available in the dataset.

Figure 5: The effects of IRA on employment, payroll and firm growth, energy communities.



Note: This figure summarizes the effects of IRA on employment, payroll, firm counts, weekly wages growth, and IRA government grants for counties we classify as energy communities relative to counties that were not classified as energy community based on the government official designation. Energy community is a dummy equal to 1 if a county has at least 1 census tract that qualifies as energy community according to IRA and zero is no census tracts like that are in a county. We plot the energy community counties in Figure 1. In each figure, we plot the outcome variable growth rate relative to 2022 and relative to respective quarters; e.g. for Q1 2023 we compute employment growth relative to Q1 20222 to control for the seasonal nature of employment. The different shapes correspond to coefficient estimates from equation (1) and the vertical dashed lines show 95% confidence intervals. In each specification we control for population and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level. In specifications with IRA grants as outcome variables we also control for logarithm of total government grants.

Table 4: Mechanisms: the role of place-based incentives.

	(1) firm growth	(2) empl growth	(3) payroll growth	(4) avg weekly wage growth	(5) IRA grants share	(6) IRA grants level
	Panel A: direct effects on energy communities					
$energycom_i$	-0.000	-0.004*	-0.003*	-0.004**	0.00006***	-15711.934
	(0.001)	(0.002)	(0.002)	(0.002)	(0.000)	(13378.043)
$energycom_i \times$ post	-0.001	0.003	0.001	0.004	-0.00019***	25539.685
	(0.002)	(0.003)	(0.004)	(0.003)	(0.000)	(37531.279)
Observations	2368800	2368800	2368796	2368796	2341389	2341389
# Counties	2264	2264	2264	2264	2189	2189
Mean Dep Var	-0.002	-0.086	-0.111	-0.125	0.000	1.2e+05
	Panel B: heterogeneity for energy communities					
$exposure_i \times$ post	0.033**	0.117***	0.129***	0.048**	0.001**	-285198.519
	(0.014)	(0.026)	(0.030)	(0.022)	(0.001)	(258975.797)
$exposure_i \times$ post	-0.019	-0.053**	-0.071**	-0.047**	-0.002***	-370668.081
$\times\ energycom_i$	(0.016)	(0.024)	(0.028)	(0.020)	(0.001)	(309574.341)
Observations	2913954	2913954	2913950	2913950	2876968	2876968
# Counties	3029	3029	3029	3029	2919	2919
Mean Dep Var	-0.002	-0.086	-0.111	-0.125	0.000	1.2e+05
Sector x Year x Quarter FE	✓	✓	✓	✓	✓	✓
State x Year x Quarter FEs	✓	✓	✓	✓	✓	✓

Note: This table summarizes the effects of IRA on employment growth, payroll growth, firm number growth, weekly wages growth, IRA direct grants as share of total grants (column 5) and in levels (column 6) for counties that were designated as energy communities. Energy community is a dummy equal to 1 if a county has at least 1 census tract that qualifies as energy community according to IRA. We plot these counties in Figure 1. In Panel A, we directly examine the effects for energy communities relative to non-energy communities and in panel B, we consider heterogeneity across energy and non-energy communities for counties that are more exposed to statutory IRA provisions. Exposure is a continuous variable which is the share of employment in 4 digit NAICs industries that were plausibly more exposed to IRA in 2022 relative to total county employment in 2022. We provide a list of those industries in Table A4. In each specification we control for population growth and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level. In column 5 and 6, we also control for logarithm of non-IRA grants.

Table 5: Energy communities: heterogeneity by the grant amount .

	(1) firm growth	(2) empl growth	(3) payroll growth	(4) avg weekly wage growth
$energycom_i \times$ post	-0.003	-0.013***	-0.016***	-0.012***
	(0.002)	(0.003)	(0.003)	(0.003)
$energycom_i \times$ post	0.002	0.017***	0.019***	0.021***
$grantsexposure_i$	(0.002)	(0.003)	(0.003)	(0.003)
Observations	2913954	2913954	2913950	2913950
# Counties	3029	3029	3029	3029
Mean Dep Var	-0.002	-0.086	-0.111	-0.125
Sector x Year x Quarter FE	✓	✓	✓	✓
State x Year x Quarter FEs	✓	✓	✓	✓

Note: This table summarizes the effects of IRA on employment, payroll, firm counts, and weekly wages growth for counties that were designated as energy communities. Energy community is a dummy equal to 1 if a county has at least 1 census tract that qualifies as energy community according to IRA. We plot these counties in Figure 1. The dummy $grantexposure_i$ is equal to 1 when a county receives more than median government IRA funding. 95% of all US counties have received some of this funding after 2022. In each specification we control for population and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

Table 6: Mechanisms: direct or spillover effects.

	(1) firm growth	(2) empl growth	(3) payroll growth	(4) avg weekly wage growth
$exposure_i \times$ post	0.034**	0.086***	0.097***	0.013
	(0.014)	(0.024)	(0.028)	(0.022)
$exposure_i \times$ post $\times$ treated	-0.074***	0.038	-0.021	0.084*
	(0.021)	(0.059)	(0.068)	(0.051)
Obs	2913954	2913954	2913950	2913950
# Counties	3029	3029	3029	3029
Mean Dep. Var.	-0.002	-0.086	-0.111	-0.125
Sector x Year x Quarter FE	✓	✓	✓	✓
State x Year x Quarter FEs	✓	✓	✓	✓

Note: This table summarizes the effects of IRA on employment, payroll, firm counts, and weekly wages growth for counties that are more exposed to statutory IRA provisions. Exposure is a continuous variable which is the share of employment in 4 digit NAICs industries that were plausibly more exposed to IRA in 2022 relative to total county employment in 2022. Treated is a dummy equal to 1 if we classified industry as exposed to IRA in 2022. In each specification we control for population growth and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

Table 7: The effects of IRA on public sector employment, payroll, firm and wage growth.

	(1) firm growth	(2) empl growth	(3) payroll growth	(4) avg weekly wage growth
	Panel A: employment growth in more exposed regions			
$exposure_i \times$ post	0.001	0.008	0.010	0.023
	(0.011)	(0.036)	(0.033)	(0.034)
Observations	51719	51719	51719	51719
# Counties	3043	3043	3043	3043
Mean Dep Var	-0.047	-0.189	-0.193	-0.195
	Panel B: employment growth in high government grant counties			
$exposure_i \times$ post	-0.001	0.007	0.005	0.048
	(0.014)	(0.051)	(0.045)	(0.038)
$exposure_i \times$ post	-0.002	0.011	0.013	-0.039
$\times\ grantsexposure_i$	(0.014)	(0.054)	(0.051)	(0.048)
Observations	49849	49849	49849	49849
# Counties	2933	2933	2933	2933
Mean Dep var	-0.047	-0.189	-0.193	-0.195
State x Year x Quarter FEs	✓	✓	✓	✓

Note: Panel A of this table summarizes the effects of IRA on public sector employment, payroll, firm counts, and weekly wages growth for counties that are more exposed to statutory IRA provisions. This analysis is conducted at the county rather than county-NAICS level. Exposure is a continuous variable which is the share of employment in 4 digit NAICs industries that were plausibly more exposed to IRA in 2022 relative to total county employment in 2022. We provide a list of those industries in Table A4. In each specification, we control for log of population and include state-quarter year fixed effects, and cluster standard errors at the county level. In panel B of this Table, we present results that evaluate the heterogeneity of the public sector employment effects for counties that also received more IRA related government grants. The dummy $grantexposure_i$ is equal to 1 when a county receives more than median government IRA funding. 95% of all US counties have received some of this funding after 2022. In each specification, we control for log of all government funding and log of population and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

ONLINE APPENDIX—NOT FOR PUBLICATION, March 23, 2026
"Subsidizing the Green Transition: Local Labor Market Effects of IRA Energy Incentives"

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A Additional descritpives

A.1 Descritpive statistics

Table A1: Descriptive statistics: comparison of high and low exposure counties.

	(1) high exposure	(2) low exposure	(3) diff	(4) t-test
number of employees	716.675	426.024	-290.651***	-61.052
number of firms	65.368	40.198	-25.169***	-22.114
total payroll	12971096.465	6879101.353	-6091995.112***	-43.776
avg weekly wages	1111.567	908.868	-202.700***	-151.635
employment growth, annual	0.012	0.006	-0.006***	-17.099
firm growth, annual	0.017	0.013	-0.004***	-27.209
payroll growth, annual	0.038	0.034	-0.005***	-10.145
avg weekly wage growth, annual	0.015	0.014	-0.001***	-3.268
employment growth, cum rel to 2022	-0.052	-0.051	0.001***	2.859
firm growth, cum rel to 2022	-0.024	-0.016	0.008***	41.310
payroll growth, cum rel to 2022	-0.073	-0.072	0.002***	3.486
avg weekly wage growth, cum rel to 2022	-0.059	-0.065	-0.006***	-14.907
county-level exposure, employment	0.107	0.047	-0.060***	-939.440
county-level exposure, firms	0.121	0.092	-0.029***	-648.254
county-level exposure, wages	0.151	0.064	-0.087***	-916.794
population	366861.140	217092.643	-149768.497***	-131.897
ln(population)	11.907	11.204	-0.703***	-295.031
share of counties that received IRA grant	0.923	0.983	0.060***	177.068
county avg of IRA grants, 2023-2025	1.272e+10	5.573e+09	-7.149e+09***	-42.179
county avg of IRA grants, 2023-2025	1.513e+11	8.126e+10	-7.005e+10***	-137.624
county avg of all grants, 2023-2025	5.211e+13	1.153e+13	-4.057e+13***	-67.012
share of IRA grants in all grants, 2023-2025	0.000	0.000	0.000	.
share of counties with mine closure	0.057	0.076	0.020***	45.488
share of counties with generator closure	0.165	0.126	-0.039***	-65.627
share of counties adjacent to closure	0.323	0.280	-0.044***	-55.882
share of counties with MSAs with large fossil fuel industry	0.529	0.503	-0.027***	-31.251
share of counties with MSAs with large fossil fuel industry+above avg unemployme	0.236	0.247	0.011***	14.657
share of counties energy community counties	0.476	0.425	-0.051***	-59.769
treated: share of 4-digit NAICS industries affected by IRA	0.098	0.083	-0.014***	-29.699
Observations	806765	600743	1407508	

Note: This table proves descritpive statistics comparing county outcomes for years 2021-2022, pre IRA. high exposure counties are defined using above median share of employees that work in 4-digit NAICS industries plausibly more affected by statutory IRA provisions.

Table A2: Descriptive statistics: comparison of energy and non-energy communities.

	(1) energy com	(2) non-energy com	(3) diff	(4) t-test
number of employees	697.485	505.338	-192.148***	-39.115
number of firms	59.120	50.884	-8.236***	-7.503
total payroll	11924477.820	9077877.048	-2846600.772***	-21.588
avg weekly wages	997.958	1047.605	49.647***	36.007
employment growth, annual	0.008	0.010	0.002***	5.174
firm growth, annual	0.014	0.017	0.003***	20.051
payroll growth, annual	0.035	0.038	0.003***	6.076
avg weekly wage growth, annual	0.015	0.015	-0.001	-1.423
employment growth, cum rel to 2022	-0.048	-0.054	-0.007***	-15.383
firm growth, cumulative rel to 2022	-0.018	-0.023	-0.005***	-26.824
payroll growth, cum rel to 2022	-0.069	-0.076	-0.007***	-15.514
avg weekly wage growth, cum rel to 2022	-0.060	-0.063	-0.003***	-9.278
county-level exposure, rel	0.084	0.078	-0.006***	-66.540
county-level exposure, firms	0.107	0.110	0.002***	41.822
county-level exposure, wages	0.121	0.107	-0.014***	-107.213
population	360973.203	245922.656	-115050.547***	-99.903
ln(population)	11.725	11.478	-0.248***	-101.003
share of counties that received IRA grant	0.985	0.918	-0.067***	-192.695
county avg of IRA grants, 2023-2025	1.453e+10	5.626e+09	-8.903e+09***	-42.870
county avg of IRA grants, 2023-2025	1.442e+11	1.025e+11	-4.175e+10***	-76.243
county avg of all grants, 2023-2025	1.173e+13	5.399e+13	4.226e+13***	67.384
share of IRA grants in all grants, 2023-2025	0.000	0.000	0.000	.
share of counties with mine closure	0.144	0.000	-0.144***	-327.418
share of counties with generator closure	0.327	0.000	-0.327***	-557.187
share of counties adjacent to closure	0.671	0.000	-0.671***	-1141.724
share of counties with MSAs with large fossil fuel industry	0.746	0.328	-0.418***	-546.850
share of counties with MSAs with large fossil fuel industry+above avg unemployme	0.530	0.000	-0.530***	-849.254
treated: share of 4-digit NAICS industries affected by IRA	0.094	0.089	-0.005***	-10.166
Observations	639364	768144	1407508	

Note: This table proves descritpive statistics comparing county outcomes for years 2021-2022, pre IRA. Energy communities are counties that include at least 1 tract designated as energy community by IRA. A census tract can qualify if: (i) the tract contains, or is adjacent to, a coal mine closed after 1999 or a coal-fired power plant retired after 2009; (ii) it lies in a metropolitan or non-metropolitan statistical area with above-average unemployment and a minimum share of employment in fossil fuel industries (including oil, gas, coal, and certain manufacturing activities); or (iii) it includes a brownfield site as defined under environmental statutes.

Table A3: Descriptive statistics: comparison of high and low IRA-related grant receiving counties.

	(1) high grant	(2) low grant	(3) diff	(4) t-test
number of employees	936.540	228.854	-707.686***	-154.758
number of firms	79.335	28.489	-50.846***	-51.338
total payroll	16781482.530	3590457.336	-1.319e+07***	-101.265
avg weekly wages	1083.638	963.086	-120.552***	-87.088
employment growth, annual	0.010	0.008	-0.003***	-8.375
firm growth, annual	0.013	0.018	0.004***	30.014
payroll growth, annual	0.036	0.037	0.001**	2.439
avg weekly wage growth, annual	0.016	0.014	-0.002***	-4.821
employment growth, cum rel to 2022	-0.042	-0.060	-0.018***	-42.331
firm growth, cum rel to 2022	-0.019	-0.022	-0.004***	-20.072
payroll growth, cum rel to 2022	-0.064	-0.082	-0.019***	-41.819
avg weekly wage growth, cum rel to 2022	-0.052	-0.073	-0.021***	-56.290
county-level exposure, employment	0.079	0.083	0.004***	42.429
county-level exposure, firms	0.107	0.110	0.003***	65.203
county-level exposure, wages	0.112	0.115	0.003***	25.265
population	480947.114	90997.912	-389949.202***	-389.630
ln(population)	12.301	10.776	-1.525***	-740.614
share of counties that received IRA grant	1.000	0.894	-0.106***	-284.076
county avg of IRA grants, 2023-2025	1.875e+10	64389279.628	-1.869e+10***	-101.117
county avg of IRA grants, 2023-2025	2.109e+11	2.673e+10	-1.842e+11***	-366.969
county avg of all grants, 2023-2025	6.680e+13	9.303e+11	-6.587e+13***	-99.269
share of IRA grants in all grants, 2023-2025	0.000	0.000	0.000	.
share of counties with mine closure	0.047	0.084	0.037***	89.054
share of counties with generator closure	0.192	0.102	-0.090***	-151.826
share of counties adjacent to closure	0.332	0.275	-0.057***	-73.615
share of counties with MSAs with large fossil fuel industry	0.516	0.519	0.003***	3.491
share of counties with MSAs with large fossil fuel industry+above avg unemployme	0.218	0.264	0.046***	63.806
share of counties energy community counties	0.474	0.433	-0.041***	-48.789
treated: share of 4-digit NAICS industries affected by IRA	0.085	0.098	0.014***	28.011
Observations	723492	684016	1407508	

Note: This table proves descritpive statistics comparing county outcomes for years 2021-2022, pre IRA. high grant counties are defined as those that received above median amount of IRA-related grants in years 2023-2025.

A.2 Industry exposure

Table A4: Industries Directly Affected by the Inflation Reduction Act of 2022

NAICS	Industry Title	Primary IRA Provisions	Notes
2111	Oil & Gas Extraction	§45Q (CCUS); blue H_2 feedstock	Gas processing and CCUS-enabled pathways.
2122	Metal Ore Mining	§45X critical minerals; §48C processing/recycling	Critical-mineral extraction for batteries and clean technologies.
2123	Nonmetallic Mineral Mining & Quarrying	§48C (processing)	Aggregates and minerals used in clean infrastructure.
2131	Support Activities for Mining	MERP	Upstream oil & gas services indirectly exposed to methane fee.
2211	Electric Power Generation, Transmission & Distribution	§45Y/§48E clean electricity; §45U nuclear; storage ITC	Utilities earning tech-neutral PTC/ITC; nuclear and storage credits.
2213	Water, Sewage & Other Systems	§48/§48E; §6417 direct pay	Public utilities developing biogas and renewable systems.
2361	Residential Building Construction	§45L	Energy-efficient new home credit.
2362	Nonresidential Building Construction	§179D	Commercial building energy-efficiency deduction.
2371	Utility System Construction	§45Y/§48E	Transmission and interconnection projects.
2382	Building Equipment Contractors	§25C/§25D; §30C; §48/§48E	Electrical/HVAC installers for heat pumps, PV, and EV charging.
3112	Grain & Oilseed Milling	§40B	Biofuel and SAF feedstock production.
3241	Petroleum & Coal Products Manufacturing	§45Q; §40B	Refinery CCUS and sustainable fuel blending.
3251	Basic Chemical Manufacturing	§45V; §45Q; §48C	Hydrogen and CCUS process upgrades.
3272	Glass & Glass Product Manufacturing	§48C	Solar/frontsheet glass and low-carbon processes.
3273	Cement & Concrete Product Manufacturing	§45Q; §48C	Cement kilns with CCUS; industrial decarbonization projects.
3311	Iron & Steel Mills & Ferroalloy Manufacturing	§45Q; §48C	CCUS and low-carbon steel initiatives.
3313	Alumina & Aluminum Production & Processing	§48C	Process electrification and efficiency investments.
3314	Nonferrous Metal (except Aluminum) Production	§48C	Critical-metal refining and recycling.
3334	Ventilation, Heating, AC & Refrigeration Equipment Mfg.	§45X; §48C	Heat pumps and efficient HVAC systems.
3336	Engine, Turbine & Power Transmission Equipment Mfg.	§45X; §48C	Wind turbine and drivetrain manufacturing.
3344	Semiconductor & Other Electronic Component Mfg.	§45X; §48C	Solar and semiconductor components for renewables.
3353	Electrical Equipment Manufacturing	§45X; §48C	Transformers and switchgear for grid modernization.
3359	Other Electrical Equipment & Component Mfg.	§45X; §48C	Battery, inverter, and charger production.
3361	Motor Vehicle Manufacturing	§30D; §45W; §45X	Clean vehicle credits and EV assembly.
3363	Motor Vehicle Parts Manufacturing	§45X	Battery and drivetrain component production.
4861	Pipeline Transportation of Crude Oil	MERP	Methane-emission charge and compliance costs.
4862	Pipeline Transportation of Natural Gas	MERP	Methane fee and leak-abatement incentives.
4869	Other Pipeline Transportation	MERP	Ancillary petroleum transport subject to methane fee.
5413	Architectural, Engineering & Related Services	§48; project enablement	Design and engineering services for energy projects.
5416	Management, Scientific & Technical Consulting	§48; §45X support	Advisory services for clean-tech deployment.
5417	Scientific Research & Development Services	§48C; §45X	R&D on clean energy, hydrogen, and CCUS technologies.
5622	Waste Treatment & Disposal	MERP; §48C	Methane-reduction and recycling infrastructure.

Note: This table lists 4-digit NAICS industries classified as directly exposed to investment, production, or emissions-related provisions of the IRA. The mapping combines statutory eligibility under key IRA sections (§45X, §48C, §45Y/§48E, §45Q, §45V, §30D, §40B, §179D, §45L) and Environmental Protection Agency programs such as the Methane Emissions Reduction Program (MERP).

A.3 Exposure maps

Figure A1: Local exposure measure.

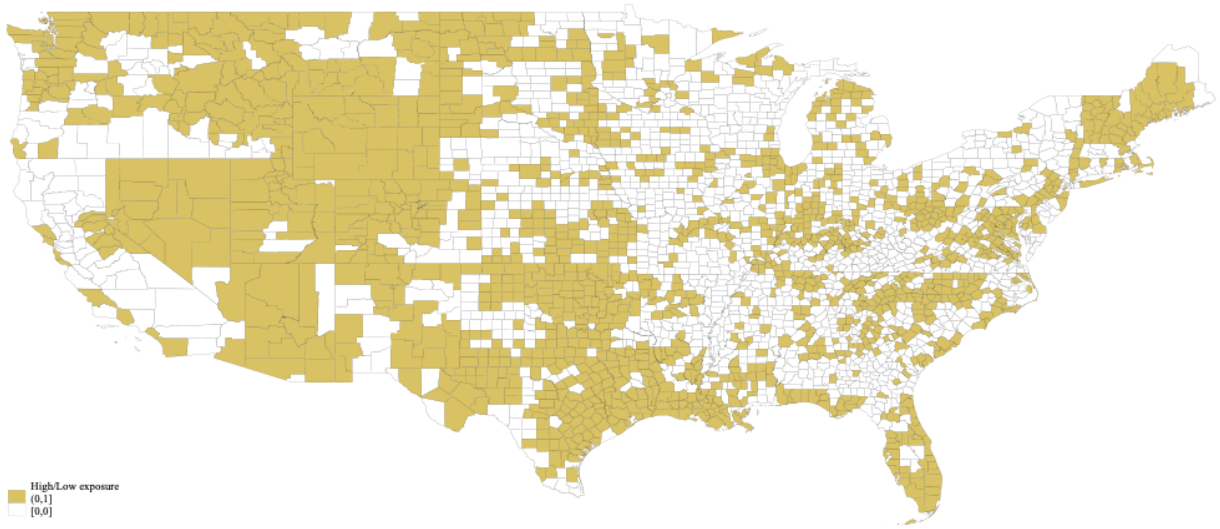
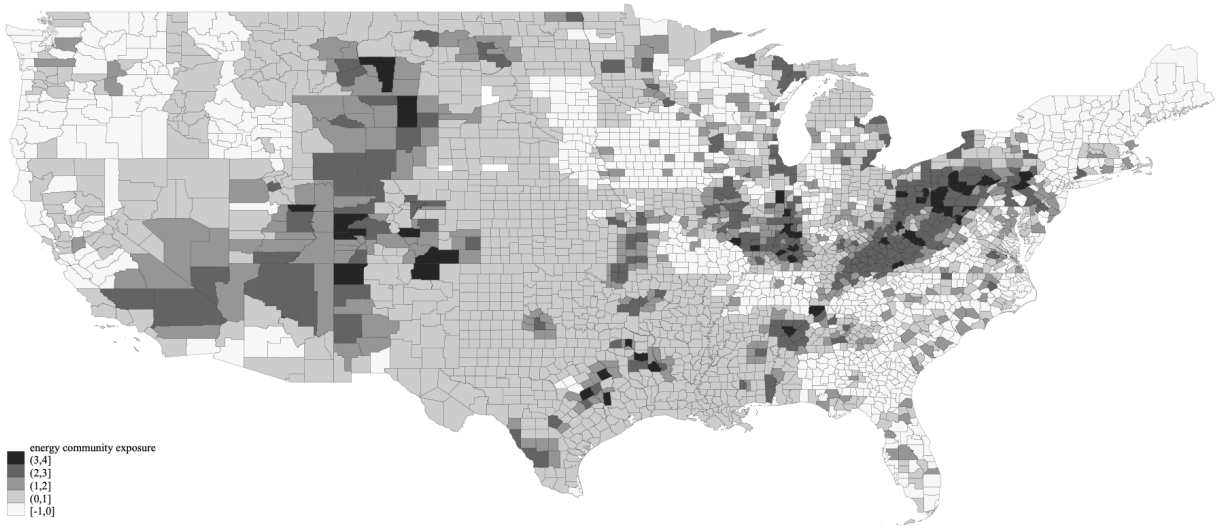
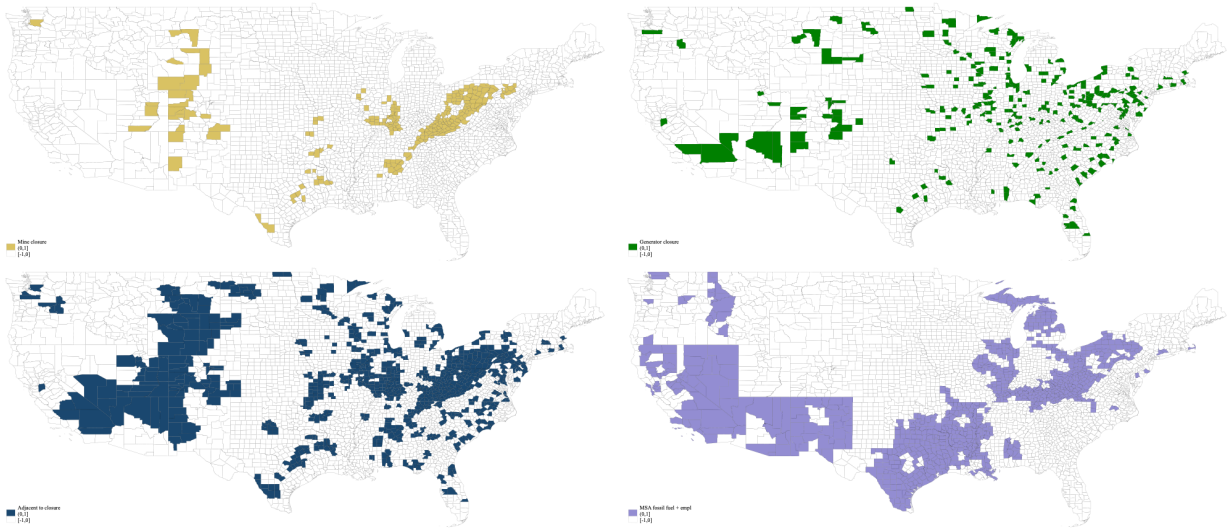


Figure A2: Energy communities, broader classification.



Note: This map demonstrates the distribution of counties that have at least 1 census tract that qualifies as energy community according to IRA. Counties that have tracts that qualify as energy communities based on different criteria are shaded in darker colors. If the county qualified to be energy community based on mine closure, generator closure, having a tract that's adjacent to closure, or intersecting with an MSA area that qualified because of the fossil fuel requirements (but not necessarily employment requirement), it is marked in black. Source: https://edx.netl.doe.gov/dataset/ira-energy-community-data-layers

Figure A3: The geographical distribution of energy communities



Note: These maps demonstrates the distribution of counties that have at least 1 census tract that qualifies as energy community according to IRA. Each map shows county-level exposure to different energy community criteria as labeled on the map. Source: https://edx.netl.doe.gov/dataset/ira-energy-community-data-layers

B Additional results

B.1 Population effects

Table B1: The effects of IRA on population and population growth.

	(1) ln(pop)	(2) pop growth	(3) ln(pop)	(4) pop growth
$exposure_i \times$ post	0.040***	0.024***		
	(0.009)	(0.005)		
$energycom_i \times$ post			-0.001	-0.000
			(0.001)	(0.000)
Sector x Year x Quarter FE	✓	✓	✓	✓
State x Year x Quarter FEs	✓	✓	✓	✓
Observations	2913975	2832604	2913975	2832604
# Counties	3029	3029	3029	3029
Mean Dep Var	11.383	0.005	11.383	0.005

Note: This table summarizes the effects of IRA on population and population growth. In columns 1 and 2 we show results for counties that are more exposed to statutory IRA provisions. Exposure is a continuous variable which is the share of employment in 4 digit NAICs industries that were plausibly more exposed to IRA in 2022 relative to total county employment in 2022. In columns 3 and 4, we show results for counties that were designated as energy communities. Energy community is a dummy equal to 1 if a county has at least 1 census tract that qualifies as energy community according to IRA. We plot these counties in Figure 1. In each specification we include quarter-year, state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

B.2 Alternative specifications and outcomes

Table B2: The effects of IRA on employment growth, robustness using annual growth.

	(1) firm growth	(2) empl growth	(3) payroll growth	(4) avg weekly wage growth
exposure_i × post	0.005**	0.019***	0.019**	0.015**
	(0.002)	(0.007)	(0.008)	(0.007)
Obs	2892830	2643246	2643449	2643387
#Counties	3029	3027	3027	3027
Mean Dep. Var.	0.010	-0.040	-0.015	-0.027
Sector x Year x Quarter FE	✓	✓	✓	✓
State x Year x Quarter FEs	✓	✓	✓	✓

Note: This table summarizes the effects of IRA on employment, payroll, firm counts, and weekly wages growth for counties that are more exposed to statutory IRA provisions. Exposure is a continuous variable which is the share of employment in 4 digit NAICs industries that were plausibly more exposed to IRA in 2022 relative to total county employment in 2022. In each specification we control for population growth and include quarter-year, state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

Table B3: The effects of IRA on employment growth, robustness using industry-level exposure.

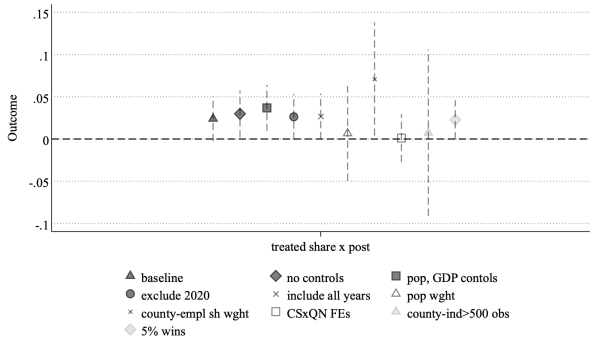
	(1) firm growth	(2) empl growth	(3) payroll growth	(4) avg weekly wage growth
$treat_j \times$ post	0.029***	0.038***	0.065***	0.025***
	(0.002)	(0.003)	(0.003)	(0.002)
Observation	2913975	2913975	2913971	2913971
# County	3029	3029	3029	3029
Mean Dep Var	-0.002	-0.086	-0.111	-0.125
County, NAICS, quarter, year FEs	✓	✓	✓	✓
State x Year x Quarter FEs	✓	✓	✓	✓

Note: This table summarizes the effects of IRA on employment, payroll, firm counts, and weekly wages growth for counties that are more exposed to statutory IRA provisions. Treat is a dummy equal to 1 if a 4 digit NAICS industry is classified as treated; we list these in Table A4. In each specification we control for population and include state-quarter-year, NAICS, County, quarter, year fixed effects, and cluster standard errors at the county level.

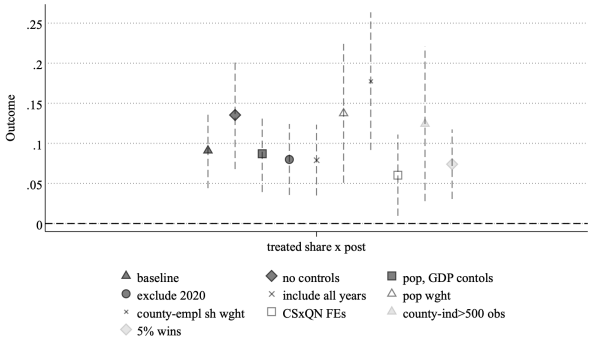
B.3 Robustness tests

Figure B1: The effects of IRA on employment, payroll, firm and wage growth, robustness.

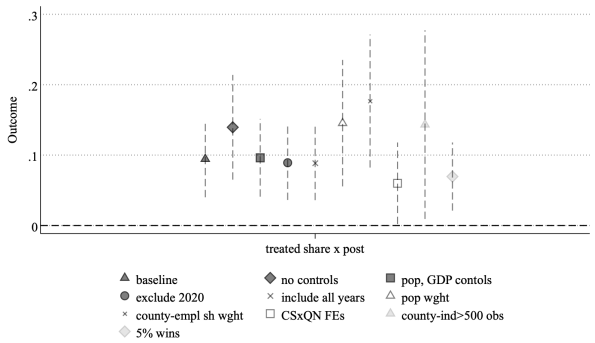
a Firm growth



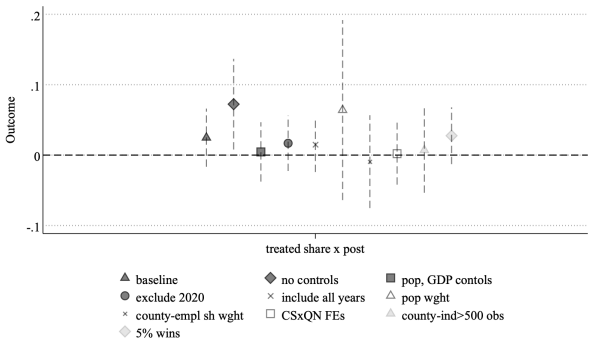
b Employment growth.



c Payroll growth.



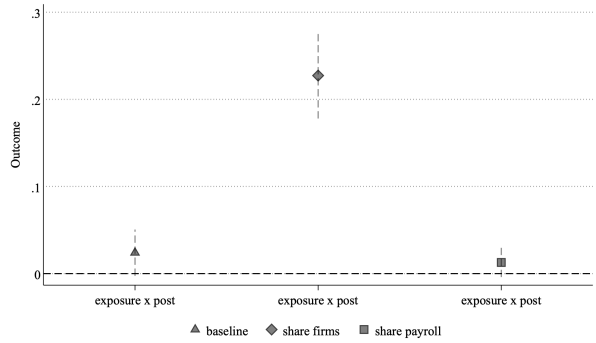
d Average weekly wage growth.



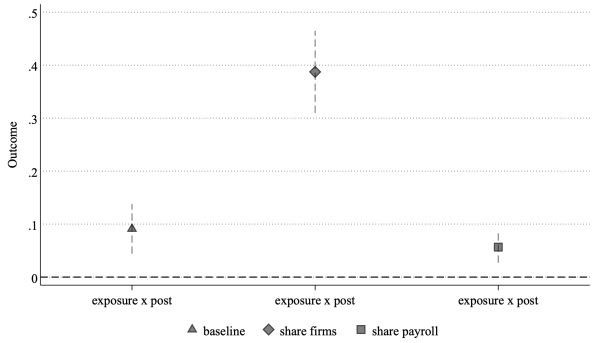
Note: This table summarizes the effects of IRA on employment, payroll, firm growth, and weekly wages growth for counties that are more exposed to statutory IRA provisions. Exposure is a continuous variable which is the share of employment in 4 digit NAICs industries that were plausibly more exposed to IRA in 2022 relative to total county employment in 2022. In filled triangles we show baseline estimates that control for population and include county x year x quarter and NAICS x year x quarter fixed effects, in filled diamonds we include no controls beyond fixed effects, in filled squares, we control additionally for GDP at the county level, in filled circles we exclude year 2020, in large crosses, we include all years, in hollow triangles we weight estimates by population rather than controlling for population, in small crosses, we weight estimates by county-industry employment shares calculated in 2022, in hollow squares we include county, state x year x quarter and NAICS fixed effects, in gray filled triangles, we only include observations that include over 500 employees in each country-NAICS cell, in filled gray diamonds we show results where we winsorize the outcome variable at 5% instead of 1% that we do at the baseline. We cluster standard errors at the county level in each specification.

Figure B2: The effects of IRA on employment, payroll, firm and wage growth, exposure measure robustness.

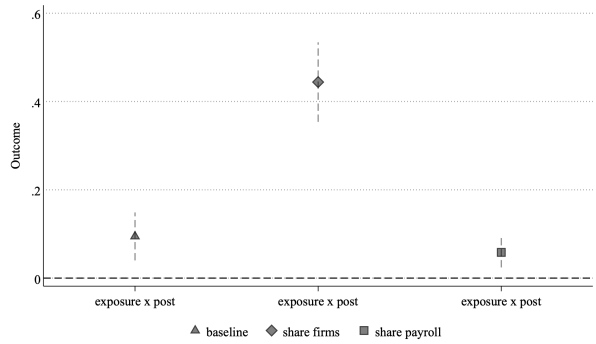
a Firm growth



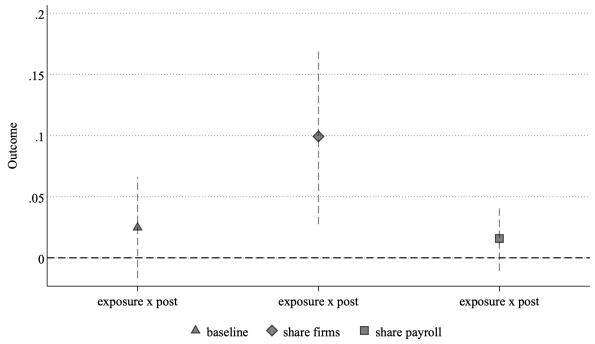
b Employment growth.



c Payroll growth.



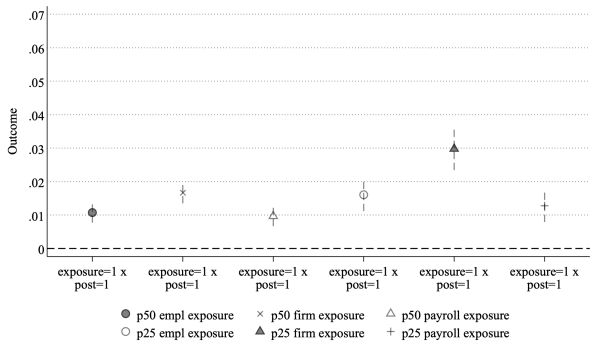
d Average weekly wage growth.



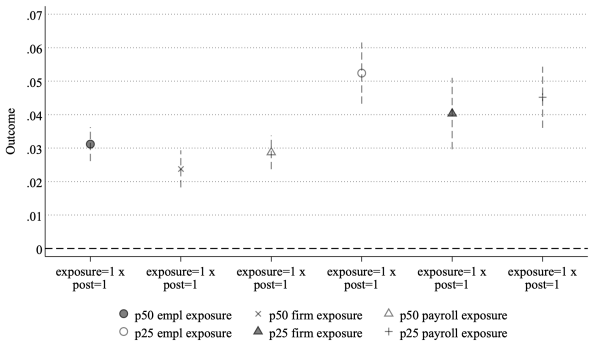
Note: This figure summarizes the effects of IRA on employment, payroll, firm counts, and weekly wages growth for counties that are more exposed to statutory IRA provisions. In each panel, we use several different exposure measures which are continuous variables based on the share of employment (baseline), share of firms, and share of payroll in 4 digit NAICs industries that were plausibly more exposed to IRA in 2022 relative to total county employment (firms or payroll) in 2022. In each specification we control for population growth and include quarter-year, state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

Figure B3: The effects of IRA on employment, payroll, firm and wage growth, exposure measure robustness.

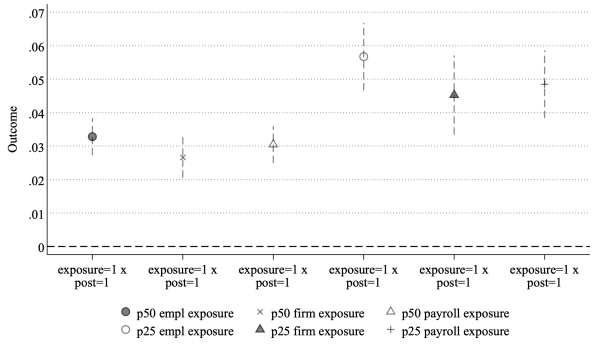
a Firm growth



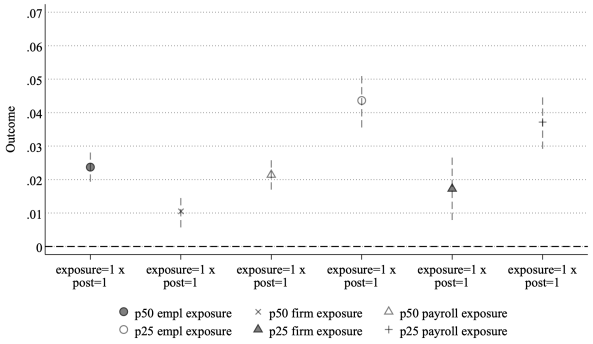
b Employment growth.



c Payroll growth.



d Average weekly wage growth.



Note: This figure summarizes the effects of IRA on employment, payroll, firm counts, and weekly wages growth for counties that are more exposed to statutory IRA provisions. In each panel, we use several different exposure measures which are dummy variables based on the high share of employment (baseline), share of firms, and share of payroll in 4 digit NAICs industries that were plausibly more exposed to IRA in 2022 relative to total county employment (firms or payroll) in 2022. High share is defined as that above median in 2022 or that above p75 as labeled in the figure. In each specification we control for population growth and include quarter-year, state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

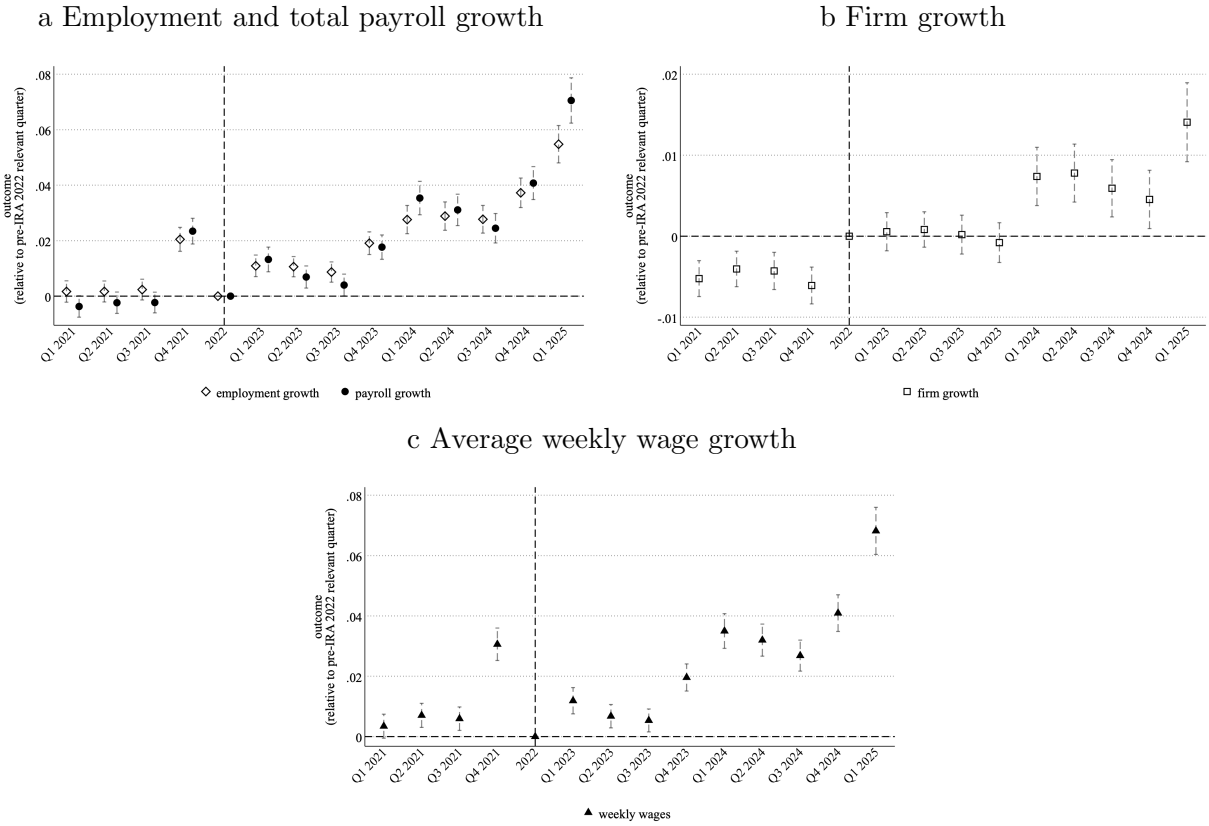
B.4 Additional results on government funding exposure

Table B4: The effects of government grants on employment, payroll, firm and wage growth.

	(1) firm growth	(2) empl growth	(3) payroll growth	(4) avg weekly wage growth
$grantsexposure_i \times$ post	0.005***	0.025***	0.027***	0.027***
	(0.001)	(0.002)	(0.003)	(0.002)
Observations	2876959	2876959	2876955	2876955
# Counties	2919	2919	2919	2919
Mean Dep Var	-0.002	-0.086	-0.111	-0.125
Sector x Year x Quarter FE	✓	✓	✓	✓
State x Year x Quarter FEs	✓	✓	✓	✓

Note: In this table we present results that evaluate the employment effects for counties that received more IRA related government grants. The dummy $grantexposure_i$ is equal to 1 when a county receives more than median government IRA funding. 95% of all US counties have received some of this funding after 2022. In each specification, we control for log of all government funding and log of population and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

Figure B4: The effects of IRA on employment, payroll and firm growth, government funding exposure measures.

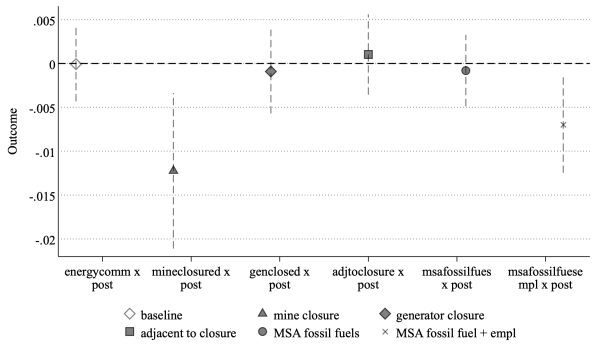


Note: This figure summarizes the effects of IRA on employment, payroll, firm counts, and weekly wages growth for counties that received above median government IRA-related funding in 2022. In each figure, we plot the outcome variable growth rate relative to 2022 and relative to respective quarters; e.g. for Q1 2023 we compute employment growth relative to Q1 20222 to control for the seasonal nature of employment. The different shapes correspond to coefficient estimates from equation x and the vertical dashed lines show 95% confidence intervals. In each specification we control for log of population, log of non-IRA government grants, and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

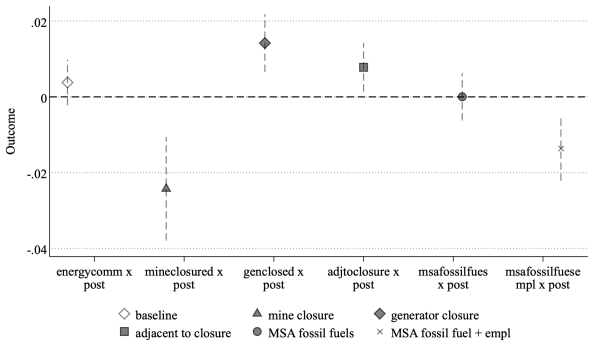
B.5 Energy communities results

Figure B5: Energy communities: robustness to different energy community designations.

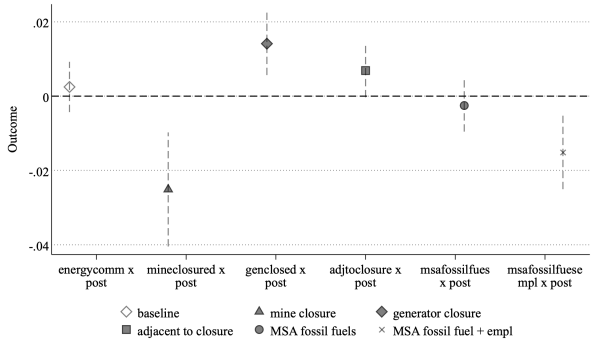
a Firm growth



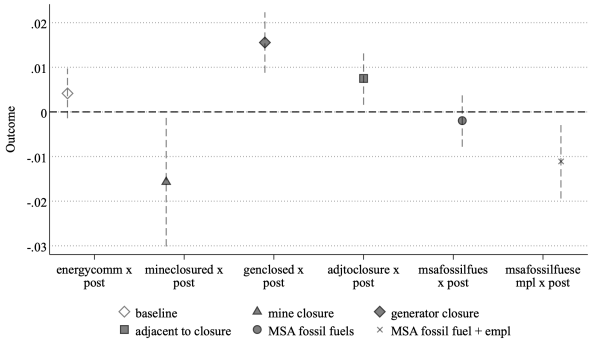
b Employment growth.



c Payroll growth.



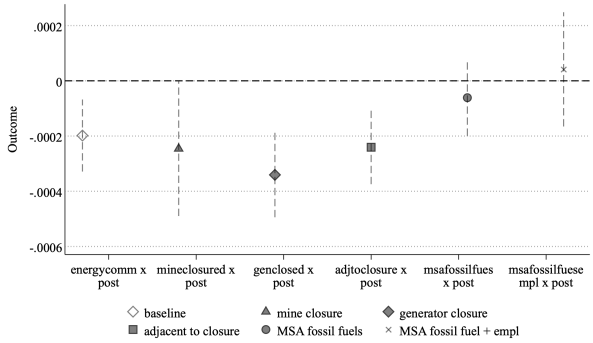
d Average weekly wage growth.



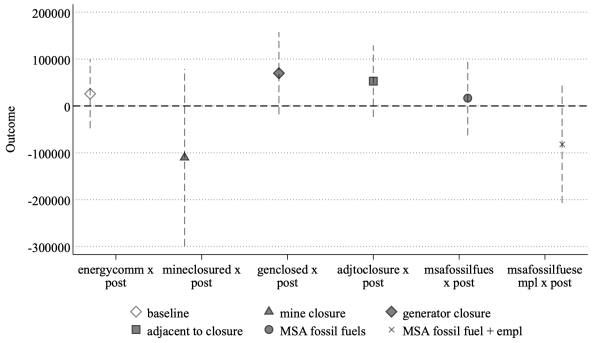
Note: This figure summarizes the effects of IRA on employment, payroll, firm counts, and weekly wages growth for counties that were designated as energy communities. Energy community is a dummy equal to 1 if a county has at least 1 census tract that qualifies as energy community according to IRA. We plot these counties in Figure 1. In each specification we control for population growth and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

Figure B6: Energy communities: robustness to different energy community designations.

a IRA grants share.



b IRA grants level.

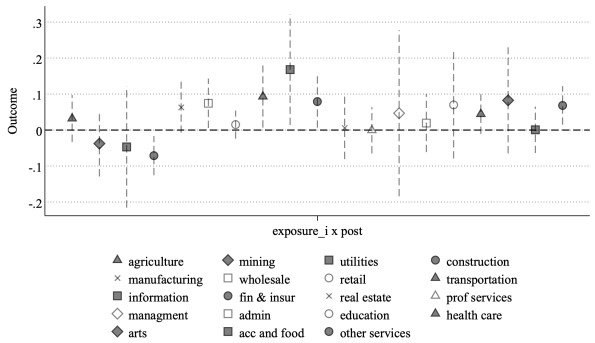


Note: This figure summarizes the effects of IRA on IRA funding for counties that were designated as energy communities. Energy community is a dummy equal to 1 if a county has at least 1 census tract that qualifies as energy community according to IRA. We plot these counties in Figure 1. In each specification we control for population growth and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

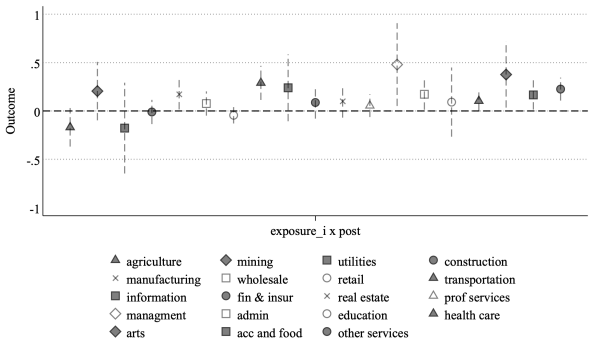
B.6 Industry heterogeneity

Figure B7: The effects of IRA on employment, payroll, firm and wage growth, sectoral variation.

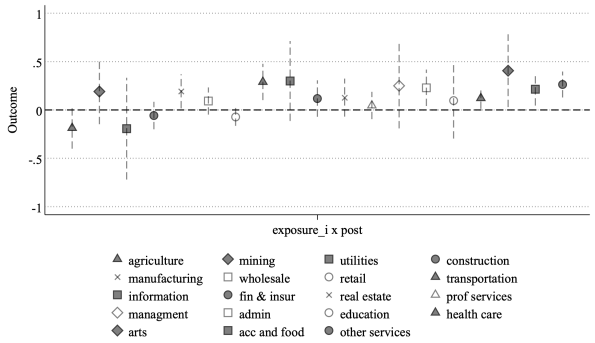
a Firm growth



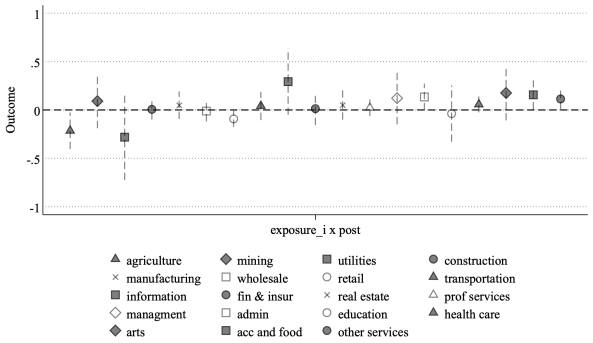
b Employment growth.



c Payroll growth.



d Average weekly wage growth.



Note: This figure summarizes the effects of IRA on employment, payroll, firm counts, and weekly wages growth for counties that are more exposed to statutory IRA provisions across sectors. Each dot corresponds to a different sector based on 2 digit NAICS codes. Exposure is a continuous variable which is the share of employment in 4 digit NAICs industries that were plausibly more exposed to IRA in 2022 relative to total county employment in 2022. In each specification we control for population growth and include quarter-year, state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

B.7 Public sector employment

Table B5: The effects of IRA grants on public sector employment, payroll, firm and wage growth.

	(1) firm growth	(2) empl growth	(3) payroll growth	(4) avg weekly wage growth
$grantexposure_i \times$ post	0.001	0.002	0.001	-0.006
	(0.001)	(0.006)	(0.006)	(0.004)
Observations	49849	49849	49849	49849
Mean Dep Var	-0.047	-0.189	-0.193	-0.195
State x Year x Quarter FEs	✓	✓	✓	✓

Note: This table presents results that evaluate the heterogeneity of the public sector employment effects for counties that also received more IRA related government grants. The dummy $grantexposure_i$ is equal to 1 when a county receives more than median government IRA funding. 95% of all US counties have received some of this funding after 2022. In each specification, we control for log of all government funding and log of population and include state-quarter year and NAICS quarter year fixed effects, and cluster standard errors at the county level.

Table B6: Mechanisms: the role of place-based incentives for public sector employment.

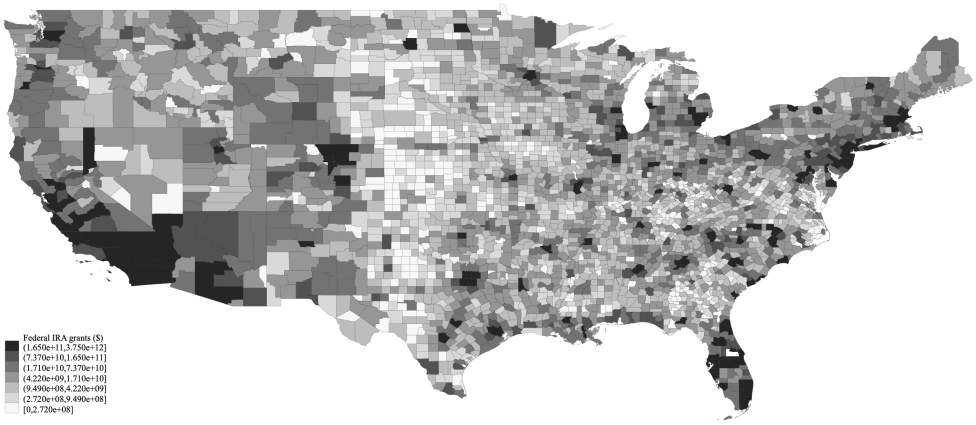
	(1) firm growth	(2) empl growth	(3) payroll growth	(4) avg weekly wage growth
$energycom_i$	-0.001	0.013*	0.012*	0.006**
	(0.001)	(0.007)	(0.006)	(0.003)
$energycom_i \times$ post	0.001	-0.010	-0.005	-0.017***
	(0.002)	(0.011)	(0.010)	(0.006)
Observations	38561	38561	38561	38561
# Counties	2269	2269	2269	2269
Mean Dep Var	-0.047	-0.189	-0.193	-0.195
State x Year x Quarter FEs	✓	✓	✓	✓

Note: This table summarizes the effects of IRA on public sector employment growth, payroll growth, firm number growth, and weekly wages growth for counties that were designated as energy communities. Energy community is a dummy equal to 1 if a county has at least 1 census tract that qualifies as energy community according to IRA. We plot these counties in Figure 1. This analysis is conducted at the county rather than county-NAICS level. In each specification we control for population growth and include state-quarter year fixed effects, and cluster standard errors at the county level.

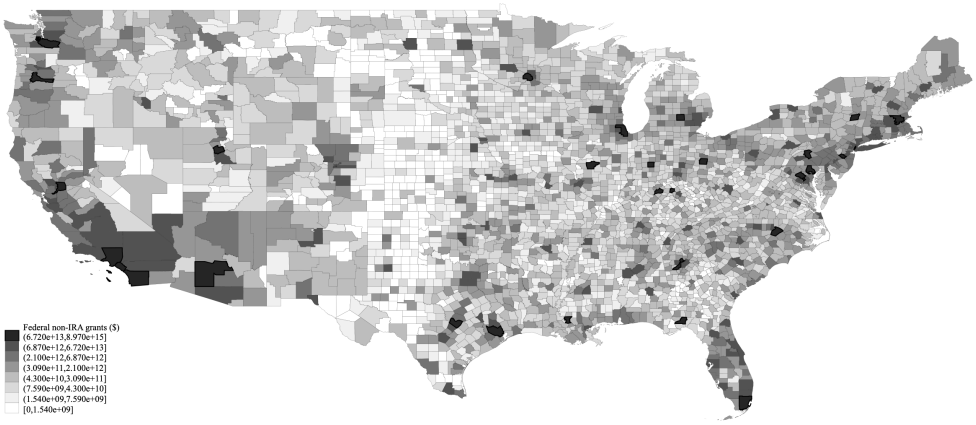
C Government funding additional descriptives

Figure B8: Geographical distribution of government direct grants.

a IRA grants: including CFDA numbers



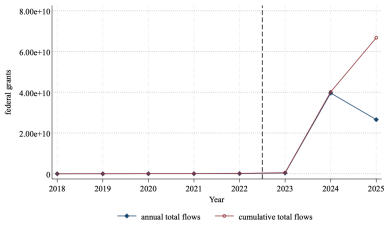
b non-IRA government grants



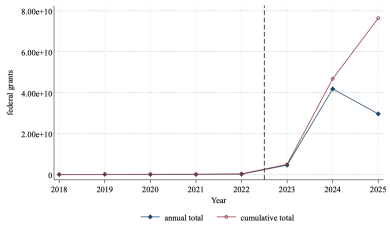
Note: The map in panel A shows the geographical distribution of total amount of government grants that mention IRA summed across all periods 2022 - 2025. These grants mention either IRA or Inflation Reduction Act in the prime award transaction description or in the program activities funding this grant. We also include all grants that were disbursed through the individual programs as outlined in the bill text. The list of CFDA program numbers that we use to classify IRA grants is listed in Tables B9-B11. Figure 4 in the Appendix shows the evolution over time of these grants. In Panel B, we show the distribution of all government grants. The scale in both graphs gives darker shades to more funded counties; the numerical brackets correspond to the following 8 brackets of funding distribution: 0-10%, 10-25%, 25-50%, 50-75%, 75-90%, 90-95%, 95-99% and 99%+. Source: https://www.usaspending.gov

Figure B9: The evolution of government grants over time.

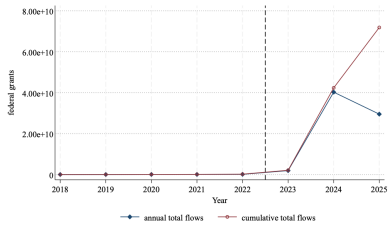
a IRA grants, flows



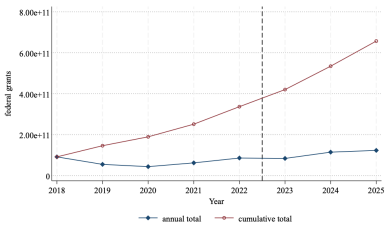
b IRA grants, including unique CFDA numbers



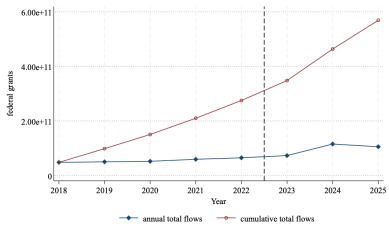
c IRA grants, including unique CFDA numbers, flows



d IRA grants, including CFDA numbers



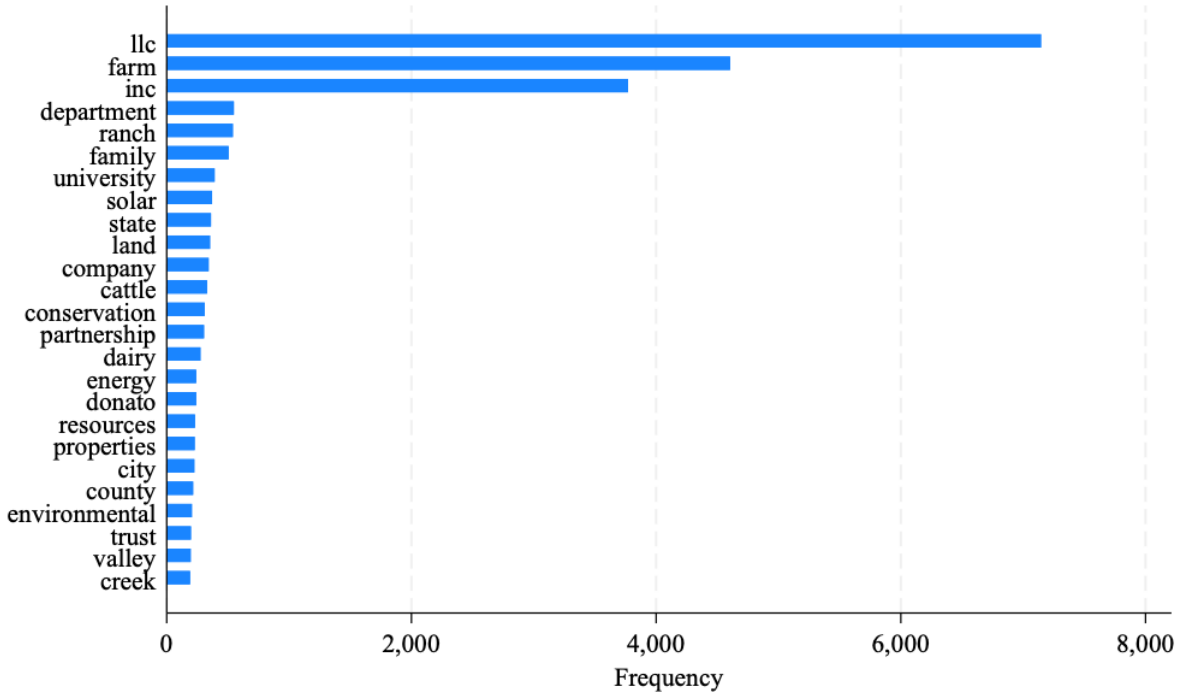
e IRA grants, including CFDA numbers, flows



Note: These plots show the total amount of government grants that mention IRA summed for each of the years 2018 - 2025. Panels b and d only include the total obligated amount and do not track the flow of when this money is disbursed to firms. Panels a, c, and e, plot the federal obligated amounts to track the progress of the flows. Panel a plots flow equivalents for Figure 4. In Panels b and c, these grants mention either IRA or Inflation Reduction Act in the prime award transaction description or in the program activities funding and also include all grants that were disbursed through the individual programs as outlined in the bill text, but only include those programs that were initiated for the IRA purposes. In Panels d and e, I include all individual programs, even if they existed before the IRA. The list of CFDA program numbers that we use to classify IRA grants is listed in Tables B9-B11. Source: https://www.usaspending.gov

C.1 Description of recipients and activities

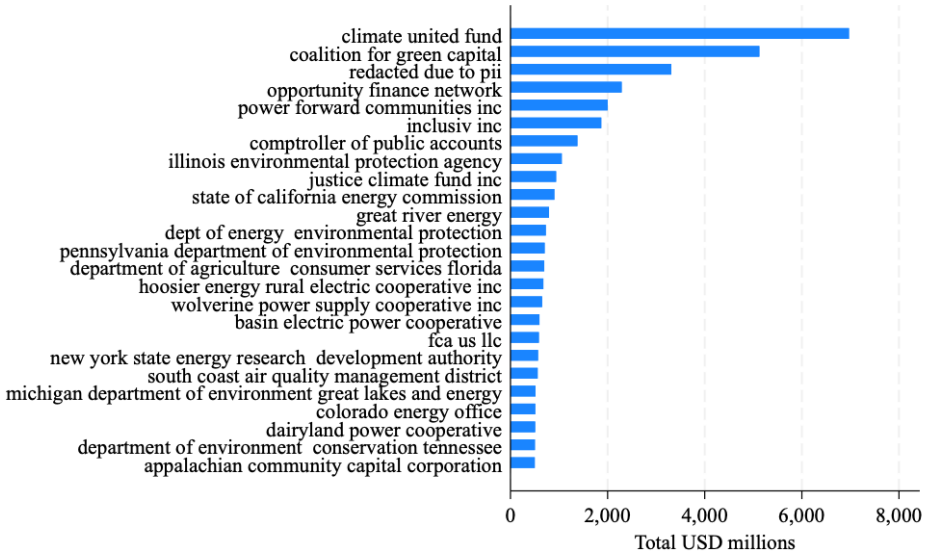
Figure B10: Recipients by type frequency.



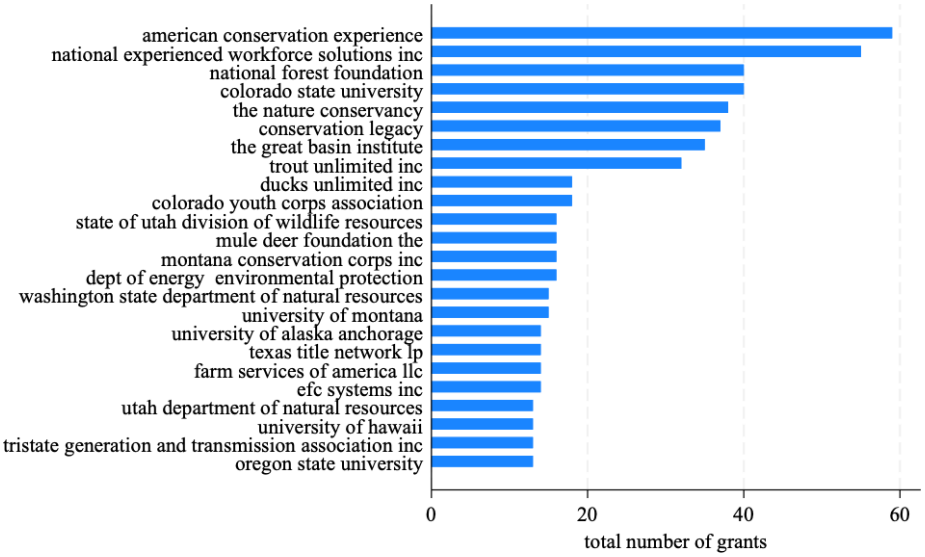
Note: This bar plots shows the most common recipient types of the federal IRA grants. Note that the total number of unique recipients is 17,014 who received 109,670 grants during the 2023-2025. Of those recipients 80,452 grants had a recipient redacted due to PII, so while we know the amount and location of the grant, we do not know who revived it. This figure only plots the recipients for whom we know the name, i.e., 27% of the sample of IRA-related grants. As we show in Table B8, only 3.1% of all grants in terms of amounts went to he redacted entities, so we are not missing large amounts of grants.

Figure B11: Recipients by amounts of grant frequency.

a Amounts



b Number of different grants



Note: These bar plots show the top 25 organizations that received the largest total amounts of IRA-related grants (panel a) and the top 25 highest number of different IRA-related grants (Panel b). In panel A, we show how many grants went to recipients whose identify was redacted due to PII. In panel b, we exclude those recipients, since they received over 80,000 grants.

C.1.1 Detailed description of 6 projects.

Climate United Fund : This agreement provides funding under the Inflation Reduction Act (IRA) to Climate United (CU). The recipient will utilize the funding to reduce emissions of greenhouse gases and other air pollutants, deliver benefits of greenhouse gas- and air pollution-reducing projects to American communities, particularly low-income and disadvantaged communities, and mobilize financing and private capital to stimulate additional deployment of greenhouse gas- and air pollution-reducing projects.

Specifically, the recipient will endeavor to accomplish this by working with community groups, technical assistance providers, financial institutions, and workforce development entities to reduce the barriers and limit the inefficiencies that have prevented broad adoption and financing of clean technologies, to ensure clean energy acceleration and market transformation beyond the National Clean Investment Fund (NCIF). Climate United will integrate this capital resource into existing lending products and processes so that all lenders, i.e., beyond just the community, green, and nonprofit sectors, learn to address decarbonization in their routine lending practices. Greening existing lending with NCIF support will have the broadest transformative impact on the capital markets nationwide.

Activities. The activities include developing a sustainable fund that can be revolved while offering products that meet borrowers and markets where they are. Specifically, they intend to leverage EPA funds with private capital to provide adequate levels of subsidy to spur the adoption of green alternatives as costs come down and markets mature. They plan to slowly decrease the amount of subsidy per transaction to ensure their products are additive and to maximize sustainability of the fund.

Climate United's plan is to build a supportive ecosystem for the financing of qualified projects (QP) that leverage national networks of local implementation partners and coordination with labor and workforce organizations to ensure financed projects are: (i) generating high-quality jobs with a diverse, skilled workforce trained in DBRA compliance and reporting, where applicable; (ii) delivering high-performing buildings for owners and occupants, or access to clean energy or transportation for American families, businesses, and organizations; and (iii) eliminating the barriers that have historically prevented the scaling of clean energy technologies across segments.

Their capital demand-side market-building plan focuses on broad awareness building, targeted outreach and education, and straightforward conversion to address historic barriers. The foundation of their strategy will be potential partnerships with national networks of local organizations that will engage, educate, and equip local partners with the tools to

facilitate QP development. Climate United will develop or partner to deliver ongoing training to lenders, contractors, owners, community organizations, building operators, and other priority segments. In conjunction with established, on-the-ground community organizations, they will work with CCIA partners, creating training programs to provide the most up-to-date information on their products and processes, to build the continuation of support for community lenders and build training for community-based organizations around how to access Climate United financial assistance.

Their capital supply-side market-building plan focuses on asset and data standardization, financial product development, portfolio analysis, and market education through a cooperative design process with transaction partners. They will create and refine their standardized products so they can more quickly scale and support the development of viable secondary markets.

Subrecipient. A portion will be deployed to balance sheets, investing in and with transaction partners to facilitate standardized and tailored loans into QPs that may stay on the balance sheets of the community.

Coalition for Green Capital : Note: A special payment condition applies to this award. This agreement provides funding under the Inflation Reduction Act. The recipient will provide financial and technical assistance to low-income and disadvantaged communities to deploy and benefit from residential-serving distributed solar energy and storage projects. These programs will ensure low-income households receive residential distributed solar by providing program beneficiaries household savings, community ownership, energy resilience, and other meaningful benefits.

Activities. Solar projects receiving financial assistance from the recipient may receive assistance for associated energy storage and upgrades that either enable project deployment or maximize the benefits of the project for low-income and disadvantaged communities. The recipient will also provide project-deployment services to enable low-income and disadvantaged communities to deploy and benefit from residential solar.

Outcomes. The anticipated deliverables will include steps and milestones to implement the strategies and plans for the Solar for All program, a distributed solar market strategy, the financial assistance strategy, the project-deployment technical assistance strategy, and an equitable access and meaningful involvement plan. The expected outcomes include climate and air pollution benefits, equity and community benefits, and market transformation benefits. The intended beneficiaries include households in low-income and disadvantaged

communities.

Comptroller of Public Accounts: Department of Energy State and Community Energy Programs (SCEP), Inflation Reduction Act of 2022 50122. SCEP seeks to provide initial guidance for the planning, administration, or technical assistance for future distributions of formula awards through the Home Energy Rebate Programs, which will require the submission to DOE of Home Energy Rebate Program plans that meet the requirements set out in future Home Energy Rebate Programs.

Illinois Environmental Protection Agency: This agreement provides funding under the Inflation Reduction Act to the Illinois Environmental Protection Agency (IEPA). The purpose of this grant is to develop a toxic pollutant program that can be used to support permitting of sources, particularly those located in environmental justice (EJ) areas, as well as other Bureau of Air programs. **Activities.** Specifically, the recipient will develop a database of existing air toxics standards and a screening tool that can be utilized in modeling analyses and other Bureau of Air tasks. The activities include researching applicable air toxics standards that may be utilized in EJ modeling analyses, developing support documents for modeling and other agency tasks with particular emphasis on EJ areas, and training staff in air toxics risk analyses and modeling.

Outcomes. The anticipated deliverables include a database of air toxics standards, support materials for IEPA staff, and a screening tool for use by IEPA staff. The expected outcomes include consistency in air toxics risk and modeling analyses, consistency in approach for permitting and modeling in EJ areas, and increased knowledge of air toxics risk analyses and modeling. The intended beneficiaries are the residents of the State of Illinois.

FCA US LLC: Inflation Reduction Act. FCA US LLC conversion of Indiana transmission plant for electric drive module production. This project will enable the continuous manufacturing of vehicle propulsion systems in the existing facility, minimizing supply chain disruption risk and securing long-term employment for the facility's UAW-represented workforce as the company transitions to an electrified future.

General Motors LLC: Inflation Reduction Act electric vehicle conversion. The recipient will convert an existing vehicle assembly facility located in the United States to electric vehicle production. The conversion will enable expansion of domestic EV production, components, and materials.

Table B7: Recipient Classification Based on Name String Matching

Category	Keyword triggers in recipient name
Agriculture	`farm`, `ranch`, `cattle`, `land`, `dairy`, `livestock`
Government	`department`, `dept`, `state`, `county`, `city`, `council`, `office`, `authority`, `cabinet`, `comptroller`, `commission`, `division`, `board`
Firms	`llc`, `inc`, `company`, `partnership`, `family`, `association`, `corporation`, `corp`
Funds and nonprofits	`fund`, `coalition`, `network`, `agency`, `cooperative`, `foundation`, `conservancy`
Research institutions	`university`, `institute`, `research`
Tribal entities	`tribe`, `tribes`, `tribal`, `band`, `bands`, `native`, `indian`, `indians`
Redacted due to PII	All entries with no known recipient
Other	Assigned when none of the above keyword sets are detected.

Notes: Recipient names are lowercased and stripped of punctuation prior to classification. Categories are assigned using substring matches on cleaned recipient names. The classification is rule-based and mutually exclusive; if multiple keyword sets match a given name, category assignment follows the sequential order of the replacement rules in the code, with later assignments overwriting earlier ones. "Other" is the residual category.

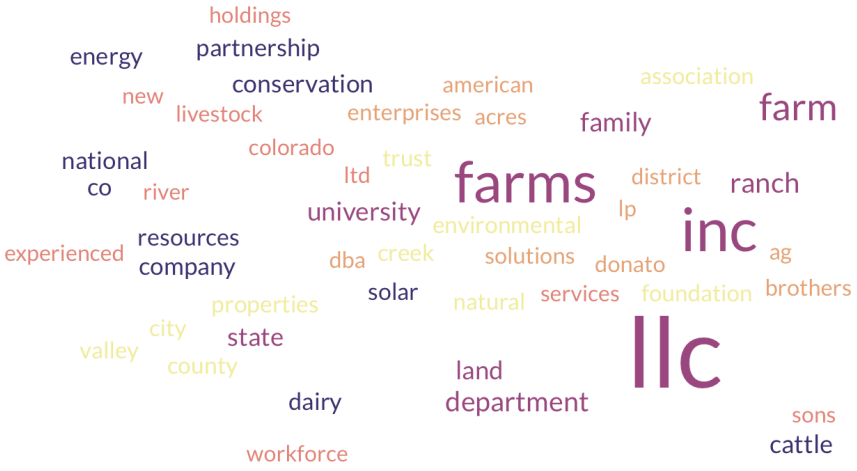
Table B8: Text-based Categorization of Grant Activity descriptions.

Category	Keywords
Equity	`equity`, `community`, `communities`, `workforce`, `jobs`, `labor`, `training`, `justice`, `education`, `restoration`, `fish`, `forest`, `conservation`, `wildlife`
Environment	`energy`, `renewable`, `solar`, `wind`, `battery`, `grid`, `climate`, `carbon`, `emissions`
Infrastructure	`infrastructure`, `construction`, `facility`, `plant`, `equipment`, `upgrade`, `installation`
Tech	`technology`, `innovation`, `research`, `development`, `engineering`, `manufacturing`
Energy	`energy`, `power`, `electric`, `generation`
Other	Assigned when keywords missing

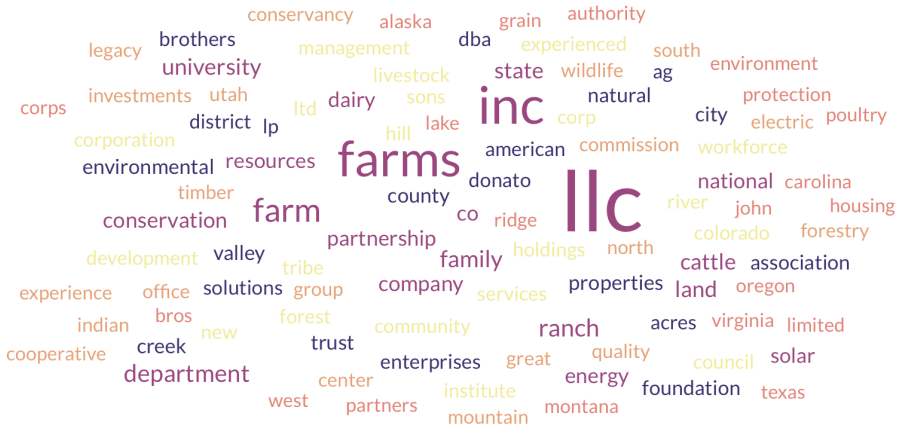
Note: Keywords are detected using substring matches on lowercased text. The first four categories use grant description text. The "Energy" category uses recipient names. Categories are assigned sequentially; if multiple keyword sets match, later replacements overwrite earlier assignments. "Other" is the residual category.

Figure B12: Word clouds: recipients.

a Recipients, top 50



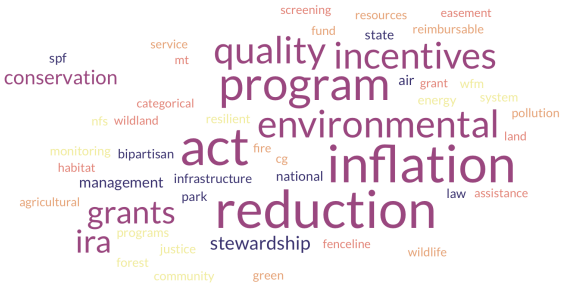
b Recipients, top 100



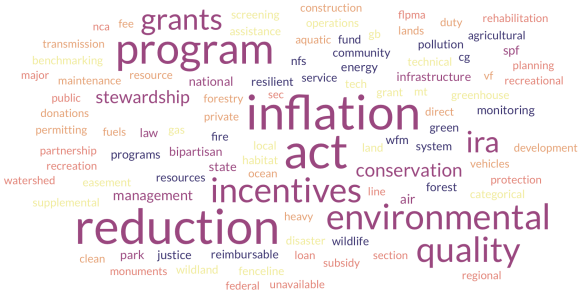
Note: These word clouds show the top 50 and top 100 most commonly occurring words for grant recipients.

Figure B13: Word clouds: program activities.

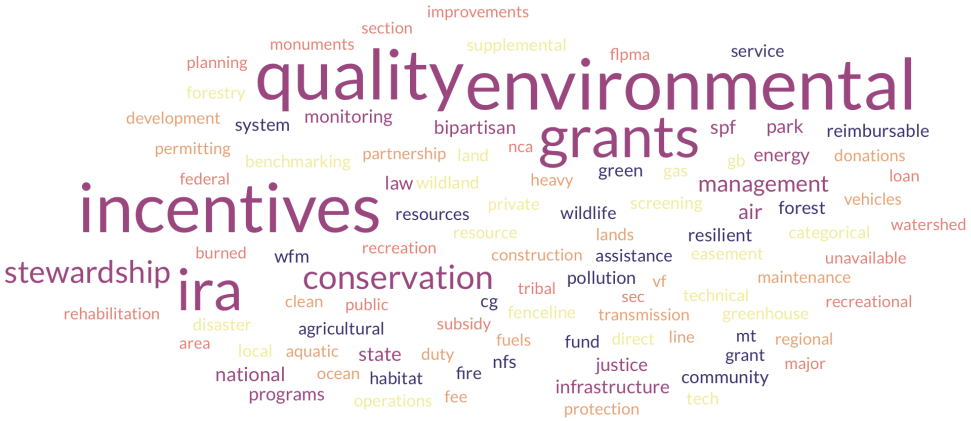
a Recipients, top 50



b Recipients, top 100



c Recipients, top 100, excluding IRA



Note: These word clouds show the top 50 and top 100 most commonly occurring words for program activities funding this grant.

C.2 Programs Funded By IRA

Table B9: Government Grants Funded by the IRA (Part 1 of 3)

Program Name	CFDA Number Assistance Listing	Initiated by IRA
Community Wood Energy and Wood Innovation Program	10.708	
Wildfire Crisis Strategy Landscapes	10.724	
Inflation Reduction Act Urban Community Forestry Program	10.727	
Inflation Reduction Act Hazardous Fuels Transportation Assistance	10.728	
Inflation Reduction Act - National Forest System	10.729	
Inflation Reduction Act Landscape Scale Restoration	10.731	
Inflation Reduction Act - Forest Legacy Program	10.734	
Higher Blends Infrastructure Incentive Program (HBIIP)	10.754	
Powering Affordable Clean Energy (PACE) Program	10.757	
New Empowering Rural America (New ERA) Program	10.758	x
Rural Energy for America Program	10.868	
Environmental Quality Incentives Program	10.912	
Conservation Stewardship Program	10.924	
Regional Conservation Partnership Program	10.932	
Increasing Land, Capital, and Market Access Program	10.968	x
Discrimination Financial Assistance Program (DFAP)	10.984	x
Ocean Acidification Program (OAP)	11.017	
Sea Grant Support	11.417	
Environmental Sciences, Applications, Data, and Education	11.440	
Coastal Zone Management Administration Awards	11.473	
Green and Resilient Retrofit Program	14.021	x
Home Investment Partnerships Program	14.239	
Tribal Electrification Program	15.165	x

Table B10: Government Grants Funded by the IRA (Part 2 of 3)

Program Name	CFDA Number Assistance Listing	Initiated by IRA
Reclamation States Emergency Drought Relief (Covers Western Water Crisis Drought Relief)	15.514	
Colorado River System Conservation Pilot	15.567	
Lower Colorado River Basin Conservation and Efficiency Program	15.575	
Domestic Water Supply Projects	15.577	x
National Wildlife Refuge System Enhancements	15.654	
Fueling Aviation's Sustainable Transition via Sustainable Aviation Fuels (FAST-SAF) and Low-Emissions Aviation Technologies (FAST-Tech) Grant	20.115	x
Highway Planning and Construction	20.205	
Surveys, Studies, Research, Investigations, Demonstrations, and Special Purpose Activities Relating to the Clean Air Act	66.034	
Diesel Emission Reduction Act (DERA) National Grants	66.039	
Diesel Emissions Reduction Act (DERA) State Grants	66.040	
Climate Pollution Reduction Grants	66.046	x
Hydrofluorocarbon Reclaim and Innovative Destruction Grants	66.047	
Clean Heavy-Duty Vehicles Program	66.049	x
Environmental Finance Center Grants	66.203	
Environmental Justice Collaborative Problem-Solving Cooperative Agreement Program	66.306	
Environmental Justice Government-to-Government (EJG2G) Program	66.312	
Environmental Protection Consolidated Grants for the Insular Areas - Program Support	66.600	
Financial Assistance For Community Support Activities To Address Environmental Justice Issues	66.614	x
Environmental Justice Thriving Communities Grantmaking Program (EJ TCGM)	66.615	x

Table B11: Government Grants Funded by the IRA (Part 3 of 3)

Program Name	CFDA Number Assistance Listing	Initiated by IRA
Environmental and Climate Justice Community Change Grants Program	66.616	x
Reducing Embodied Greenhouse Gas Emissions for Construction Materials and Products	66.721	x
Greenhouse Gas Reduction Fund: National Clean Investment Fund	66.957	x
Greenhouse Gas Reduction Fund: Solar for All	66.959	x
Greenhouse Gas Reduction Fund: Clean Communities Investment Accelerator	66.960	x
State Energy Program	81.041	
Renewable Energy Research and Development	81.087	
Fossil Energy Research and Development	81.089	
Energy Efficiency and Renewable Energy Information Dissemination, Outreach, Training and Technical Analysis/Assistance	81.117	
Manufacturing and Energy Supply Chain Demonstrations and Commercial Applications	81.253	x
Grid Infrastructure Deployment and Resilience (Covers Transmission Siting Grants)	81.254	
Clean Energy Demonstrations (Covers Advanced Industrial Facilities Deployment)	81.256	x
Improving the Capability of Indian Tribal Governments to Regulate Environmental Quality	93.581	

Note: CFDA stands for Catalog of Federal Domestic Assistance. These codes were chosen by first using AI tools to determine every individual program that received funding in the bill text. Then, with the help of AI, we individually searched online for the official program assistance listing on SAM.gov or grants.gov. If you would like more detail on any of these programs, you can enter the CFDA number into the SAM.gov website. Much thanks to congressman Ed Case of Hawaii for a publication on his website that made this process much easier.