The Initial Effect of the Inflation Reduction Act on Local Business Activities

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Abstract: We examine initial local business activity responses to the Inflation Reduction Act (IRA). The IRA provides major supply-side investment incentives for clean energy, with estimates of clean energy investments already totaling over $280 billion. Using a unique dataset that captures firm-level clean energy investment announcements that are eligible for IRA tax incentives, we first identify county-level factors associated with the location of private firm clean energy investments post-IRA. We find counties with greater existing economic activity and higher unemployment rates are more likely to be selected for clean energy investments. Second, we investigate the extent to which firm-level clean energy investments are associated with county-level business activities. Our lower bound estimates indicate clean energy investments are associated with a 0.4 to 1.3 percent increase in county-level business establishments, suggesting IRA-related investments generate positive economic benefits. Our findings inform the political debate on the economic impact of the IRA by quantifying the impact on local economies.

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Keywords: Clean Energy Investment; Environmental Taxes and Subsidies; Inflation Reduction Act; Local Business Activities

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1. Introduction

The U.S. introduced the Inflation Reduction Act (IRA) as the "most ambitious funding ever for tackling climate change" and "the largest climate legislation in U.S. history" (Bistline, Mehrotra, and Wolfram 2023). Through the use of a broad range of tax and other incentives, the IRA is structured to incentivize investments in clean energy primarily with the intention of reducing energy costs and spurring economic growth (Department of the Treasury 2023). Clean energy investments have already surpassed $280 billion by the first anniversary of the IRA in August 2023 (van Nieuwenhuijzen, Willner, Reinders, and Utkarsh 2023) and are expected to surpass $3 trillion by 2032 (Goldman Sachs 2023; van Nieuwenhuijzen et al. 2023). Despite these initial assessments and broad investment estimates, our understanding of the economic impact of the IRA remains limited, particularly concerning the locational distribution of clean energy investments and the impact of induced investments on local business activities.[1]

In this paper, we contribute to this discussion by examining two questions. First, we identify county-level factors associated with the location of firm clean energy investments following the enactment of the IRA.[2] A key objective of the IRA is to reduce inequality by attracting clean energy investments in disadvantaged communities with the intent of spurring economic growth in these communities (Department of the Treasury 2023). Despite the substantial subsidies provided by the IRA, it is unclear if IRA-specific characteristics (e.g., additional tax benefits when investing in disadvantaged communities) affect a county's likelihood of receiving firm-level clean energy investments over other (socio)economic, environmental, or political

[1] The IRA includes provisions to promote domestic clean energy investments, enhance healthcare affordability, modernize the IRS, and raise revenue through new corporate taxes (e.g., corporate minimum tax and excise tax on stock buybacks) with the overall goal to reduce the federal government budget deficit and inflation. The tax provisions to fund clean energy investments are the major spending provisions and the focus of this paper.

[2] Firms, the largest investors in clean energy and related technologies, are predicted to receive more than half of the IRA funding (McKinsey 2022; U.S. Congress 2022). We use the terms "private firms" and "firms" interchangeably throughout the text to refer to those firms that are not government owned.

characteristics that affect investment location decisions. To assess whether the IRA is achieving its goals, policymakers must understand where firms are investing in clean energy and whether the law has changed the factors influencing location choices.

Second, we investigate the extent to which firm-level clean energy investments are associated with changes in county-level business activities. The size and scale of the tax incentives in the IRA are unprecedented and exceed many other important tax incentives such as the R&D tax credit.[3] Given the political debates about the IRA's funding distribution and its net effects on the U.S. economy, understanding and quantifying the magnitude of local economic responses from firm investments in clean energy is crucial for policymakers (Bistline, Mehrotra, and Wolfram 2023; Department of the Treasury 2023; The White House 2023a). Providing evidence also informs policymakers in other countries considering implementing similar legislation (Curie 2023).

We investigate our research questions leveraging geographic variations in firms' clean energy investment announcements across U.S. counties after the enactment of the IRA. We use the Clean Investment Monitor (CIM) dataset provided by Rhodium Group and MIT's Center for Energy and Environmental Policy Research (CEEPR), which documents firm-level investment announcements in the manufacture (e.g., production of solar modules or batteries) and deployment (e.g., building solar parks and energy storage facilities) of clean technologies.[4] Importantly, this dataset provides detailed information on the location and estimated amount of clean energy investment announcements, restricted to those eligible for IRA tax incentives. We merge this

[3] Tax credits are a crucial tool of the IRA to incentivize production and investment of clean electricity generation and energy storage as well as clean energy manufacturing. The Congressional Budget Office (CBO) estimates that over two-thirds of the estimated fiscal costs of the climate-related provisions of IRA ($271 billion) will be tax credits, which target clean electricity production and investment.

[4] CIM covers $241 billion in clean energy investments in the post-IRA period, representing a substantial portion of the $280 billion investments documented by van Nieuwenhuijzen et al. (2023). The CIM includes investments in a wide range of clean technologies aimed at reducing greenhouse gas (GHG) emissions, as well as the input components of these technologies. Importantly, the dataset provides details on the announcement status (i.e., operating, under construction, cancelled). See section 3.1 for more details on the dataset.

dataset with quarterly county-level data on business establishments, which allows us to link firm investments in renewable energy technologies to data on county-level characteristics and overall business activities (i.e., number of business establishments).

We first use a determinants model to identify county characteristics associated with the likelihood of firms selecting a county as a location for clean energy investments following the enactment of the IRA. Our determinants model includes several variables that reflect (socio)economic, environmental, technology-related, and political characteristics, as well as specific IRA provisions. We document that economic characteristics are substantially associated with the likelihood of counties receiving clean energy investments. Specifically, we find counties with higher existing economic activities and counties with previous clean energy-related investments are more likely to attract clean energy investments in the post-IRA period. We do not find an increased likelihood of "energy communities"—disadvantaged communities designated to receive additional IRA-related tax benefits—being selected for post-IRA clean energy investments. Comparing county characteristics between the post-IRA and pre-IRA periods, our results indicate that economic and environmental factors are key determinants of selection in both periods. Interestingly, a county's unemployment rate is positively associated with the likelihood of being selected in the post-period only. This finding suggests a higher likelihood of investments in counties that historically suffer from greater inequality and is consistent with reports by the Department of the Treasury (2023).

In a second set of analyses, we employ a generalized difference-in-differences design (DiD) to evaluate the effect of clean energy investments on county-level business activities. Specifically, we examine changes in county-level business establishments between counties where private firms announce clean energy investments following the enactment of the IRA to counties that do not receive such investments. We classify counties where firms invest in clean energies after the enactment of the IRA as treated counties. Our DiD specification includes a vector of time-varying county characteristics (e.g., lagged establishments, median income, etc.) as well as county or state and quarter-year fixed effects to control for heterogeneity across counties and time. Using our DiD specification, we document a 0.4 to 0.6 percent increase in total business establishments, which translates into an average increase of 11 to 16 business establishments in a county that receives clean energy investments after the IRA compared to counties that do not receive a clean energy investment. We also analyze specific industries related to clean energy for which we expect more pronounced responses. Consistent with this rationale, we find a 0.8 and 1.3 percent increase in utility, manufacturing, and transportation and warehousing establishments. These results suggest a spillover effect of renewable energy investments to overall business activities and to specific industries that are related to clean energy.

To address concerns that counties receiving clean energy investments differ from those that do not, we use an entropy-balanced sample that accounts for differences in observable county characteristics between treated and control counties and find consistent results. We also demonstrate that the positive impact of private clean energy investments on local business activities is concentrated in counties with above-median private investments, which suggests that a certain minimum amount of clean energy investment is needed to have a positive effect on local business activities. Additionally, we find a positive impact on local business activities separately for investments in manufacturing as well as in the deployment of clean energy technologies, which suggests that both types of clean-energy investments individually provide economic benefits to local communities.

One main goal of the IRA is to spur economic growth in disadvantaged communities. We focus on two features that characterize disadvantaged communities. First, we examine if the IRA induces more pronounced business activities in energy communities for which clean energy investments are eligible for higher tax credits. When bifurcating our sample, our results indicate that energy communities receive some benefits from the IRA through increased business activity. However, we do not find evidence of a more pronounced response for those energy communities relative to other treated counties. Thus, our results show that investments made in communities specifically targeted by the IRA generate at least the same level of economic benefits as investments made in non-targeted communities. Second, we examine the business activity response between counties with high and low unemployment rates. We document the increase in business activities is concentrated in counties with below-median unemployment rates. Although our determinants model results show counties with higher unemployment rates are more likely to receive clean energy investments, our results also suggest no increase in business activities in these counties. Therefore, we find mixed evidence whether the IRA's policy goals to help disadvantaged communities are being met.

Our study adds to economic and public policy literatures as well as the political discussion about the economic impact of the IRA. First, we add to the nascent academic research studying the firm and local economic responses of the IRA (Bistline, Blanford, et al. 2023; Huang and Kahn 2024; Jiang, Jia, and Liao 2024). We provide some of the first empirical insights into the impact of the IRA on the U.S. economy by documenting the determinants influencing firms' decisions regarding the location of clean energy investments and the extent to which these investments affect county-level business activities. Our analyses reveal an initial positive impact of firm-level clean energy investments on local business activities following the IRA. This provides some of the first evidence of the IRA's impact on energy-related and broader economic activities, which speaks to the economic incidence of specific IRA provisions and their distributional implications (Bistline, Mehrotra, et al. 2023; The White House 2023b). Our findings of increases in local business activities resulting from firm clean energy investments are informative for the political discussions concerning the benefits and costs of the IRA on the U.S. economy.

Second, we contribute to the literature on investment stimulus policies and targeted tax incentives by quantifying the impact of a large-scale policy incentivizing clean energy technologies across different industries. We provide insights into the regional distribution of energy investments and their economic effects on the local economy, which are valuable for understanding the IRA's advantages in targeting energy equity. These findings add to the broader literature on investment responses to targeted tax policy incentives (Edgerton 2010; Zwick and Mahon 2017; Ohrn 2018; Lester 2019; Andersen, Curtis, and Ohrn 2024), energy investment tax credits (e.g., Chan and Fischer 2024; Jacob and Zerwer 2024), government subsidies (De Simone, Lester, and Raghunandan 2022; Drake, Hess, Wilde, and Williams 2022), and place-based tax incentives (Frank, Hoopes, and Lester 2022). Our initial findings are also valuable for policymakers in other countries that are considering implementing similar regulations incentivizing green energy investments and economic growth (Curie 2023). While our analysis focuses on initial responses to the IRA, investments in clean energy are expected to increase further in 2024 (The Clean Investment Monitor 2024). Thus, we leave it to future research to examine the longer-term impacts of the IRA.

2. Institutional Background and Literature

2.1 IRA and Tax Credits for Clean Energy Investments

The Inflation Reduction Act of 2022 seeks to improve U.S. economic competitiveness, innovation, and industrial productivity. Labeled as "the largest climate legislation in U.S. history," the IRA directs nearly $400 billion in federal funding to clean energy. The IRA aims to substantially lower carbon emissions and spur economic growth (Department of the Treasury 2023; The White House 2023a). The IRA's federal funding, which is delivered through a mix of tax incentives, grants, and loan guarantees, span the entire energy sector, from producers of raw materials to end-use consumers. The most important component of distributing the federal funding is through tax incentives. In the Congressional Budget Office's (CBO) budgetary cost assessment of the IRA, the CBO estimates that over two-thirds, or $271 billion, of the climate-related provisions' fiscal costs will be tax credits (Bistline, Mehrotra, et al. 2023).

The IRA introduced new and extended several existing tax credits for the production and investment of clean electricity generation and energy storage as well as clean energy manufacturing (see Appendix B for an overview). Firms whose investments qualify for tax credits claim the credits on their income tax return. One key aspect of the IRA is its focus on incentivizing the location of clean energy investments through additional (bonus) tax credits, aiming to address inequality by stimulating economic growth in disadvantaged counties with historically high inequality and unemployment rates. This policy goal is reflected in several of the clean energy tax incentives. For example, the law offers bonus credits for projects that are located in economically disadvantaged communities or traditional energy communities, collectively referred to as energy communities, and for projects that meet requirements to pay the prevailing wage and hire qualified registered apprentices (The White House 2023b).[5]

[5] Energy communities are defined as Metropolitan Statistical Areas (MSAs) with high economic activity related to fossil fuels and recently high unemployment, an area that is in close proximity to a coal mine closure, or brownfield sites (such as land that is underutilized due to pollution from former industrial use) (EnergyCommunities.gov).

The tax credit amounts are substantial and depend on the provision for which the investment qualifies. The IRA modified and extended the existing production tax credit (PTC) (IRC § 45Y) and investment tax credit (ITC) (IRC § 48E) by adding technology-neutral, emissions-based credits and bonus tax credit components.[6] The PTC is awarded per megawatt-hour of electricity output and offers a based credit amount of 0.3 Cents/kW for production of clean electricity. The ITC provides tax credits for investments in facilities that generate clean electricity. The ITC is awarded as a percentage of the investment cost and offers a base credit amount of six percent of qualified investments. Both the PTC and ITC are increased five times for projects meeting prevailing wage and registered apprenticeship requirements. Further, qualifying investments located in an energy community are eligible for a bonus credit equal to 10 percent for the PTC and 10 percentage points for the ITC. The production and investment tax credits for clean electricity and energy storage account for more than one-third of the estimated costs of IRA's climate provisions (Congressional Budget Office 2022). If a firm qualifies for the PTC and ITC, it can select only one of the two provisions.

The law also introduced the Advanced Manufacturing Production Credit (IRC § 45X) which provides a tax credit for domestic manufacturing of components for solar and wind energy, inverters, battery components, and critical minerals. The tax credit amount varies depending on the type of technology that is produced. Generally, the tax credit is calculated as a fixed dollar rate multiplied by the capacity of the eligible component, a fixed dollar rate multiplied by the weight or size of the eligible component, or a flat percentage multiplied by the production cost of the eligible component (IRC § 48X(b)). The manufacturing tax credit accounts for nearly $16 billion of the estimated costs of IRA's climate provisions (Congressional Budget Office 2022). However,

[6] The technology neutral feature will be effective starting from 2025.

Credit Suisse projects the cost of the manufacturing tax credit could significantly exceed the CBO estimates (Credit Suisse 2022).[7]

2.2 Literature and Hypothesis Development

The nascent academic literature, governmental analyses, and industry reports on the IRA mainly focus on predictions of the overall macroeconomic, energy and power-related, and emission-related outcomes (Bistline, Blanford, et al. 2023; Bistline, Mehrotra, et al. 2023; Jiang et al. 2024). Due to the limited availability of data, the concurrent literature relies largely on simulations and predictions. At the same time, the studies stress the complexity of the provisions and the diverse sectoral and geographic impact that the IRA might have. This diverse impact might result from already existing infrastructure for certain technologies in regions, provisions incentivizing specific types of technology investments, and additional tax relief when firms invest in low-income and disadvantaged communities.

In our first research question, we investigate which county characteristics affect firm-level clean energy investments and whether the IRA altered the relative importance of characteristics in selecting counties as investment locations between the pre and post IRA periods. Prior literature identifies several categories of non-tax characteristics that shape a firm's decision to locate new investments in a specific area. These categories include (socio)economic, environmental- and technology-related, and political characteristics that affect firms' choices of investments (Freedman 2012; Chaurey 2017; Frank et al. 2022). The IRA introduced and extended tax credits to spur additional clean energy investment that might spur firm investments in areas where non-

[7] The IRA also included a number of other tax credits. For example, the IRA extended or added tax credits for individual taxpayers such as for investments in home solar or battery storage or electric vehicles. We only focus on firm-level investments as the CIM data does not include detailed information on such "retail" investments. Further, the IRA includes other firm-level tax credits such as the Advanced Energy Project Credit (IRC § 48C). Firms must submit applications for pre-qualification for this credit, and the first round of approved applicants was announced in March 2024 (Department of Energy 2024). As discussed below, our sample period ends in December 2023, and the CIM data does not include information on investments that qualify for this tax credit.

tax factors would not make investments as attractive otherwise. Prior literature provides evidence that general tax policy incentives such as loss offsets (Edgerton 2010; Zwick and Mahon 2017) and targeted investment incentives such as bonus depreciation (Ohrn 2018; Garrett, Ohrn, and Suárez Serrato 2020; Andersen et al. 2024) affect firm and local investments. More recent literature investigates local investment responses and real effects related to targeted government subsidies (Aobdia, Koester, and Petacchi 2023; De Simone et al. 2022; Drake et al. 2022; Ferrari and Ossa 2023) and place-based incentives such as Opportunity Zones (Frank et al. 2022).

We build on those factors identified in prior literature and add IRA-specific characteristics to compare the relative importance of different characteristics and whether the IRA altered the importance of the characteristics. While the IRA introduced significant incentives to invest in clean energy technologies, locational characteristics such as economic and environmental characteristics likely play a substantial role in firms' investment decisions. For instance, investments benefiting from IRA tax credits are likely to be deployed in states with existing industrial infrastructure (van Nieuwenhuijzen et al. 2023; McKinsey 2024). Hence, we provide empirical evidence as to which county-level factors are most highly associated with firms' investment decisions, and we examine the relative importance of these characteristics in selecting counties as investment locations when compared to clean energy investments made in the period prior to the enactment of the IRA.

In our second research question, we focus on whether and to what extent firm-level investments incentivized by IRA provisions affect local business activities at the county level. Firms are predicted to receive more than half of the funding from the IRA and are at the same time the largest investors in clean energy and related technologies (McKinsey 2022; U.S. Congress 2022). From a theoretical standpoint, the IRA's tax credits targeting production and investment reduce the cost of capital (through a "negative capital tax") (Bistline, Mehrotra, et al. 2023). Based on this rationale, existing firms take on new or increase existing investments and firms increase the number of establishments in a county by entering the market to start businesses. As these investments are capital-intensive and often require inputs from already existing or new suppliers and contractors operating in the same county, interconnected firms could expand their operations in the areas surrounding the focal investment, creating spillover effects.

While theoretical arguments suggest an increase in investments by firms, there might be reasons why the impact on local business activities might not be observable. First, even though firms increase investments, these investments may only expand existing operations (to reap the additional tax credits as windfall gains) which might not affect local business activities. For example, a battery manufacturer could extend its capacity without constructing a new establishment and other firms such as suppliers setting up new business establishments. Second, there might be a time lag firm-level and induced county-level investments might take time to materialize. For example, many firms noted in the months after the enactment of the IRA that they are evaluating investment decisions (e.g., from the background of supply chain decisions) and how more detailed implementation guidelines — particularly from the IRS — would be needed to make appropriate investment decisions (Goldman Sachs 2023). Third, the IRA might not provide large enough incentives to generate measurable changes in local business activities, especially in disadvantaged counties that might be less attractive for firm investments and lack the necessary infrastructure and a qualified labor pool. Lastly, other local and state-level subsidies for a broader range of projects and technologies are already available and local business activities might not be affected by additional incentives by the IRA (McKinsey 2022; Bistline, Mehrotra, et al. 2023). Given these competing predictions, it is unclear ex-ante to what extent tax credits increase local business activities. Therefore, we make no directional prediction for the initial change in county-level business activities to the IRA and state our hypothesis in the null form:

H1: There is no change in business activities for counties that receive private clean energy investments after the IRA.

3. Empirical Methodology

3.1 Data

To identify clean energy investments, we rely on Clean Investment Monitor (CIM) data provided by Rhodium Group and MIT's Center for Energy and Environmental Policy Research (CEEPR). The data documents announcements of energy investments from 2017 through March 2024. The database includes nearly 6,700 investment project announcements and tracks investment at the individual project level through a combination of third-party data sources and third-party state-level data. Importantly, the CIM includes those investment projects in technologies that are eligible for tax incentives under the IRA.[8] Importantly, CIM only includes projects that are "announced" when a specific location and timeline for the project has been specified and, in the case of larger projects, Front-end Engineering Design (FEED) work has begun. The dataset also classifies which tax code sections (e.g., IRC § 45X) apply to each investment. Further, nearly all investment projects include information on project locations, the estimated investment amount of projects (i.e., capital expenditures), and segments.[9,10] We provide an example of the data in Figure

[8] Most of these technology categories are also eligible for grants, loans, or loan guarantees funded through the IRA, the IIJA, or the CHIPS and Science Act (Bermel et al. 2023).

[9] We are unable to match all investment projects due to unreliable or missing location data. The location data fields provided consist of the street address and/or latitude and longitude of the investment. We use Python and Google's Geocoding API to identify the county of each investment using the provided location data.

[10] All investment figures are in 2022 U.S. dollars to reduce the impact of inflation on the comparability of investment amounts. Similar to BEA aggregate investment data, the CIM relies on a similar approach for breaking out clean investment into three "segments": investment in the manufacture of GHG emission-reducing technology ("Manufacturing"), and investment in the deployment of that technology, both to produce clean energy or decarbonize industrial production ("Energy and Industry") and through the purchase and installation of that technology by

1. We clean the CIM data by removing any observations that the data provider identifies as having unreliable location data or for which the investment was subsequently canceled. Further, we drop observations for which we cannot determine the county location based on the address provided. As discussed below, our research methodology requires the use of panel data at the county-quarter level. As such, we transform the CIM data from the individual investment level to the county-quarter level. Our county-quarter observation data allows us to measure the presence of any investment project in a specific county as well as the number of investment projects and the sum of estimated investment projects over time.

To measure local business activities, we use data from the Bureau of Labor Statistics' (BLS) Quarterly Census of Employment and Wages program. Specifically, we measure investment using the number of private business establishments for all industries. We use business establishments as a proxy for local business activities because it captures incremental business activities (i.e., the formation of new businesses) rather than the expansion of existing operations (e.g., adding a second facility of an already existing manufacturing site). Therefore, we alleviate concerns that changes in local business activities are purely driven by the initial energy investment. As the BLS data also provides the number of private business establishments by industry using NAICS, we complement the total private business establishments with selected industries (i.e., utilities, manufacturing, and transportation and warehousing) that are more likely to be impacted by clean energy investments.

We obtain data from the BLS and several other sources to create variables for our determinants analysis and as control variables for measuring changes in local business activities. From the BLS, we also obtain quarterly wage data and unemployment data. From the Census

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individual households and businesses ("Retail") (Bermel et al. 2023, pages 4-5). Our dataset uses firm-level data on "Manufacturing" and "Energy and Industry" as these categories pertain exclusively to firm-level investments.

Bureau, we obtain median income data. From NASA, we obtain average daily sunlight data. We obtain data on the count of turbines operating in a county from the U.S. Wind Turbines Database. From the Good Jobs First Subsidy Tracker, we obtain data on subsidies provided to businesses in counties. From the IRS, we obtain data on counties eligible for bonus clean energy credits. Finally, we obtain data on counties' 2020 U.S. presidential election results from MIT Election Data.

3.2 Sample

Table 1 reports our sample construction. To create our sample of county-quarter observations, we start with all county-quarter observations from the BLS' Quarterly Census of Employment and Wages program between Q1 2021 and Q4 2023. We start our sample period in Q1 2021 to avoid the most significant impacts of the COVID-19 pandemic on establishments during 2020 that could create distortions between the pre and post periods that are unlikely attributable to energy investments. Additionally, as our post period only has five quarters, starting the sample in Q1 2021 reduces the imbalance in terms of the number of quarters between the pre and post period. Our sample ends in Q4 2023 because this is the most recent quarter for which BLS establishment data is available.

Next, we merge the BLS data with the CIM, Census Bureau, NASA, Wind Turbine, IRS, and MIT Election Data datasets. We drop county-quarter observations when missing required variables. Further, we drop observations in states that did not receive any clean energy investments during the sample period. As we include state fixed effects, observations in these states do not offer any within-state variation of energy investments. The IRA was enacted in August 2022 which is in the middle of the third quarter (Q3) in 2022, but our variables are measured at the county-quarter level. Because Q3 2022 spans both the pre and post periods, we drop all Q3 2022 observations from the sample. Finally, we require a balanced sample for total business establishments such that each county appears 11 times. Our dataset for local business activities tests includes 33,638 county-quarter observations from 3,058 distinct counties. For our determinants analysis of the factors associated with a county being selected for a clean energy investment, which is conducted at the county level, our sample consists of 3,051 counties.[11] Our final dataset includes 1,099 post-IRA announcements of firm investments totaling over $198 billion.

3.3 Regressions

3.3.1 Determinants of Clean Energy Investment

We first investigate which factors contribute to the selection of counties as a location for clean energy investments by estimating the following model at the county level:

$$IRA\ Invest_c = \alpha_0 + \alpha_1\ Business\ Est.\ (Ln) - Lagged_c + \alpha_2\ \Delta Qtr.\ Wages_c + \alpha_3\ Pre\text{-}IRA\ Invest_c + \alpha_4\ Subsidies\ (Ln) - Lagged_c + \alpha_5\ Median\ Income\ (Ln)_c + \alpha_6\ Unemployment_c + \alpha_7\ Energy\ Community_c + \alpha_8\ Avg.\ Daily\ Sunlight_c + \alpha_9\ Turbine\ Count\ (Ln)_c + \alpha_{10}\ Democrat\ Vote_c + State\ FE + \varepsilon \quad (1)$$

We use subscripts *c* to indicate county. We estimate equation (1) using static county-level observations (i.e., one observation per county) where we measure all variables as of Q2 2022, the quarter prior to the enactment of the IRA. Our dependent variable is *IRA Invest*$_c$, which takes the value of one if county *c* was selected for clean energy investment during any post-IRA quarter. To examine if the IRA changed the relative importance of county characteristics, we re-estimate equation (1) using *Pre-IRA Invest*$_c$, which takes the value of one if county *c* was selected for clean energy investment during any pre-IRA quarter.

[11] We lose seven county-observations for the sample when estimating equation (1), resulting in a sample of 3,051. This is because a logit model perfectly predicts the model for two Delaware counties in the post-IRA period and for five Rhode Island counties in the pre-IRA period.

We also examine the determinants associated with the magnitude of clean energy investments by incorporating the cumulative count and expected dollar value of the investments. Specifically, *IRA Invest – Count (Ln)*$_c$ is equal to the natural log of one plus the count of clean energy investments during the post-IRA period in county *c*, and *IRA Invest – Dollars (Ln)*$_c$ is equal to the natural log of one plus the expected dollar value of clean energy investments in county *c* during the post-IRA period.

To examine determinants of clean energy investments, we include (socio)economic, environmental, political, and IRA-specific characteristics that could affect the desirability of the county as an investment location. For economic factors, we use two measures to proxy for overall economic activity. First, *Business Est. (Ln) - Lagged*$_c$, is the natural log of one plus the total number of establishments in the county in quarter q-4.[12] Second, for current economic conditions, we use the change in quarterly wages ($\Delta Qtr.\ Wages_c$). Counties experiencing temporary economic downturns may be appealing to companies seeking lower costs for property. Conversely, counties with persistent economic challenges may be less attractive due to perceptions of long-term instability.

Next, we include two variables that proxy for the economic conditions of the investment environment of a county. First, we include *Pre-IRA Invest*$_c$, an indicator variable that captures counties that were selected for clean energy investment prior to the enactment of the IRA (between 2021 and Q2 2022). Being previously selected for clean energy investment indicates other firms found the county appropriate for clean energy investment or existing clean energy infrastructure. Second, we include the dollar value of subsidies provided to private firms in the county in the prior

[12] An alternative proxy for the economic activities in a county is its population. We do not include county population in equation (1) because *Total Est (Ln)* and population are significantly and positively correlated (correlation coefficient of 0.97, significant at the 1% level). Including both variables creates multicollinearity issues.

year (*Subsidies (Ln) - Lagged$_c$*) to account for other government subsidies at the local or state level that might affect the attractiveness of the county for additional investments.

Next, we use two measures to capture socioeconomic characteristics of a county and its labor market. First, we use *Median Income (Ln)$_c$* to capture the relative labor costs of workers with lower values representing cheaper wages and lower hiring costs. Second, the annual unemployment rate (*Unemployment$_c$*) is the proportion of employees employed. Counties with higher unemployment could be attractive for new investments if potential employees demand lower wages to obtain work. In contrast, counties with higher unemployment could suffer from broader economic challenges that make the county less attractive for investment.

From a tax credit perspective, the IRA offers additional tax credits for investments in disadvantaged communities. Therefore, we use *Energy Community$_c$* if the IRS identified (i) the county as lying within an MSA or non-MSA area that is listed as an eligible energy community county within the definition of high economic activity related to fossil fuels and high unemployment or (ii) any census tract within the county as an eligible energy community county within the definition of being in close proximity to a coal mine closure.[13]

Moving on to environmental and technology-related aspects for clean energy investments that could affect investment likelihood, we include measures that capture the employability of clean energy technology. We use *Avg. Daily Sunlight*, which is the average amount of daily sunlight in the county.[14] Since solar energy projects often involve solar panels, counties with

[13] In addition these two types of energy communities, a third category eligible for bonus tax credits are Brownfield sites. We omit the Brownfield site category from our determinants model because Brownfield sites are real estate-parcel-specific and may cover only a fraction of the overall county. Therefore, an indicator variable for whether any Brownfield site lies within the county would create the possibility of misinterpreting the results because the clean energy investment may not be within a narrowly defined Brownfield site. Further, the IRS notes "[t]here is not a single registry, website, or map of all Brownfield sites" (https://energycommunities.gov/energy-community-tax-credit-bonus-faqs/). As such, the data is not readily available in a central repository.

[14] As noted in Appendix A, we use the average sunlight in county *c* between 2007 and 2011 using NASA's North America Land Data Assimilation System Daily Sunlight data. We are not able to identify more recent county-level

greater sunlight could be more attractive for solar panels. We also include the count of turbines, *Turbine Count (Ln)*, that are located in county *c* as of the beginning of Q1 2021. A county in which turbines already exist could indicate the county is more suitable from an environmental perspective for additional clean energy investments. However, to the extent the county is close to a "wind turbine capacity," these counties could be less attractive.

Finally, we include a variable to capture the political leaning of the county. Prior research finds political affiliation and connections could influence subsidy and investment allocation decisions (Hanlon, Hoopes, and Slemrod 2019; Aobdia et al. 2023; Frank et al. 2022) We construct the variable *%Democrat Vote* $_c$, which equals the percentage of votes that Joe Biden received in county *c* for the 2020 U.S. presidential election. We obtain data from the MIT Election Data (MIT Election Data and Science Lab 2024).

When estimating equation (1) with *IRA Invest* and *Pre-IRA Invest* as the dependent variable, we use a logit model employing state fixed effects because the dependent variable is an indicator and fixed effects are limited to the state level, which reduces the likelihood of the incidental parameters problem (Greene 2004). When *IRA Invest – Count (Ln)* $_c$ and *IRA Invest – Dollars (Ln)* $_c$ are the dependent variables, we estimate equation (1) using OLS with state fixed effects. We winsorize all continuous variables quarter at the 1st and 99th percentile. In all specifications, we cluster standard errors at the county level.

3.3.2 County-Level Business Activity Outcomes

To test how IRA affects county-level business activities, we use the following generalized difference-in-differences (DiD) specification:

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sunlight data. However, we expect that the relative average sunlight across counties is unlikely to be significantly different during our sample period, and thus this data provides a reliable estimate of the relative average sunlight at the county-level.

$$Business\ Est._{c,t} = \beta_0 + \beta_1\ IRA\ Invest_c + \beta_2\ IRA\ Invest_c \times Post\text{-}Invest_{c,t} + Controls + Fixed\ Effects + \varepsilon \quad (2)$$

Our dependent variable, *Business Est.*$_{c,t}$, captures county-level business activities as proxied by the number of private establishments. We use four different measures of private establishments to capture the nature and scope of business investments. First, *Business Est. (Ln)*$_{c,t}$ is the total number of private establishments for all industries. This proxy reflects the overall business activities in the county and captures potential spillovers of clean energy investments to other sectors. Second, we use private establishments in the NAICS 22 utilities industry, *Business Est. (Ln) – Utilities*$_{c,t}$, because the utilities industry is likely more impacted by clean energy investments. Specifically, we expect that economic activities in the utilities industry will be impacted by the IRA as the IRA incentivizes investments in gas, electricity, water, and power generation. Third, we use private establishments in the NAICS 31 to 33 manufacturing industries, *Business Est. (Ln) – Mfg*$_{c,t}$, because the IRA incentivizes investment in the production and sale of clean energy goods (e.g., electric vehicles, household vehicles, electrical equipment) that is best represented by these industries. Fourth, we use private establishments in NAICS 48-49 transportation and warehousing industries, *Business Est. (Ln) – Transport*, because these establishments could be needed to support the clean energy investments by providing transportation or storage of the materials used in the manufacturing and deployment of clean energy technologies. When estimating equation (2) with *Business Est. (Ln)* as the dependent variable, we use the entire sample of observations. When *Business Est. (Ln) – Utilities* or *Business Est. (Ln) – Mfg*, or *Business Est. (Ln) – Transport* is the dependent variable, we restrict the sample to those counties with reported data on the respective variable.

Our main variable of interest is the interaction of *IRA Invest*$_c$ × *Post-Invest*$_{c,t}$. As defined above, *IRA Invest*$_c$ is an indicator variable that equals one if county *c* was selected for clean energy investment during any post-IRA quarter. *Post-Invest*$_{c,t}$ is an indicator variable that equals for all quarters including and after the first time an announcement for clean energy investment is made in county *c*. The coefficient on *IRA Invest*$_c$ × *Post-Invest*$_{c,t}$ captures the percentage change in county-level business establishments for treated counties in the post-period including and subsequent to the announcement of a clean energy investment to county-quarters that did not receive any energy investments. A positive and significant coefficient on β_2 indicates that in counties with clean energy investments, there is an increase in establishments, suggesting an increase in local business activities as a result of the clean energy investment.

As discussed below, we alternate the use of county fixed effects and use state-by-quarter fixed effects in all specifications. The coefficient on *IRA Invest*$_c$ is presented in specifications not using county fixed effects, whereas the main coefficient on *IRA Invest*$_c$ is subsumed when including county fixed effects. Due to the staggered treatment effect and use of state-by-quarter fixed effects, the coefficient on *Post-Invest*$_{c,t}$ is subsumed in all specifications. and only the interaction term coefficient is presented. The coefficient on *IRA Invest*$_c$ captures the percentage difference in county-level businesses establishments between treated counties (i.e., counties with firm-level energy investments) prior to the announcement of a clean energy investment and non-treated counties.

We include the vector of variables accounting for county characteristics used in equation (1) as control variables when estimating equation (2). Whereas in equation (1) we measured all variables as of Q2 2022, we use time-varying county characteristics when available. Specifically, we use time-vary county characteristics for all variables except for *Energy Community*, *Avg. Daily Sunlight*, and *Democrat Vote*.

When estimating equation (2), we use state-by-quarter fixed effects in all specifications. State-by-quarter fixed effects difference out confounding factors (e.g., regulatory changes or new legislation) that vary by quarter potentially affecting establishments. In addition to specifications that only include state-by-quarter fixed effects, we also present results of specifications with county fixed effects. The use of county fixed effects differences out time-invariant county characteristics that might affect changes in the number of establishments. Finally, we cluster standard errors at the county level.

4. Empirical Results

4.1 Univariate Results

Figures 2 and 3 map out the geographic locations of the clean energy investments, aggregated at the county level. Figure 2 provides the count of clean energy investments, and Figure 3 provides the estimated dollar value of clean energy investments. Both figures show a concentration of investments in several counties in western states (e.g., Arizona and California). However, this could also be due to western states' counties being geographically larger than other states. In untabulated analyses, we find that the top five states with the highest concentration of energy investments per square mile are all eastern states: Rhode Island, Massachusetts, New Jersey, New York, and Maryland. However, when assessing investments per population, we find the highest concentration in Midwestern states.

Table 2, Panel A reports descriptive statistics for the variables used in the regressions. In total, 18.71 percent of counties are selected for at least one clean energy investment after the enactment of the IRA (*IRA Invest*). Counties with energy investments in the current quarter or in a prior quarter after the enactment of the IRA (*Post-Invest*) comprise 5.9 percent of the total observations. On average, counties have 2,714 establishments, while the median value is 625 establishments, suggesting positive skewness. Although counties exhibit an average positive economic growth with a quarterly wage growth (*ΔQtr. Wages*) of 7.38 percent, 16.6 percent of counties exhibit negative values for *ΔQtr. Wages* (untabulated), suggesting some counties exhibit economic declines. About 40 percent of counties are classified as energy communities by the IRS and hence eligible for bonus tax credits. Finally, 19.59 percent of counties received energy investments in the pre-IRA period between Q1 2021 and Q2 2022. Table 2, Panel B presents descriptive statistics when bifurcating our sample in counties that receive investments after the enactment of the IRA and counties that do not. Univariate tests of differences reveal that counties that receive investments in the post-period were more likely to receive clean energy investments prior to the enactment of the IRA. Further, counties that receive investments in the post-period have a higher median income but at the same time also higher unemployment rates. They also have more daily sunlight and a higher count of wind turbines, on average. Interestingly, univariate tests do not offer evidence of differences in quarterly wage growth (*ΔQtr. Wages*) and do not have a significantly different share of energy communities.

Table 3 reports correlation statistics for the variables used to estimate equation (2). We find a positive and significant correlation between *IRA Invest* and total establishments (*Business Est. (Ln)*) and for specific industries (e.g., *Business Est. (Ln) – Utilities* or *Business Est. (Ln) – Mfg*, and *Business Est. (Ln) – Transport*), suggesting counties receiving energy investments are more likely to be larger in total and with regards to these specific industries. Although *IRA Invest* is positively and significantly correlated with most of the reflect (socio)economic, environmental- and technology-related, and political characteristics, we find insignificant correlations between

IRA Invest and *ΔQtr. Wages* and *Energy Community*, suggesting counties selected for clean energy investments are not associated with economic growth nor with the county being eligible for additional tax credits.

4.2 Determinants of Clean Energy Investment - Results

Table 4 presents results for estimating equation (1), which evaluates the determinants of clean energy investment. Column (1) presents the results when estimating equation (1) using *IRA Invest*, an indicator variable, taking the value of one if a county was selected for clean energy investment during any post-IRA quarter. Consistent with the correlations table, we find that larger counties as proxied by *Business Est. (Ln) - Lagged* exhibit an increased likelihood of receiving clean energy investments. However, we do not find a significant coefficient on *ΔQtr. Wages* (p>0.10) indicating the current economic trend in a county does not affect firms' investment choices. We also find an increase in the likelihood that a county receives an energy investment if the county has received a clean energy investment previously (*Pre-IRA Invest*). These findings suggest that economic determinants (e.g., through already existing infrastructure or economies of scales) seem important for firms' locational choices after the IRA. The positive and significant coefficient on *Subsidies (Ln) - Lagged* (p<0.01) suggests counties with greater subsidies exhibit a higher likelihood of being selected possibly because state and local governments could be more likely to also provide subsidies to firms making clean energy investments in these counties.

Turning to socioeconomic characteristics, the positive and significant coefficient on *Unemployment* (p<0.05) indicates an increased likelihood of being selected for investments when unemployment is higher. This finding suggests an increase in the likelihood of investments in counties that historically suffer from greater inequality, which is consistent with reports by the Department of the Treasury (2023). We do not find a significant coefficient on *Energy Community* (p>0.10), suggesting that there is no increase in the likelihood of firms selecting these communities, despite the additional tax benefits available for investments in these counties.

We next examine variables that proxy for environmental- and technology-related characteristics. We find some evidence that counties with greater turbine counts (*Turbine Count (Ln)*) exhibit a higher likelihood of being selected for investment whereas our results indicate no significant association with sunlight (*Avg. Daily Sunlight*) (p>0.10). Counties with support for the Democratic party do not appear to exhibit a higher likelihood of being selected for investment, suggesting political connections do not affect investment location decisions.

Column (2) presents results when estimating equation (1) using *Pre-IRA Invest*. Comparing county characteristics between the post-IRA and pre-IRA periods, our results indicate that economic and environmental characteristics (*Business Est. (Ln) - Lagged* and *Turbine Count (Ln)*) are also key determinants of selection in the pre-IRA period. In contrast to column (1), the coefficient on *ΔQtr. Wages* is negative and significant (p<0.10), but coefficients on *Subsidies (Ln) - Lagged* and *Unemployment* are not significant (p>0.10). Combining these results in columns (1) and (2), we interpret our findings that the IRA seems to have altered the relative importance of socioeconomic factors, but economic characteristics still constitute the most important group of factors that affect a county's likelihood of being selected for clean energy investments.

We next turn to the magnitude of the investment in columns (3) and (4). Column (3) presents the results when estimating equation (1) with *IRA Invest – Count (Ln)* as the dependent variable. Column (4) presents the results when estimating equation (1) with *IRA Invest – Dollar (Ln)* as the dependent variable. Consistent with column (1), we also find larger counties (*Business Est. (Ln) – Lagged*) and counties with prior clean energy investments (*Pre-IRA Invest*) are associated with a greater magnitude the investment. In columns (3) and (4), we find some evidence that counties with a higher unemployment rate are more likely to receive a greater dollar magnitude of investment. This suggest that higher unemployment counties are not only more likely to receive any investment per the results in column (1) but are also more likely to receive larger clean energy investments, which is consistent with the IRA's policy objectives to increase investment in disadvantaged communities.

4.3 Changes in County-Level Business Activities – Results

Table 5 presents results for estimating the impact of the IRA on county-level business activities using equation (2). Panel A presents the results using *Business Est. (Ln)* as dependent variable. Column (1) shows results for specifications deploying state-by-quarter fixed effects, and column (2) includes county fixed effects and state-by-quarter fixed effects. Both columns show positive and significant coefficients on *IRA Invest x Post-Invest* ($p<0.05$) suggesting an increase in local business establishments for counties that receive clean energy investments in the post-period. In terms of economic magnitude, we document an increase of about 0.4 percent in *Business Est. (Ln)* in column (1) and 0.6 percent increase in column (2).[15] The estimated 0.4 and 0.6 percent increase for *Business Est. (Ln)* translates to an average increase of about 11 to 16 (=0.004*2,714; 0.006*2,714) establishments, on average, following a clean energy investment in the county in the post-IRA period relative to counties that do not receive any clean energy investment.[16] The coefficients on the control variables for the size and trend of economic activities within a county (*Business Est. (Ln) – Lagged* and *ΔQtr. Wages*) are positive and statistically significant ($p<0.01$).

[15] The magnitude is calculated using a log-level transformation with a difference-in-differences specification as 100(exp(β_1) -1) percent change in the post period for the treated countries. For a coefficient of 0.004, this results in a 100(exp(0.004)-1) = 0.4008 percent change.

[16] In untabulated robustness tests, we document qualitatively and quantitatively similar results when using investment announcement that are either operating or under construction.

We note that our estimations have a very high adjusted R^2 resulting from a strict fixed effects structure and including the lagged variable of the dependent variable as a control.

Panel B presents the results for establishments operating in the utilities, manufacturing, and transportation and warehousing industries. Columns (1) to (3) show results for specifications deploying state-by-quarter fixed effects, and columns (4) to (6) include county fixed effects and state-by-quarter fixed effects. Columns (1) to (3) show positive coefficients on *IRA Invest x Post-Invest* for two of the three dependent variables (i.e., *Business Est. (Ln) – Utilities* and *Business Est. (Ln) – Transport*), in which the coefficients are significant at conventional levels (p<0.10). In terms of economic magnitude, we document an increase of about 5.0 percent in *Business Est. (Ln) - Utilities* in column (1), and a 2.4 percent increase in the post-IRA period for *Business Est. (Ln) – Transport* in column (3).

For the specifications adding county fixed effects, coefficients on *IRA Invest x Post-Invest* are positive and significant for all three dependent variables (p<0.10). Economic magnitudes are less pronounced but still meaningful ranging from an increase of 0.8 to 1.3 percent in specific industry establishments following a clean energy investment in the county in the post-IRA period. Overall, our results show clean energy investments lead to an increase in overall county-level business activities and in clean energy-related industries.

Table 6 presents results for estimating equation (2) where we deploy a continuous treatment variable, *Post-Invest – Continuous (Ln)*. The continuous treatment variable takes the value of the natural log of one plus the number of cumulative clean energy investments as of quarter *q* in county *c*, and zero otherwise. Our coefficient of interest is *IRA Invest x Post-IRA – Continuous (Ln)*. Table 6, Panel A shows again positive and significant coefficients (p<0.01) when *Business Est. (Ln)* is the dependent variable for specifications with state-by-year fixed effects (column 1) and when adding county fixed effects (column 2).

The results in Panel B are similar to the ones when using an indicator treatment variable. Columns (1) to (3), which include state-by-year fixed effects, show positive and significant coefficients on *IRA Invest x Post-IRA – Continuous (Ln)* for two of the three dependent variables ($p<0.01$). In columns (4) to (6), we find positive and significant ($p<0.10$) coefficients for all three specifications when adding county fixed effects. Economic magnitudes are again less pronounced for specifications when adding county fixed effects but again sizeable. Overall, the results in Tables 5 and 6 provide evidence of positive economic benefits as captured by increases in local business activities for those counties that receive clean energy investments.

To support the use of the difference-in-differences approach in analyzing the impact of the IRA on local business activities, we graphically assess whether the parallel trends assumption holds (Roberts and Whited 2013). In Figure 4, we modify equation (2) by separately interacting county-quarter indicators with the *IRA Invest* and plot these quarterly interaction coefficients at the 95% confidence interval. We conduct these analyses using the quarter prior to the first private clean energy investment in a county as the base quarter. For *Business Est. (Ln), Business Est. (Ln) – Mfg*, and *Business Est. (Ln) – Transport* the coefficients on *IRA Invest x Quarter* are statistically indistinguishable from zero in the quarters before the first clean energy investment, providing support for parallel trends in the pre-period and our inferences. For *Business Est. (Ln) – Utilities*, all except one coefficient in the quarters before the first clean energy investment are statistically indistinguishable from zero.

5. Additional Analyses

5.1 Entropy Balancing

One concern when studying the economic effects of tax policies is that counties that receive private investments could be substantially different from other selected counties along a number of dimensions, and these differences drive the results. To mitigate this concern, we use entropy balancing to enhance the covariate balance between the treatment and control group by assigning continuous weights to observations in the control sample (Hainmueller 2012; McMullin and Schonberger 2020). We match on all covariates in Q2 2022 (the quarter before the enactment of the IRA). Table 7 presents results for estimating the impact of the IRA on *Business Est. (Ln)* proxying for county-level business activities. We find consistent results as in our baseline tests.

5.2 Magnitude and Type of Clean Energy Investments

We next conduct two analyses to further explore the impact of clean energy investments on local business activities by examining the magnitude and type of the clean energy investments First we investigate whether the positive impact of private clean energy investments on local business activities (*Business Est. (Ln)*) varies based on the magnitude of the private investments. To this end, we use a median split using the expected dollar value of firm-level clean energy investments, expecting more pronounced changes in local business activities when private investments are larger. We present regressions results in Table 8. We find our main results of increases in local business activities are concentrated in counties in which private clean energy investments are above the median. This result suggests that a certain minimum amount of clean energy investment is needed to have a positive effect on local business activities.

Second, we investigate whether the impact of clean energy investments on local business activities varies based on whether the investment relates to manufacturing facilities (e.g., production of solar modules or batteries) or the deployment of clean technologies (labeled as

"Energy and Industry" by CIM) (e.g., building solar parks and energy storage facilities). To do so, we create an indicator variable *IRA Invest Mfg (IRA Invest E&I)* equal to one if county *c* was selected for a manufacturing (energy and industry) clean energy investment during any post-IRA quarter and zero otherwise.

We first re-estimate equation (1) with *IRA Invest Mfg* and *IRA Invest E&I* as the dependent variables to examine whether county characteristics differ in terms of which counties are selected for these different types of clean energy investments. Table 9, Panel A presents these results of re-estimating equation (1).[17] Consistent with results in Table 4, the positive and significant coefficients on *Business Est. (Ln) - Lagged* and *Pre-IRA Invest* in both columns indicate that economic characteristics are key factors that affect the likelihood of a county being selected for either type of investment. In column (1), the coefficient on *Energy Community* is negative and significant ($p<0.01$) suggesting a decreased likelihood of receiving clean energy investments related to manufacturing. In column (2), coefficients on *Unemployment* and *Turbine Count (Ln)* are positive and significant ($p<0.05$), which suggests that counties with higher unemployment rates and more wind turbines exhibit a greater likelihood of receiving investments that deploy clean energy technologies. This finding is consistent with the notion that it is more beneficial for firms to deploy clean energy in counties that offer suitable environmental and technological conditions.

Panel B presents results for total business activity outcomes (*Business Est. (Ln)*) using equation (2). Consistent with the results in Table 5, we find positive and significant coefficients ($p<0.10$) for both types of clean energy investments. The magnitude of the change in business activities seems to be more pronounced when considering manufacturing investments (*IRA Invest*

[17] The determinants model in Table 9 has fewer observations than in our baseline tests because there are states that do not have any variation with respect to the dependent variable. Therefore, these observations are omitted given the use of state fixed effects.

Mfg), which is consistent with the notion that manufacturing investments tend to be of a larger scale and result in more pronounced changes in local business activities and create greater spillover effects.

5.3 Changes in County-Level Business Activities – Disadvantaged Communities

One policy objective of the IRA is to spur economic growth, particularly in disadvantaged counties. Although we show increases in local business activities broadly, it is important from a policy perspective to understand whether there are differential responses in business activities in disadvantaged communities. To explore this question, we bifurcate our sample using two features that characterize disadvantaged communities. First, we examine if the IRA induces more pronounced changes in business activities in energy communities for which clean energy investments are eligible for higher tax credits. Table 10, Panel A presents the results. Columns (1) and (3) present results for communities that are not designated as energy communities and columns (2) and (4) for energy communities. We find positive coefficients on *IRA Invest x Post-Invest* in all four columns but coefficients are only statistically significant at the 10 percent level for one specification, which is partly due to the loss in statistical power. The magnitude of the coefficients on *IRA Invest x Post-Invest* is more pronounced for energy communities (0.004 and 0.006 versus 0.003 and 0.004, respectively). However, when comparing differences in magnitudes between the two groups, differences are not statistically significant at conventional levels ($p>0.10$). This suggests that there is not a more pronounced response for energy communities relative to other treated counties. Even though the increases in local business activities are not more pronounced in treated energy communities, the results demonstrate that disadvantaged counties are receiving some benefits from investments induced by the IRA.

Second, we examine the business activity response between counties with high and low unemployment rates as an alternative proxy for disadvantaged communities. Panel B presents the results. We document the increases in business activities are concentrated in counties with below-median unemployment rates. Thus, our results collectively in Table 10, Panels A and B, show that investments made in communities specifically targeted by the IRA generate at least the same level of increases in local business activities as investments made in non-targeted communities. However, our results also suggest weaker business activity responses when broadening the classification of disadvantaged communities. Overall, we find mixed evidence of whether the IRA's policy goals to help disadvantaged communities are being met.

6. Conclusion

This paper examines initial local business activity responses to the IRA. We first identify county-level factors associated with the location of firm clean energy investments following the enactment of the IRA. We find that greater existing economic activity and higher unemployment increase the likelihood of investment. Next, we document a 0.4 to 0.6 percent increase in total business establishments and 0.8 to 1.3 percent increase in establishments of industries related to clean energy. The increase in total establishments translates into an average increase of 11 to 16 business establishments in a county that receives clean energy investments after the IRA.

Our study adds to the economic and public policy literatures and the political discussions about the economic impact of the IRA. First, we provide some of the first empirical insights on the impact of the IRA on the U.S. economy by documenting the determinants of how firms choose the location of clean energy investments and how the IRA altered the county-level characteristics that are associated with receiving firm-level investments. Second, we add to the literature on investment stimulus policies and targeted tax incentives by demonstrating how IRA-induced clean investments positively impact local business activities and the economy. Our findings also inform the discussion about the economic impact of the IRA.

References

Andersen, D. C., E. M. Curtis, and E. Ohrn. 2024. Unintended Environmental Consequences of Investment Stimulus Policy. *Working paper.*

Aobdia, D., A. Koester, and R. Petacchi. 2023. Political connections and U.S. state government resource allocation effectiveness. *The Journal of Law and Economics, forthcoming.*

Bermel, L., J. Chen, B. Deese, M. Delgado, L. English, Y. Garcia, T. Houser, et al. 2023. The Clean Investment Monitor: Tracking Decarbonization Technology in the United States. Rhodium Group, MIT, CEEPR.

Bistline, J., G. Blanford, M. Brown, D. Burtraw, M. Domeshek, J. Farbes, A. Fawcett, et al. 2023. Emissions and energy impacts of the Inflation Reduction Act. *Science* 380 (6652): 1324–1327.

Bistline, J., N. Mehrotra, and C. Wolfram. 2023. Economic Implications of the Climate Provisions of the IRA. NBER Working Paper 31267.

Chan, J., and D. Fischer. 2024. Energy Investment Tax Credits and Environmental Outcomes: Evidence from Electric Utilities. *Working paper.*

Chaurey, R. 2017. Location-based tax incentives: Evidence from India. *Journal of Public Economics* 156: 101–120.

Congressional Budget Office. 2022. *Estimated Budgetary Effects of Public Law 117-169 (Summary),.*

Credit Suisse. 2022. *US Inflation Reduction Act – A tipping point in climate action.*

Curie, A. 2023. Every country needs an Inflation Reduction Act, November 23.

De Simone, L., R. Lester, and A. Raghunandan. 2022. Tax Subsidy Disclosure and Local Economic Effects. *Working paper.*

Department of Energy. 2024. *Biden-Harris Administration Announces $4 Billion in Tax Credits to Build Clean Energy Supply Chain, Drive Investments, and Lower Costs in Energy Communities.*

Department of the Treasury. 2023. *General Explanations of the Administration's Fiscal Year 2024 Revenue Proposals*.

Drake, M. S., R. V. Hess, J. H. Wilde, and B. M. Williams. 2022. The Relevance of Non-Income Tax Relief*. *Contemporary Accounting Research* 39 (3): 1797–1833.

Edgerton, J. 2010. Investment incentives and corporate tax asymmetries. *Journal of Public Economics* 94 (11–12): 936–952.

Ferrari, A., and R. Ossa. 2023. A quantitative analysis of subsidy competition in the U.S. *Journal of Public Economics* 224: 104919.

Frank, M. M., J. L. Hoopes, and R. Lester. 2022. What determines where opportunity knocks? Political affiliation in the selection of Opportunity Zones. *Journal of Public Economics* 206: 104588.

Freedman, M. 2012. Teaching new markets old tricks: The effects of subsidized investment on low-income neighborhoods. *Journal of Public Economics* 96 (11–12): 1000–1014.

Garrett, D. G., E. Ohrn, and J. C. Suárez Serrato. 2020. Tax Policy and Local Labor Market Behavior. *American Economic Review: Insights* 2 (1): 83–100.

Goldman Sachs. 2023. *Carbonomics*.

Hainmueller, J. 2012. Entropy Balancing for Causal Effects: A Multivariate Reweighting Method to Produce Balanced Samples in Observational Studies. *Political Analysis* 20 (1): 25–46.

Hanlon, M., J. L. Hoopes, and J. Slemrod. 2019. Tax Reform Made Me Do It! *Tax Policy and the Economy* 33: 33–80.
Huang, R., and M. E. Kahn. 2024. Do Red States Have a Comparative Advantage in Generating Green Power? *Environmental and Energy Policy and the Economy* 5: 200–238.
Jacob, M., and K. L. Zerwer. 2024. Emission Taxes and Capital Investments: The Role of Tax Incidence. *The Accounting Review*: 1–32.
Jiang, Z., X. Jia, and J. Liao. 2024. Natural resources, renewable energy, and healthcare expenditure in the pursuit of sustainable development amidst inflation reduction act of 2022. *Resources Policy* 89: 104563.
Lester, R. 2019. Made in the U.S.A.? A Study of Firm Responses to Domestic Production Incentives. *Journal of Accounting Research* 57 (4): 1059–1114.
McKinsey. 2022. *The Inflation Reduction Act: Here's what's in it*.
McKinsey. 2024. *The Inflation Reduction Act: Here's what's in it (Update)*.
McMullin, J. L., and B. Schonberger. 2020. Entropy-balanced accruals. *Review of Accounting Studies* 25 (1): 84–119.
MIT Election Data and Science Lab. 2024. County Presidential Election Returns 2000-2020. Harvard Dataverse.
van Nieuwenhuijzen, V., M. Willner, S. Reinders, and A. Utkarsh. 2023. The US Inflation Reduction Act is Driving Cean-Energy Investment One Year In. *Goldman Sachs Insights Report*.
Ohrn, E. 2018. The Effect of Corporate Taxation on Investment and Financial Policy: Evidence from the DPAD. *American Economic Journal: Economic Policy* 10 (2): 272–301.
Roberts, M. R., and T. M. Whited. 2013. Endogeneity in Empirical Corporate Finance1. In *Handbook of the Economics of Finance*, edited by G. M. Constantinides, M. Harris, and R. M. Stulz, 2:493–572. Elsevier.
The Clean Investment Monitor. 2024. The Clean Investment Monitor. The Clean Investment Monitor. *The Clean Investment Monitor*. https://www.cleaninvestmentmonitor.org/.
The White House. 2023a. FACT SHEET One Year In, President Biden's Inflation Reduction Act is Driving Historic Climate Action and Investing in America to Create Good Paying Jobs and Reduce Costs.
The White House. 2023b. Building A Clean Energy Economy: A Guidebook to the Inflation Reduction Act's Investments in Clean Energy and Climate Action.
U.S. Congress. 2022. *Inflation Reduction Act of 2022, H.R. 5376, 117th Cong. (2021–22) PLAW-117publ169.pdf*.
Zwick, E., and J. Mahon. 2017. Tax Policy and Heterogeneous Investment Behavior. *American Economic Review* 107 (1): 217–248.

Figure 1: Clean Investment Monitor Data

Panel A: Examples of Data Points

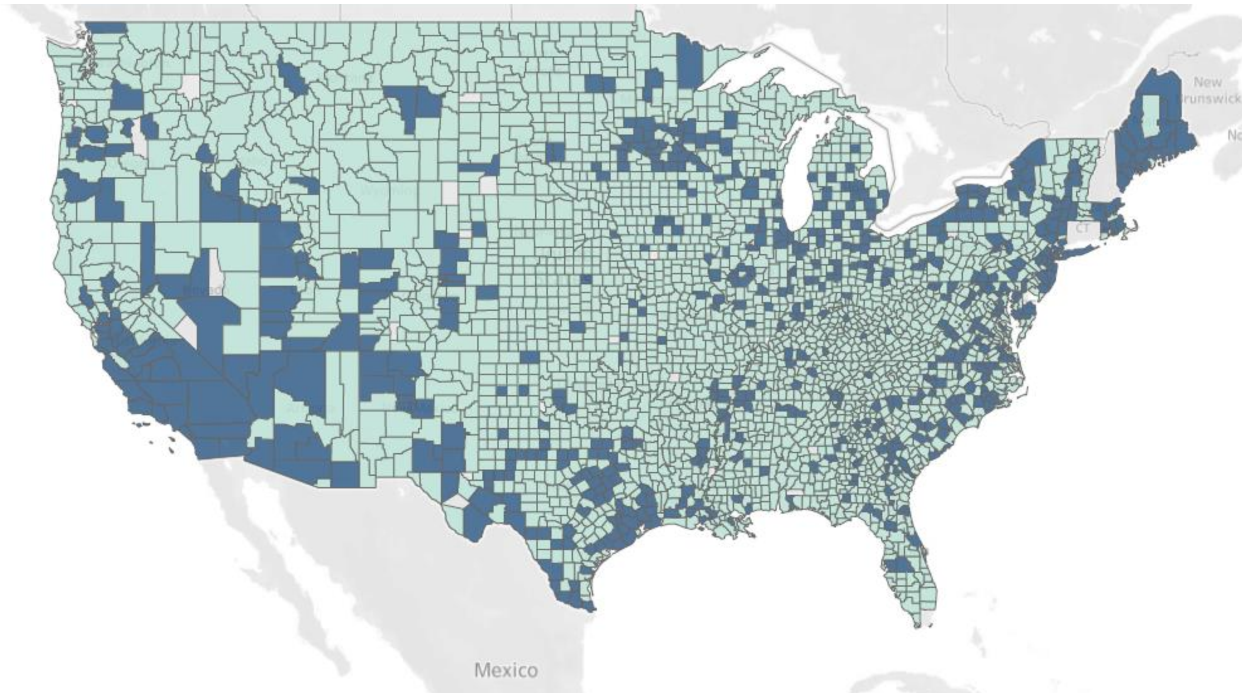
Unique ID	Segment	Company	Technology	Project Type	Status Description	State	Address	Latitude	Longitude	Announcement Date	Estimated CapEX
I.CCS.BKV_TX.0	Energy and Industry	BKV Corp, Banpu Power US Corporation	Carbon Management	New	Under Construction	TX	TX	31.54073	-99.1425	10/1/2022	15.060226
M.B.Electrovaya_NY.0	Manufacturing	Electrovaya	Batteries	New	Operating	NY	Jamestown, NY	42.1014	-79.2411	10/3/2022	48.168638
I.CCS.CarbonAmerica_NE.0	Energy and Industry	Carbon America	Carbon Management	Retrofit	Announced	NE	10106 S Railroad Ave, Bridgeport, NE 69336	41.64479	-103.078	10/3/2022	37.941479
M.FU.FLO_MI.0	Manufacturing	FLO	Fueling Equipment	New	Operating	MI	1270 Pacific Dr, Auburn Hills, MI 48326	42.6928	-83.26906	10/4/2022	3.01054
M.B.Gotion_MI.0	Manufacturing	Gotion	Batteries	New	Announced	MI	120 N Warren Ave, Big Rapids, MI 49307	43.699	-85.48	10/5/2022	2368.2914
M.B.OurNext_MI.0	Manufacturing	Our Next Energy, Inc.	Batteries	New	Operating	MI	45145 Twelve Mile Rd, Novi, MI 48377	42.49344	-83.49212	10/5/2022	1605.6213
M.EZ.Accelera_MN.0	Manufacturing	Accelera	Electrolyzers	New	Operating	MN	1400 73rd Ave NE, Fridley, MN 55432	45.09894	-93.23363	10/10/2022	10.035133
M.Z.Honda_OH.2	Manufacturing	Honda	Zero Emission Vehicles	Expansion	Announced	OH	12500 Meranda Rd, Anna, OH 45302	40.37881	-84.18847	10/11/2022	234.1531
M.FU.SK Signet_TX.0	Manufacturing	SK Signet	Fueling Equipment	New	Operating	TX	4101 E Plano Pkwy, Plano, TX 75074	33.00869	-96.65438	10/12/2022	15.052699
M.B.Cirba_OH.0	Manufacturing	Cirba Solutions	Batteries	Expansion	Under Construction	OH	512 Hocking St, Lancaster, OH 43130	39.719	-82.61	10/13/2022	250.87833

Panel B: Mapping of Segment and Technology into Tax Code Sections (Bermel et al. 2023, Table A1)

Segment	Technology	Subcategories	Tax Code
Manufacturing	Solar	Modules, Cells, Wafers, Polysilicon, Torque Tubes, Structural Fasteners, Polymeric Backsheets, Inverters	45X
	Wind	Blades, Nacelles, Towers, Offshore Foundations, Related Vessels, Distributed Wind Inverters	45X

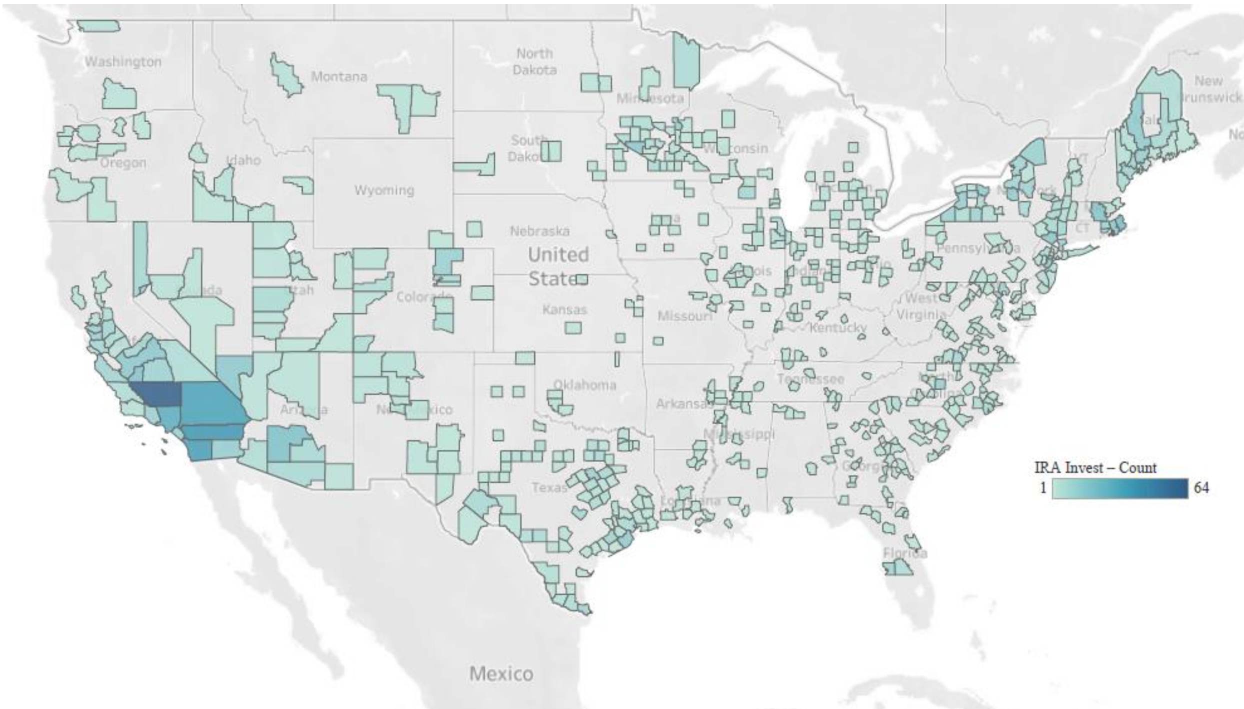
Notes: This figure provides a sample of the Clean Investment Monitor data at the individual investment project level (Panel A) and an example of the mapping of segments and technologies into Tax Code sections (Panel B).

Figure 2: Distribution of IRA Investments by County – Indicator of Clean Energy Investments



Notes: This figure provides an overview of all counties that receive at least one clean energy investment in the post-IRA period (i.e., Q4 2022-Q4 2023). Lighter (darker) shades of blue indicate counties with no (at least one) clean energy investment. We obtain clean energy investment data from the Clean Energy Monitor dataset.

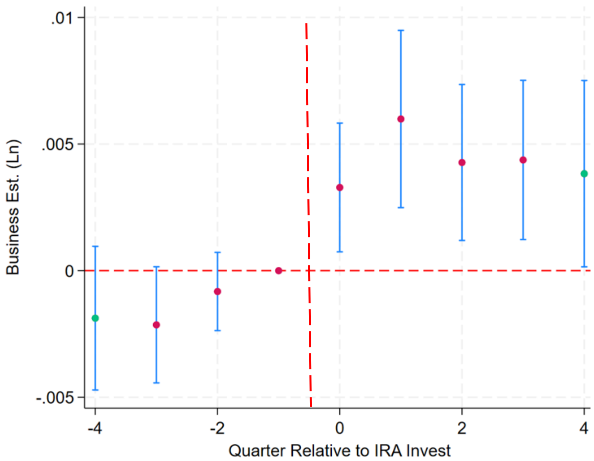
Figure 3: Distribution of IRA Investments by County – Number of Clean Energy Investments



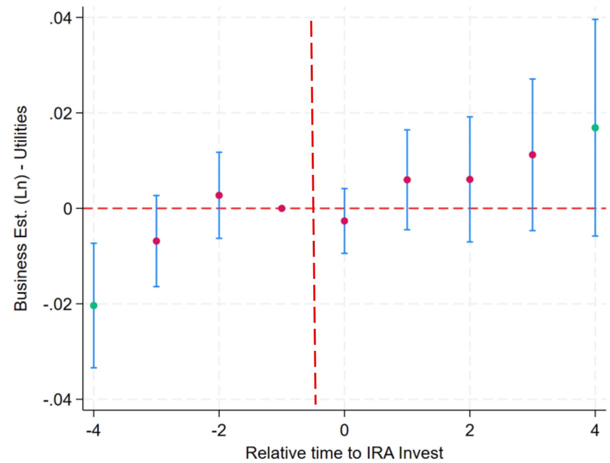
Notes: This figure provides the count of clean energy investments by county in the post-IRA period (i.e., Q4 2022-Q4 2023). Lighter (darker) shades of blue indicate counties with fewer (higher) clean energy investments. Counties receiving no clean energy investments are unshaded. We obtain clean energy investment data from the Clean Energy Monitor dataset.

Figure 4: Parallel Trends - Changes in County-Level Business Activities

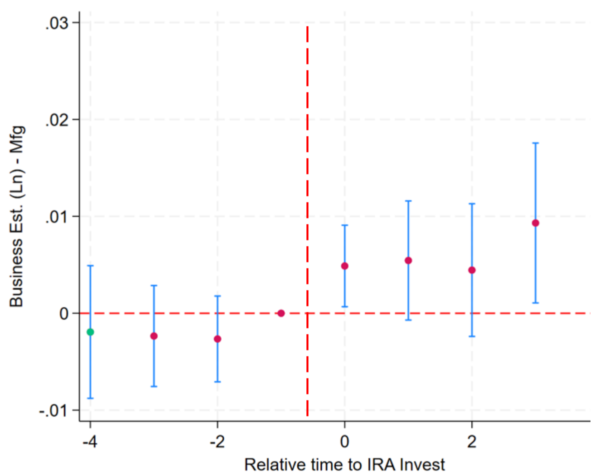
Panel A: *Business Est. (Ln)*



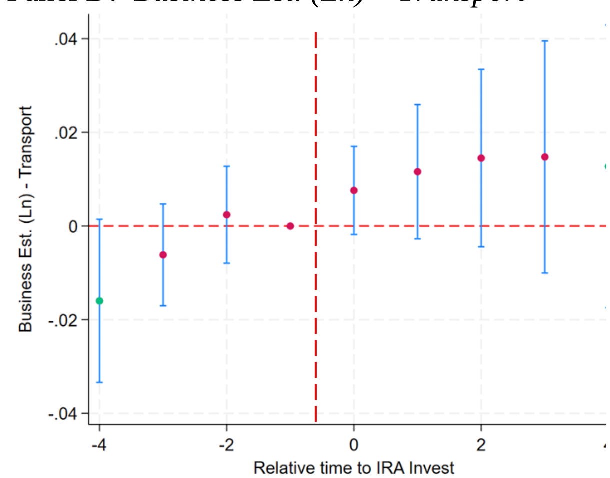
Panel B: *Business Est. (Ln) – Utilities*



Panel C: *Business Est. (Ln) – Mfg*



Panel D: *Business Est. (Ln) – Transport*



Notes: This figure presents the regression coefficient estimates of β_2 (*IRA Invest x Quarter*) from the regression in equation (2) in nine quarters around the first clean energy investment in the post-IRA period. The specification includes controls and state by time (i.e., calendar-year quarter) and county fixed effects. We report coefficient significance using a 90% confidence interval.

Appendix A: Variable Definitions

Variable	**Description**
%Democrat Vote	The percentage of votes that Joe Biden received in county *c* for the 2020 U.S. presidential election. Source: MIT Election Data.
Avg. Daily Sunlight	The average daily sunlight (KJ/m^2) between 2007 and 2011 in county *c*. Source: NASA's North America Land Data Assimilation System Daily Sunlight data.
Business Est. (Ln)	The natural log of one plus the total number of all private establishments in county *c* in quarter *q*. Source: BLS' Quarterly Census of Employment and Wages program.
Business Est. (Ln) – Lagged	The natural log of one plus the total number of all private establishments in county *c* in quarter *q-4*. Source: BLS' Quarterly Census of Employment and Wages program.
Business Est. (Ln) – Mfg	The natural log of one plus the total number of all durable manufacturing establishments in county *c* in quarter *q*. Durable manufacturing establishments are identified as establishments with the NAICS codes of 31 to 33. Source: BLS' Quarterly Census of Employment and Wages program.
Business Est. (Ln) – Transport	The natural log of one plus the total number of all transportation and warehousing establishments in county *c* in quarter *q*. Transportation and warehousing establishments are identified as establishments with the NAICS codes of 48 and 49. Source: BLS' Quarterly Census of Employment and Wages program.
Business Est. (Ln) – Utilities	The natural log of one plus the total number of all utility establishments in county *c* in quarter *q*. Utility establishments are identified as establishments with the NAICS code of 22. Source: BLS' Quarterly Census of Employment and Wages program.
Energy Community	An indicator variable set equal to if county *c* includes a qualifying energy community for which investments qualify for additional tax credits. Qualifying energy communities include the following: 1. An MSA or non-MSA area that meets the definition of high economic activity related to fossil fuels and high unemployment. Qualified energy communities are eligible for bonus credits under IRC §§ 45, 45Y, 48, and 48E. Source: IRS Notice 23-29 and IRS Notice 23-47. 2. Any census tract that meets the definition of being in close proximity to a coal mine closure. Qualified energy communities are eligible for bonus credits under IRC §§ 45, 45Y, 48, and 48E. Source: IRS Notice 23-29 and IRS Notice 23-47.
IRA Invest	An indicator variable equal to one if county *c* was selected for a clean energy investment during any post-IRA quarter (i.e., any quarter after Q3 2022), and zero otherwise. Source: Clean Investment Monitor dataset.

IRA Invest – Count (Ln)	The natural log of one plus the number of cumulative clean energy investments in county *c* for all post-IRA quarters (i.e., all quarters after Q3 2022). Source: Clean Investment Monitor dataset.
IRA Invest – Dollars (Ln)	The natural log of one plus the estimated value (in millions) of all clean energy investments in county *c* for all post-IRA quarters (i.e., all quarters after Q3 2022). Clean energy announcement estimated values are identified using the Clean Investment Monitor dataset.
IRA Invest E&I	An indicator variable equal to one if county *c* was selected for an energy and industry clean energy investment during any post-IRA quarter (i.e., any quarter after Q3 2022), and zero otherwise. Source: Clean Investment Monitor dataset.
IRA Invest Mfg	An indicator variable equal to one if county *c* was selected for a manufacturing clean energy investment during any post-IRA quarter (i.e., any quarter after Q3 2022), and zero otherwise. Source: Clean Investment Monitor dataset.
Median Income (Ln)	The natural log of one plus the median income in county *c* as of 2020. Source: Census Bureau's American Community Survey.
Post-Invest	An indicator variable equal to one in quarter *q* and all following quarters upon the first clean energy investment announcement in county *c*, and zero otherwise. Clean energy investment announcements are identified using the Clean Investment Monitor dataset.
Post-Invest – Continuous (Ln)	The natural log of one plus the number of cumulative clean energy investments as of quarter *q* in county *c*, and zero otherwise. Clean energy investment announcements are identified using the Clean Investment Monitor dataset.
Post-Invest E&I	An indicator variable equal to one in quarter *q* and all following quarters upon the first energy and industry clean energy investment announcement in county *c*, and zero otherwise. Energy and industry clean energy investment announcements are identified using the Clean Investment Monitor dataset.
Post-Invest Mfg	An indicator variable equal to one in quarter *q* and all following quarters upon the first manufacturing clean energy investment announcement in county *c*, and zero otherwise. Manufacturing clean energy investment announcements are identified using the Clean Investment Monitor dataset.
Pre-IRA Invest	An indicator variable equal to one if there is a clean energy investment announcement in county *c* during any quarter after Q4 2020 and prior to Q3 2023, and zero otherwise. Clean energy investment announcements are identified using the Clean Investment Monitor dataset.
Subsidies (Ln) - Lagged	The natural log of one plus the dollar value of subsidies provided to businesses in county *c* in year *t-1*. Source: Good Jobs First Subsidy Tracker.

Turbine Count (Ln)	The natural log of one plus the count of turbines operating in county c as of the beginning of Q1 2021. Source: U.S. Wind Turbines Database (https://eerscmap.usgs.gov/uswtdb/data/)
Unemploy. Above Median	An indicator variable equal to one if the unemployment rate in county c in year *t* is above a state's median unemployment rate, and zero otherwise. Source: BLS' Local Area Unemployment Statistics.
Unemployment	The unemployment rate in county *c* in year *t*. Source: BLS' Local Area Unemployment Statistics.
ΔQtr. Wages	Change in county *c*'s total quarterly wages for private sector employees from quarter *q-1* to quarter *q*, scaled by total quarterly wages for private sector employees in quarter *q-1*. Source: BLS' Quarterly Census of Employment and Wages program.

Appendix B: Summary of Selected IRA Tax Credit Provisions

Provision	**Requirements**	**Benefits/Tax Credit**

Advanced **Manufacturing** Production Credit (IRC § 45X)	Manufacturing of components for solar and wind energy, inverters, battery components, and critical minerals	• Domestic manufacturers
		• Varies by technology, generally calculated as:
		  o fixed dollar rate multiplied by the capacity of the eligible component,
		  o fixed dollar rate multiplied by the size or weight of the eligible component, or
		  o flat percentage multiplied by the production cost of the eligible component

Clean **Electricity Production** Tax Credit (IRC § 45Y)	Production of clean electricity	• 0.3 cents/kW • Credit is increased by 5 times for projects meeting prevailing wage and apprenticeship requirements • Credit is increased by 10% if located in an energy community
Clean **Electricity Investment** Tax Credit (IRC § 48E)	Investment in facilities that generate clean electricity	• 6% of qualified investment (basis) • Credit is increased by 5 times for facilities meeting prevailing wage and registered apprenticeship requirements. • Credit is increased by up to 10 percentage points if located in an energy community

Table 1: Sample Composition

Sample Selection	**County-Quarters**
Total County-Quarter Observations between Q1 2021 to Q4 2023 with BLS' Quarterly Census of Employment and Wages program data	38,697
Less: Observations Missing Control Variables	(1,737)
Less: Observations of states receiving no firm-level investment during sample period	(125)
Less: County-quarter observations in Q3 2022	(3,069)
Less: Counties without 10 observations (require balanced sample)	(128)
Final Sample for equation (2)	33,638
Less: Duplicate county observations	(30,580)
Less: Counties in states with no variation in clean energy investments	(7)
Final Sample for equation (1)	**3,051**

Notes: This table presents the sample selection process of the samples for estimating equations (1) and (2).

Table 2: Descriptive Statistics

Panel A: Sample Descriptives for All County-Quarter Observations

Variable	N	Mean	SD	P25	Median	P75
IRA Invest	33,638	0.1871	0.3900	0.0000	0.0000	0.0000
Post-Invest	33,638	0.0591	0.2359	0.0000	0.0000	0.0000
Post-Invest - Continuous (Ln)	33,638	0.0525	0.2235	0.0000	0.0000	0.0000
Business Est.	33,638	2,714	6,706	264	625	1,744
Business Est. (Ln)	33,638	6.6176	1.4733	5.5797	6.4394	7.4645
Business Est. (Ln) – Utilities	15,309	2.0666	0.7350	1.6094	1.9459	2.4849
Business Est. (Ln) – Mfg	29,706	3.7026	1.3218	2.7081	3.5835	4.4998
Business Est. (Ln) – Transport	23,370	6.0306	1.8531	4.6821	5.8579	7.2869
ΔQtr. Wages	33,638	0.0738	0.0882	0.0206	0.0713	0.1212
Pre-IRA Invest	33,638	0.1959	0.3969	0.0000	0.0000	0.0000
Subsidies (Ln) - Lagged	33,638	3.4041	5.9474	0.0000	0.0000	8.8482
Median Income (Ln)	33,638	10.8793	0.2429	10.7274	10.8705	11.0218
Unemployment	33,638	0.0394	0.0140	0.0294	0.0370	0.0465
Energy Community	33,638	0.4026	0.4904	0.0000	0.0000	1.0000
Avg. Daily Sunlight	33,638	16,405	1,590	15,058	16,110	17,728
Turbine Count (Ln)	33,638	0.6538	1.5264	0.0000	0.0000	0.0000
%Democrat Vote	33,638	0.3302	0.1560	0.2088	0.2986	0.4193

Table 2: Descriptive Statistics (continued)

Panel B: County-Quarter Observations by *IRA Invest*

Variable	IRA Invest = 1 N	Mean		Median		SD	IRA Invest = 0 N	Mean	Median	SD
Business Est.	6,292	6,096	***	1,451	###	10,836	27,346	1,936	531	5008
Business Est. (Ln)	6,292	7.5039	***	7.2804	###	1.5742	27,346	6.4137	6.2766	1.3702
Business Est. (Ln) – Utilities	3,921	2.4232	***	2.3026	###	0.8295	11,435	1.9440	1.7918	0.6576
Business Est. (Ln) – Mfg	6,034	4.4167	***	4.2905	###	1.4129	23,709	3.5194	3.4340	1.2345
Business Est. (Ln) – Transport	5,078	7.0853	***	7.0728	###	1.8555	18,369	5.7366	5.6095	1.7453
ΔQtr. Wages	6,292	0.0725		0.0721		0.0824	27,346	0.0741	0.0711	0.0895
Pre-IRA Invest	6,292	0.4476	***	0.0000	###	0.4973	27,346	0.1380	0.0000	0.3449
Subsidies (Ln) - Lagged	6,292	5.0351	***	0.0000	###	6.9388	27,346	3.0289	0.0000	5.6286
Median Income (Ln)	6,292	10.9582	***	10.9425	###	0.2444	27,346	10.8611	10.8581	0.2389
Unemployment	6,292	0.0423	***	0.0392	###	0.0147	27,346	0.0388	0.0365	0.0137
Energy Community	6,292	0.4073		0.0000		0.4914	27,346	0.4014	0.0000	0.4902
Avg. Daily Sunlight	6,292	16,590	***	16,368	###	1,819	27,346	16,362	16,080	1,529
Turbine Count (Ln)	6,292	0.8851	***	0.0000	###	1.6830	27,346	0.6006	0.0000	1.4829
%Democrat Vote	6,292	0.3969	***	0.3803	###	0.1541	27,346	0.3149	0.2799	0.1523

Notes: This table presents descriptive statistics based on the final sample defined in Table 1. Panel A presents descriptive statistics for all county-quarter observations. Panel B separately presents descriptive statistics for county-quarter observations where *IRA Invest* equals one and for county-quarter observations where *IRA Invest* equals zero. ***, **, and * indicate t-tests of mean differences across groups are significant at the one-, five-, and ten-percent level, respectively, using two-tailed tests. ###, ##, and # indicate Wilcoxon signed-rank tests of median differences across groups are significant at the one-, five-, and ten-percent level, respectively, using two-tailed tests. All variables are defined in Appendix A.

Table 3: Correlation Matrix

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	IRA Invest	1.0000								
(2)	Post-Invest	0.5226*	1.0000							
(3)	Post-Invest - Continuous (Ln)	0.4898*	0.9372*	1.0000						
(4)	Business Est.	0.2419*	0.1526*	0.1831*	1.0000					
(5)	Business Est. (Ln)	0.2885*	0.1651*	0.1765*	0.7064*	1.0000				
(6)	Business Est. (Ln) – Utilities	0.2840*	0.1791*	0.2022*	0.7520*	0.7961*	1.0000			
(7)	Business Est. (Ln) – Mfg	0.2728*	0.1539*	0.1644*	0.6859*	0.9451*	0.7435*	1.0000		
(8)	Business Est. (Ln) – Transport	0.2995*	0.1694*	0.1777*	0.6493*	0.8819*	0.7159*	0.8689*	1.0000	
(9)	ΔQtr. Wages	-0.0072	-0.0673*	-0.0662*	0.0063	0.0251*	0.0236*	0.0158*	0.0097	1.0000
(10)	Pre-IRA Invest	0.3042*	0.1767*	0.1915*	0.2815*	0.3334*	0.2580*	0.3142*	0.3127*	-0.0007
(11)	Subsidies (Ln) - Lagged	0.1315*	0.0598*	0.0627*	0.2707*	0.3327*	0.2535*	0.3208*	0.3188*	-0.0014
(12)	Median Income (Ln)	0.1560*	0.0880*	0.0892*	0.3747*	0.4946*	0.3851*	0.4740*	0.4613*	0.0453*
(13)	Unemployment	0.0974*	-0.0358*	-0.0218*	0.0447*	0.0651*	0.0438*	0.0210*	-0.0095	-0.0112
(14)	Energy Community	0.0047	-0.0017	-0.0006	-0.0188*	-0.0135	0.0079	-0.0201*	-0.0051	-0.0127
(15)	Avg. Daily Sunlight	0.0558*	0.0310*	0.0466*	0.0966*	-0.0008	0.1695*	-0.0296*	-0.0014	0.0382*
(16)	Turbine Count (Ln)	0.0727*	0.0380*	0.0457*	-0.0261*	-0.0737*	-0.0522*	-0.0691*	-0.0499*	-0.0253*
(17)	%Democrat Vote	0.2050*	0.1124*	0.1190*	0.4706*	0.5564*	0.4600*	0.4998*	0.4784*	-0.0103

	Variables	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(10)	Pre-IRA Invest	1.0000							
(11)	Subsidies (Ln) - Lagged	0.1610*	1.0000						
(12)	Median Income (Ln)	0.2071*	0.1815*	1.0000					
(13)	Unemployment	0.0425*	-0.0362*	-0.3019*	1.0000				
(14)	Energy Community	-0.0221*	-0.0416*	-0.1785*	0.3288*	1.0000			
(15)	Avg. Daily Sunlight	-0.0013	-0.0860*	-0.1842*	0.1293*	0.0571*	1.0000		
(16)	Turbine Count (Ln)	0.0904*	-0.0113	0.0682*	-0.0524*	-0.0342*	0.0036	1.0000	
(17)	%Democrat Vote	0.2456*	0.1849*	0.2027*	0.2372*	-0.0526*	0.0090	-0.0949*	1.0000

Notes: This table presents Pearson correlations for variables used to estimate equation (2). We define all other variables in Appendix A. * denotes statistical significance at the one-percent level.

Table 4: Determinants of Investments

DV =	(1) *IRA Invest*	(2) *Pre-IRA Invest*	(3) *IRA Invest – Count (Ln)*	(4) *IRA Invest – Dollars (Ln)*
Business Est. (Ln) - Lagged	0.046***	0.060***	0.076***	0.212***
	(6.599)	(6.529)	(4.516)	(3.971)
ΔQtr. Wages	0.080	-0.132*	0.030	0.238
	(1.003)	(-1.816)	(0.384)	(0.699)
Pre-IRA Invest	0.124***		0.411***	0.884***
	(8.549)		(7.691)	(6.962)
Subsidies (Ln) - Lagged	0.004***	0.002	0.003	0.023**
	(2.645)	(1.156)	(1.185)	(2.583)
Median Income (Ln)	-0.013	-0.042	-0.043	-0.048
	(-0.397)	(-1.057)	(-0.920)	(-0.291)
Unemployment	2.155**	-0.539	3.396**	13.914**
	(2.476)	(-0.603)	(2.292)	(2.545)
Energy Community	-0.021	0.008	-0.040	-0.116
	(-1.220)	(0.369)	(-1.561)	(-1.107)
Avg. Daily Sunlight	0.000	0.000	0.000	0.000
	(0.901)	(0.090)	(1.207)	(1.464)
Turbine Count (Ln)	0.013**	0.020***	0.016*	0.079**
	(2.442)	(4.345)	(1.924)	(2.461)
%Democrat Vote	-0.011	-0.001	-0.033	0.035
	(-0.180)	(-0.017)	(-0.343)	(0.116)
Observations	3,051	3,051	3,051	3,051
State FE	Yes	Yes	Yes	Yes
Goodness of Fit	0.197	0.209	0.330	0.166

Notes: This table presents results of estimating equation (1), which evaluates the determinants of a firm announcing a clean energy investment in county *c* during any post-IRA quarter (i.e., any quarter after Q3 2022) (column 1) and during any pre-IRA quarter (i.e., any quarter before Q3 2022) (column 2). In columns (1) and (2), we estimate equation (1) using logit. In columns (3) and (4), we estimate equation (1) using OLS. We define all variables in Appendix A. All columns include state fixed effects, untabulated for parsimony, and standard errors clustered at the county level. In columns (1) and (2), we report marginal effects and z-statistics in parenthesis, and goodness of fit is based on pseudo R^2 because the dependent variable is an indicator variable. In columns (3) and (4), we report t-statistics in parentheses and goodness of fit is based on Adjusted R^2 because the dependent variable is continuous. ***, **, and * denote significance at the one-, five-, and ten-percent level using two-tailed tests of significance.

Table 5: Changes in County-Level Business Activities (Binary Treatment)

Panel A: Total Business Establishments

DV=	(1) Business Est. (Ln)	(2) Business Est. (Ln)
IRA Invest	-0.000	
	(-0.312)	
IRA Invest x Post-Invest	**0.004****	**0.006*****
	(2.340)	**(2.903)**
Business Est. (Ln) - Lagged	1.000***	0.481***
	(2,212.486)	(26.574)
ΔQtr. Wages	0.064***	0.022***
	(10.783)	(5.395)
Pre-IRA Invest	0.001	
	(1.399)	
Subsidies (Ln) - Lagged	0.000	-0.000
	(0.370)	(-0.270)
Median Income (Ln)	0.027***	
	(10.297)	
Unemployment	-0.070	0.251**
	(-1.400)	(2.286)
Energy Community	-0.000	
	(-0.034)	
Avg. Daily Sunlight	-0.000*	
	(-1.820)	
Turbine Count (Ln)	-0.001***	
	(-4.920)	
%Democrat Vote	0.005	
	(1.372)	
State-by-quarter FE	Yes	Yes
County FE	No	Yes
Observations	33,638	33,638
Adj. R^2	0.999	1.000

Table 5: Changes in County-Level Business Activities (Binary Treatment) (continued)

Panel B: Business Establishments by Selected Industries

DV=	(1) Business Est. (Ln) – Utilities	(2) Business Est. (Ln) – Mfg	(3) Business Est. (Ln) – Transport	(4) Business Est. (Ln) – Utilities	(5) Business Est. (Ln) – Mfg	(6) Business Est. (Ln) – Transport
IRA Invest	0.053*	0.066***	0.106***			
	(1.895)	(3.665)	(4.973)			
IRA Invest x Post-Invest	**0.050*** (2.959)**	**-0.004 (-0.354)**	**0.024* (1.907)**	**0.013* (1.799)**	**0.008* (1.875)**	**0.008* (1.705)**
Business Est. (Ln) - Lagged	0.469*** (35.151)	0.946*** (110.039)	0.863*** (90.442)	0.466*** (4.960)	0.253*** (4.421)	0.405*** (6.398)
ΔQtr. Wages	0.015	-0.004	-0.176***	0.009	0.031**	-0.011
	(0.173)	(-0.076)	(-2.646)	(0.415)	(2.558)	(-0.789)
Pre-IRA Invest	0.014	0.037**	0.100***			
	(0.510)	(2.038)	(4.492)			
Subsidies (Ln) - Lagged	-0.000 (-0.199)	0.006*** (4.687)	0.002 (1.595)	-0.000 (-0.826)	0.000 (0.426)	-0.000 (-0.122)
Median Income (Ln)	-0.079	-0.115**	0.064			
	(-1.120)	(-2.534)	(1.148)			
Unemployment	2.408*	-4.163***	3.825***	0.164	-0.009	-0.202
	(1.777)	(-4.530)	(3.559)	(0.275)	(-0.028)	(-0.557)
Energy Community	0.142***	-0.046***	0.045**			
	(5.406)	(-2.753)	(2.307)			
Avg. Daily Sunlight	0.000	-0.000***	0.000***			
	(0.594)	(-6.767)	(4.571)			
Turbine Count (Ln)	0.017**	-0.013***	0.029***			
	(2.358)	(-2.701)	(4.683)			
%Democrat Vote	-0.261***	-0.572***	-0.481***			
	(-2.714)	(-8.015)	(-5.502)			
State-by-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
County FE	No	No	No	Yes	Yes	Yes
Observations	15,309	29,706	23,370	15,309	29,706	23,370
Adj. R^2	0.707	0.929	0.909	0.985	0.998	0.997

Notes: This table presents results of estimating equation (2). We define all variables in Appendix A. Panel A, column (1) and Panel B, columns (1)-(3) include state by time (i.e., calendar-year quarter) fixed effects. Panel A, column (2) and Panel B, columns (4)-(6) include state by time (i.e., calendar-year quarter) and county fixed effects. All columns cluster standard errors at the county-level. Values in parentheses represent t-statistics and goodness of fit is based on Adjusted R^2. ***, **, and * denote significance at the one-, five-, and ten-percent level using two-tailed tests of significance.

Table 6: Changes in County-Level Business Activities (Continuous Treatment)

Panel A: Total Business Establishments

	(1)	(2)
DV=	Business Est. (Ln)	Business Est. (Ln)
IRA Invest	-0.001	
	(-0.490)	
IRA Invest x Post-Invest Continuous	**0.006***** **(3.092)**	**0.007***** **(3.404)**
Business Est. (Ln) - Lagged	1.000*** (2,211.680)	0.480*** (26.698)
ΔQtr. Wages	0.064***	0.022***
	(10.783)	(5.402)
Pre-IRA Invest	0.001	
	(1.326)	
Subsidies (Ln) - Lagged	0.000	-0.000
	(0.373)	(-0.282)
Median Income (Ln)	0.027***	
	(10.350)	
Unemployment	-0.070	0.256**
	(-1.404)	(2.327)
Energy Community	-0.000	
	(-0.032)	
Avg. Daily Sunlight	-0.000*	
	(-1.839)	
Turbine Count (Ln)	-0.001***	
	(-4.933)	
%Democrat Vote	0.005	
	(1.380)	
State-by-quarter FE	Yes	Yes
County FE	No	Yes
Observations	33,638	33,638
Adj. R^2	0.999	1.000

Table 6: Changes in County-Level Business Activities (Continuous Treatment) (continued)

Panel B: Business Establishments by Selected Industries

	(1)	(2)	(3)	(4)	(5)	(6)
DV=	Business Est. (Ln) – Utilities	Business Est. (Ln) – Mfg	Business Est. (Ln) – Transport	Business Est. (Ln) – Utilities	Business Est. (Ln) – Mfg	Business Est. (Ln) – Transport
IRA Invest	0.042	0.066***	0.097***			
	(1.519)	(3.672)	(4.564)			
IRA Invest x Post-Invest Continuous	**0.097***** **(4.599)**	**-0.005** **(-0.383)**	**0.063***** **(3.944)**	**0.014*** **(1.836)**	**0.007*** **(1.759)**	**0.010**** **(2.100)**
Business Est. (Ln) - Lagged	0.469*** (35.179)	0.946*** (110.058)	0.863*** (90.511)	0.465*** (4.945)	0.253*** (4.410)	0.404*** (6.373)
ΔQtr. Wages	0.015	-0.004	-0.177***	0.010	0.031**	-0.011
	(0.172)	(-0.077)	(-2.655)	(0.432)	(2.560)	(-0.782)
Pre-IRA Invest	0.012	0.038**	0.099***			
	(0.438)	(2.043)	(4.442)			
Subsidies (Ln) - Lagged	-0.000 (-0.194)	0.006*** (4.687)	0.002 (1.595)	-0.000 (-0.827)	0.000 (0.421)	-0.000 (-0.124)
Median Income (Ln)	-0.076	-0.115**	0.065			
	(-1.074)	(-2.535)	(1.178)			
Unemployment	2.422*	-4.163***	3.838***	0.173	-0.012	-0.191
	(1.792)	(-4.530)	(3.574)	(0.291)	(-0.038)	(-0.528)
Energy Community	0.142***	-0.046***	0.045**			
	(5.415)	(-2.753)	(2.312)			
Avg. Daily Sunlight	0.000	-0.000***	0.000***			
	(0.572)	(-6.767)	(4.559)			
Turbine Count (Ln)	0.017**	-0.013***	0.029***			
	(2.358)	(-2.701)	(4.684)			
%Democrat Vote	-0.260***	-0.572***	-0.481***			
	(-2.716)	(-8.016)	(-5.501)			
State-by-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
County FE	No	No	No	Yes	Yes	Yes
Observations	15,309	29,706	23,370	15,309	29,706	23,370
Adj. R^2	0.708	0.929	0.909	0.985	0.998	0.997

Notes: This table presents results of estimating equation (2). We define all variables in Appendix A. Panel A, column (1) and Panel B, columns (1)-(3) include state by time (i.e., calendar-year quarter) fixed effects. Panel A, column (2) and Panel B, columns (4)-(6) include state by time (i.e., calendar-year quarter) and county fixed effects. All columns cluster standard errors at the county -level. Values in parentheses represent t-statistics and goodness of fit is based on Adjusted R^2. ***, **, and * denote significance at the one-, five-, and ten-percent level using two-tailed tests of significance.

Table 7: Changes in County-Level Business Activities – Entropy-Balanced Sample

	(1)	(2)
DV=	Business Est. (Ln)	Business Est. (Ln)
IRA Invest	-0.001	
	(-0.744)	
IRA Invest x Post-Invest	**0.005****	**0.005****
	(2.346)	**(2.406)**
Controls	Yes	Yes
State-by-quarter FE	Yes	Yes
County FE	No	Yes
Observations	33,638	33,638
Adj. R^2	1.000	1.000

Notes: This table presents results of estimating equation (2) after entropy balancing on the first three moments on all covariates between counties where *IRA Invest* equals zero and counties where *IRA Invest* equals one. We define all variables in Appendix A. Column (1) includes state by time (i.e., calendar-year quarter) fixed effects, and column (2) includes state by time (i.e., calendar-year quarter) and county fixed effects. Both columns cluster standard errors at the county-level. Values in parentheses represent t-statistics and goodness of fit is based on Adjusted R^2. ***, **, and * denote significance at the one-, five-, and ten-percent level using two-tailed tests of significance.

Table 8: Magnitude of Clean Energy Investments

	(1)	(2)	(3)	(4)
	IRA Invest – Dollars Above Median = 0	IRA Invest – Dollars Above Median = 1	IRA Invest – Dollars Above Median = 0	IRA Invest – Dollars Above Median = 1
DV=	Business Est. (Ln)		Business Est. (Ln)	
IRA Invest	0.001	-0.000		
	(0.538)	(-0.280)		
IRA Invest x Post-Invest	**0.001**	**0.007*** **	**0.004**	**0.009*** **
	(0.284)	**(2.810)**	**(1.352)**	**(2.922)**
Test of diff. for coefficients - z-score	-1.992		-1.314	
P-value	0.046**		0.189*	
Controls	Yes	Yes	Yes	Yes
State-by-quarter FE	Yes	Yes	Yes	Yes
County FE	No	No	Yes	Yes
Observations	30,547	30,525	30,547	30,525
Adj. R^2	0.999	0.999	1.000	1.000

Notes: This table presents results of estimating equation (2) when separating *IRA Invest* into counties with total firm-level clean investments (in dollars) above and below the median. The two rows below *IRA Invest x Post-Invest* reports results of z-tests of differences (one-tailed) in the coefficient for *IRA Invest x Post-Invest* across consecutive columns. We define all variables in Appendix A. Column (1) includes state by time (i.e., calendar-year quarter) fixed effects, and column (2) includes state by time (i.e., calendar-year quarter) and county fixed effects. Both columns cluster standard errors at the county-level. Values in parentheses represent t-statistics and goodness of fit is based on Adjusted R^2. ***, **, and * denote significance at the one-, five-, and ten-percent level using two-tailed tests of significance.

Table 9: Type of Clean Energy Investments

Panel A: Determinants of Investments

	(1)	(2)
DV =	*IRA Invest Mfg*	*IRA Invest E&I*
Business Est. (Ln) - Lagged	0.031***	0.026***
	(8.850)	(3.195)
ΔQtr. Wages	-0.065	0.098
	(-0.691)	(1.300)
Pre-IRA Invest	0.035***	0.108***
	(3.757)	(7.857)
Subsidies (Ln) - Lagged	0.001	0.002
	(1.313)	(1.320)
Median Income (Ln)	-0.009	-0.003
	(-0.496)	(-0.084)
Unemployment	0.911	1.814**
	(1.134)	(2.126)
Energy Community	-0.033***	-0.003
	(-2.742)	(-0.165)
Avg. Daily Sunlight	-0.000	0.000
	(-1.015)	(1.244)
Turbine Count (Ln)	0.002	0.012**
	(0.618)	(2.285)
%Democrat Vote	0.008	-0.018
	(0.307)	(-0.321)
Observations	2,582	2,999
State FE	Yes	Yes
Goodness of Fit	0.314	0.209

Table 9: Type of Clean Energy Investments (continued)

Panel B: Changes in County-Level Business Activities (Binary Treatment)

DV=	(1) Business Est. (Ln)	(2) Business Est. (Ln)	(3) Business Est. (Ln)	(4) Business Est. (Ln)
IRA Invest Mfg	0.001			
	(0.509)			
IRA Invest Mfg x Post-Invest Mfg	**0.005****	**0.011*****		
	(2.394)	**(4.683)**		
IRA Invest E&I			-0.000	
			(-0.020)	
IRA Invest E&I x Post-Invest E&I			**0.004***	**0.005****
			(1.860)	**(2.156)**
State-by-quarter FE	Yes	Yes	Yes	Yes
County FE	No	Yes	No	Yes
Observations	33,638	33,638	33,638	33,638
Adj. R^2	0.999	1.000	0.999	1.000

Notes: This table presents results of estimating equations (1) and equation (2) when bifurcating the type of clean energy investment between manufacturing and energy/industry. Panel A presents the results of estimating equation (1) when replacing the dependent variable with *IRA Invest Mfg* and *IRA Invest E&I.* All columns are estimated using logit, include state fixed effects, untabulated for parsimony. Marginal effects and z-statistics are presented in parenthesis, and goodness of fit is based on pseudo R^2. In Panel B, columns (1) and (2) present results of estimating equation (2) when replacing *IRA Invest* and *Post-Invest* with IRA *Invest Mfg, Post* and *Invest Mfg*. Columns (3) and (4) present results of estimating equation (2) when replacing *IRA Invest* and *Post-Invest* with *IRA Invest E&I* and *Post-Invest E&I*. Columns (1) and (3) include state by time (i.e., calendar-year quarter) fixed effects. Columns (2) and (4) include state by time (i.e., calendar-year quarter) and county fixed effects. Values in parentheses represent t-statistics and goodness of fit is based on Adjusted R^2. We define all variables in Appendix A. All panels and columns cluster standard errors at the county-level. ***, **, and * denote significance at the one-, five-, and ten-percent level using two-tailed tests of significance.

Table 10: Disadvantaged Communities

Panel A: Energy Communities

	(1)	(2)	(3)	(4)
	Energy Community = 0	Energy Community = 1	Energy Community = 0	Energy Community = 1
DV=	Business Est. (Ln)		Business Est. (Ln)	
IRA Invest	-0.001	-0.000		
	(-0.555)	(-0.034)		
IRA Invest x Post-Invest	**0.003**	**0.004**	**0.004**	**0.006***
	(1.438)	**(1.593)**	**(1.616)**	**(1.942)**
Test of diff. for coefficients - z-score	-0.331		-0.433	
P-value	0.741		0.665	
Controls	Yes	Yes	Yes	Yes
State-by-quarter FE	Yes	Yes	Yes	Yes
County FE	No	No	Yes	Yes
Observations	20,086	13,519	20,086	13,519
Adj. R^2	0.999	0.999	1.000	1.000

Table 10: Disadvantaged Communities (continued)

Panel B: High Unemployment Counties

	(1)	(2)	(3)	(4)
	Unemploy. Above Median = 0	Unemploy. Above Median = 1	Unemploy. Above Median = 0	Unemploy. Above Median = 1
DV=	Business Est. (Ln)		Business Est. (Ln)	
IRA Invest	0.001	-0.001		
	(0.536)	(-0.798)		
IRA Invest x Post-Invest	**0.005****	**0.001**	**0.007*****	**0.001**
	(2.148)	**(0.392)**	**(2.944)**	**(0.272)**
Test of diff. for coefficients - z-score	1.279		1.878	
P-value	0.201		0.060*	
Controls	Yes	Yes	Yes	Yes
State-by-quarter FE	Yes	Yes	Yes	Yes
County FE	No	No	Yes	Yes
Observations	17,231	16,376	17,231	16,376
Adj. R^2	0.999	0.999	1.000	1.000

Notes: This table presents results of estimating equation (2) when bifurcating the sample based on *Energy Community* in Panel A and *Unemploy. Above Median* in Panel B. We define all variables in Appendix A. In both panels, Columns (1) and (3) include state by time (i.e., calendar-year quarter). Columns (2) and (4) include state by time (i.e., calendar-year quarter) and county fixed effects. The two rows below *IRA Invest x Post-Invest* reports results of z-tests of differences in the coefficient for *IRA Invest x Post-Invest* across consecutive columns. All columns cluster standard errors at the county-level. Values in parentheses represent t-statistics and goodness of fit is based on Adjusted R^2. ***, **, and * denote significance at the one-, five-, and ten-percent level using two-tailed tests of significance.