Electrifying Populism? Rural Electrification and Democratic Backsliding in the Early 20th Century United States

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Abstract

Recent research in comparative politics and international relations has found that robotics, artificial intelligence, and technological change in the form of globalization more generally have led to sharp increases in populist sentiment in regions impacted by these trends (Cameron Ballard-Rosa and Scheve, 2021; Milner, 2021; Scheiringer et al., 2024). In many cases, the primary drivers of technological change have been private firms concerned with profit maximization. Thus, the economic changes accompanying many modern technological transformations, particularly those related to automation technologies, have resulted in labor displacement, unemployment, and political discontent, which increase support for populist leaders. However, it is less clear whether state-funded technological transformations catalyzed by infrastructure investments in technology have similar effects to those of privately funded interventions. In this paper, I examine the political impact of one of the most significant state-sponsored modernization efforts of the early 20th century: the Rural Electrification Administration (REA). The REA provided low-interest loans to rural areas in the United States that could be used to create electrical utility cooperatives in areas where private firms refused to build electrical lines due to high costs and the prospect of relatively low returns. Using instrumental variables, a novel measure of REA funded power plants and county-level election returns between 1930-1960, I

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identify the impact of rural electrification on support for populist third parties, conservative right-leaning mainstream parties such as Jim Crow era Southern Democrats and so-called Southern "Mountain Republicans," a politically important anti-secessionist and anti-Confederate movement in the post Civil War South. I find that the establishment of REA funded power plants led to significant reductions in support populist third-parties in the South with decreases in support for Southern Democrats and significant increases in support for Southern Mountain Republicans. The impact of REA power plants on Farmer-Labor Party support are mixed. While grounded in historical research, this paper has implications for state-led efforts to deal with existing disruptive technologies such as robotics and artificial intelligence.

1 Introduction

Joseph Schumpeter noted that a key feature of capitalism was its continuous cycles of "creative destruction" in which old forms of economic life were replaced with new ones (Schumpeter, 1942). At the heart of creative destruction is technological change. New technologies, particularly general purpose technologies, transform industries affected by them and have ripple effects that upend every facet of the existing social order including family arrangements, urban and rural areas and even turnover of political elites (Bresnahan and Trajtenberg, 1995).

For instance, improvements made to the steam engine by James Watt are widely believed to have ushered in the industrial revolution because they made factory production of textiles and other goods feasible (Mokyr, 1990). Because these improvements could be applied to multiple industries, such as textiles and railroads, the steam engine provided the basis for other innovations such as the spinning jenny, which eventually led to the demise of the guild system of labor and the rise of the factory system. This, in turn, transformed the social and political fabric of 19th-century England through urbanization and the rise of a new class

of political and economic elites (Hobsbawm, 1968).

Because technological change creates new classes of winners and losers in the economy (Postman, 1993; Drezner, 2019), creative destruction is often accompanied by political unrest, which stems, in large part, from the economic insecurity it creates. In the early 19th century, this political unrest manifested in democratic uprisings, such as the revolutions of 1848, which led to constitutional reform and improvements in democratic governance (Hobsbawm, 1962). In the late 19th and early 20th centuries, political unrest stemming from economic insecurity manifested in the emergence of Marxist and socialist political movements, and in the 20th century, in the form of Spanish, Italian, and German fascist movements (Paxton, 2004). In recent years, more rigorous work has examined the relationship between economic insecurity and the rise of populist movements.

In a recent meta-analysis of several studies exploring the connection between populism and economic insecurity Scheiringer et al. (2024) find that economic insecurity during the late 20th and and early 21st century led to the rise of mostly right-wing populist movements. Recent research has found that robotics, artificial intelligence, and other automation technologies have led to sharp increases in populist sentiment and support for extremist candidates in areas impacted by these trends (Cameron Ballard-Rosa and Scheve, 2021; Milner, 2021).

While political unrest driven by technological change and economic instability takes different forms across time and place, a common factor is that it always poses a direct threat to the existing political order, which must respond to survive. In the United States, for example, Progressive Era reforms (1890–1920) aimed to curb economic instability caused by the rise of a new industrial class in railroads, oil, and manufacturing (Hofstadter, 1955; Wiebe, 1967). These reforms

Reform	Year Enacted	Description
Sherman Antitrust Act	1890	First federal act to outlaw monopolistic business practices and promote competition. Aimed to break up large trusts and monopolies.
Interstate Commerce Act	1887	Regulated railroad industry, especially monopolistic practices, ensuring fair rates and prohibiting discriminatory practices.
Hepburn Act	1906	Strengthened federal regulation of railroads by giving the Interstate Commerce Commission the power to set maximum railroad rates.
Federal Reserve Act	1913	Established the Federal Reserve System to regulate the money supply and provide a safer, more flexible, and stable monetary and financial system.
Clayton Antitrust Act	1914	Strengthened antitrust laws by further prohibiting monopolistic practices and exempting labor unions from being targeted under antitrust laws.
Keating-Owen Child Labor Act	1916	Prohibited the sale of goods produced by factories that employed children under certain ages. Aimed to reduce child labor.
Adamson Act	1916	Established an eight-hour workday for railroad workers, with additional pay for overtime work.
Workers' Compensation Laws	Various (state-level)	State-level laws providing compensation to workers injured on the job, holding employers accountable for workplace accidents.
Minimum Wage Laws	1912 onward (state-level)	Massachusetts became the first state to pass minimum wage legislation, ensuring that workers were paid a minimum amount for their labor.

Table 1: Economic and Labor Reforms Enacted During the Progressive Era, 1890-1920

also responded to emerging political movements and parties, such as the Progressive Party (1912), the Socialist Party of America (1901), and the Populist Party (1891) (Arthur M. Schlesinger, 1945; Buenker, 1973). Key reforms included the Interstate Commerce Act (1887) and the Hepburn Act (1906), which regulated railroads to ensure fair rates and prevent discriminatory practices. The Clayton Antitrust Act (1914) sought to prevent monopolies and protect labor unions, while the Sherman Antitrust Act (1890) targeted monopolies like Standard Oil. Child labor laws, such as the Keating-Owen Act (1916), banned the interstate sale of goods produced by child labor, and the Adamson Act (1916) laid the foundation for the eight-hour workday (Zinn, 1980).

Each of these measures and others shown in Table **??** sought to reduce the economic instability caused by the spread of major innovations, such as railroads and new methods of extracting oil. Shortly after the Progressive Era, a new challenge to American democracy arose in the form of the Great Depression of 1929. While the Great Depression was caused primarily by financial speculation, practically all of the major stocks with high levels of speculation were related to new technological innovations that did not have strong fundamentals, including electrical utility stocks run by holding companies that collapsed. Automobile industry stocks, radio and communications stocks, and railroad stocks were also subject to high degrees of financial speculation, which eventually led to the collapse of a financial bubble (Galbraith, 1954).

Once again, the Great Depression demanded political action to address extreme financial insecurity and high unemployment, which threatened to push the country into political chaos. In 1932, Franklin Delano Roosevelt won the presidency in a landslide on a platform of economic recovery through government interven-

tion, known as the New Deal. This led to a significant expansion of the federal government's size and power through programs that created jobs for the unemployed, redistributed concentrated wealth, and shared the benefits of technological advancements, such as the widespread adoption of electrical power, which greatly improved living standards (Arthur M. Schlesinger, 1958).

While a great deal of research has focused on the extent to which technological change leads to economic insecurity and political instability in the form of new populist movements (Judis, 2016; Rodrik, 2018), little research has examined the extent to which state-led efforts, such as the New Deal, can reduce the political instability caused by technological change, particularly those which sought to redistribute the benefits of technological innovations to individuals whom the market may have precluded access (Daniel A. Ackerberg, 2007; Price V. Fishback, 2014).

In this paper, I address this issue by examining the extent to which the Rural Electrification Administration (REA), a government agency set up during the New Deal, provided electricity to rural areas which were either underserved or not served at all due to the cost-prohibitive nature of running electrical lines over long distances in sparsely populated regions (Saloutos, 1982). The REA provided low-interest loans to rural areas in the United States that could be used to create electrical utility cooperatives in areas where private firms refused to build electrical lines due to high costs and the prospect of relatively low returns. Using a novel measure of REA-funded power plants and county-level election returns between 1930-1960, I identify the impact of rural electrification on support for populist third parties and right-leaning mainstream parties such as Jim Crow-era Southern Democrats and Republicans. While grounded in historical research, this paper has implications for state-led efforts to deal with existing disruptive technologies, such

as robotics and artificial intelligence (Acemoglu and Restrepo, 2020; David Autor, 2020).

1.1 American Rural Populism in the Early 20th Century

Defining which parties could be considered "populist" in the United States during the early 20th century is not an easy task. While there are some clear third parties which had populist platforms such as the Farmer-Labor Party in the North, third parties were nonexistent in the South and the extent to which Southern Democrats or Republicans could be considered populist depends on a number of factors including where in the South these Republicans can be found as described below.

1.2 Rural Populism in Northern and Midwestern States

During the New Deal era, rural populism in the northern United States found expression through movements like the Farmer-Labor Party, which sought to represent the interests of farmers and workers who felt marginalized by both major political parties (Hicks, 1931). This populist sentiment was rooted in the economic challenges faced by small farmers, particularly in the Upper Midwest, where agricultural communities were hit hard by the Great Depression (Hofstadter, 1955). Many farmers struggled with debt, falling crop prices, and foreclosure, which deepened their dissatisfaction with the existing political and economic system. These struggles fostered a growing alignment between rural farmers and urban laborers, who both saw their interests as being overlooked by large corporations and monopolistic practices (Samuel Eliot Morrison and Leuchtenburg, 1980).

The Farmer-Labor Party, active primarily in states like Minnesota and North Dakota, emerged as a powerful force for advocating policies that promoted fair labor practices and government intervention in markets (Thelen, 1992). It drew heavily on the populist traditions of the late 19th century, particularly the anti-monopoly and pro-regulation sentiments that had motivated earlier movements like the Grangers and the Populist Party (Goodwyn, 1978). The Farmer-Labor Party supported progressive taxation, labor rights, public ownership of key industries, and agricultural reforms designed to stabilize farm prices and provide relief to rural communities (Ostler, 1999).

In Minnesota, the Farmer-Labor Party was particularly influential, with candidates like Floyd B. Olson serving as governor from 1931 to 1936 (Arthur M. Schlesinger, 1958). Olson's administration pushed for policies that aligned with New Deal principles, advocating for state intervention in the economy, public works programs, and the protection of farmers and workers (Brody, 1980). The party also supported New Deal agricultural programs like the Agricultural Adjustment Act (AAA), which aimed to raise farm incomes by controlling production and stabilizing prices, but sought even more radical reforms at the state level (Bernstein, 1967).

The Farmer-Labor movement's emphasis on the intersection of rural and labor interests set it apart from other populist movements of the time. It not only addressed the economic struggles of rural communities but also sought to build alliances with industrial workers in northern cities (Frederickson, 1986). The coalition between farmers and laborers reflected a broader vision of economic equality that resonated with those affected by the economic hardships of the Great Depression. Ultimately, the Farmer-Labor Party merged with the Democratic Party

in Minnesota in 1944, forming the Democratic-Farmer-Labor (DFL) Party, which still exists today.

1.3 Rural Populism in the South

In *Southern Politics in State and Nation*, V.O. Key noted that "One never knows who is and who is not a Republican...Only in North Carolina, Virginia and Tennessee do the Republicans approximate the reality of a political party" (V. O. Key, 1949, p. 277). Rural populism in the South during the New Deal era was shaped by longstanding political divisions between the dominant Southern Democrats and a more localized group of Mountain Republicans (V. O. Key, 1949). In much of the South, Democrats had held political power since the end of Reconstruction, often maintaining control through policies that favored wealthy landowners, segregation, and conservative economic interests (Woodward, 1955). However, in the Appalachian Mountain regions and other rural areas, a distinct brand of Republican populism persisted, rooted in the anti-elite, anti-slavery, and anti-secessionist sentiment that had been strong in these areas during the Civil War (McGriff, 1985). Mountain Republicans, often representing small farmers, miners, and rural communities, advocated for policies that challenged plantation and industrial elites associated with Southern Democrats. (Martis, 1994).

The New Deal brought these political divisions into sharper focus. Southern Democrats were often split on how to respond to Roosevelt's New Deal policies. While some embraced federal intervention in the economy, others resisted New Deal reforms that threatened traditional power hierarchies in the South, particularly labor protections and agricultural programs that benefited small farmers (Scott,

1980). Southern Democrats were more likely to support programs that reinforced the status quo of segregation and the concentration of wealth in the hands of the region's elites, while Mountain Republicans, who represented a poorer, more isolated population, were more open to reforms that redistributed wealth and resources to rural communities (Schulman, 1994).

Mountain Republicans, in particular, welcomed New Deal policies like the Tennessee Valley Authority (TVA), which brought electrification and infrastructure improvements to isolated regions in Appalachia (Crouch, 1995). These projects aligned with the interests of rural communities who felt left behind by the rapid industrialization that had benefited urban centers in the South. The TVA and other New Deal programs not only provided economic relief but also empowered Mountain Republicans to push for greater government involvement in improving the lives of rural Southerners, often in opposition to the more conservative Southern Democrats who resisted federal intervention (Saloutos, 1982).

1.4 The Rural Electrification Administration (REA)

The Rural Electrification Administration (REA), established in 1935 as part of President Franklin D. Roosevelt's New Deal, was a government agency tasked with bringing electricity to rural areas in the United States. Prior to its creation, only around 10% of rural households had access to electricity due to the high costs of extending transmission lines to sparsely populated areas. The REA addressed this by providing low-interest loans to cooperatives, which were formed by groups of local farmers and rural residents, enabling them to build and maintain their own electric distribution systems. These cooperatives were pivotal in bringing afford-

able electricity to rural America, transforming agricultural productivity, household labor, and quality of life in these regions (Kitchens and Fishback, 2015; Lewis and Severnini, 2020).

Historians and economists have documented the profound economic and social impacts of rural electrification. According to Kitchens and Fishback (2015), the REA significantly boosted agricultural productivity, allowing farms to mechanize and reduce labor costs. This, in turn, led to greater efficiency and improved living standards for rural populations. Other scholars, including David N. Laband and Price V. Fishback, have examined the long-term development effects of the REA, noting that the program not only alleviated rural poverty but also contributed to narrowing the urban-rural divide in the United States. The REA serves as a key example of how large-scale government intervention can address market failures in infrastructure development, a topic frequently explored in development economics (Laband, 1983; Price V. Fishback, 2014).

2 Hypotheses

Due to the significant regional differences and historical legacies in the North and the South, I expect that the political impacts of rural electrification will manifest in different ways within northern and Southern states but in both cases, I argue that rural electrification should lead to a shift in voting patterns that suggest an increase in support for the New Deal agenda and the federal government and a decrease in support for local and regional factionalism. Thus I have the following hypotheses:

- **Hypothesis 1a**: In the rural North, establishment of REA power plants

should decrease support for the Farmer-Labor Party in Congressional elections.

- **Hypothesis 1b:** In the rural North, establishment of REA power plants should increase support for Democratic Party candidates in presidential elections.

- **Hypothesis 2a:** In the rural South, establishment of REA power plants should decrease support for the Democratic party and increase support for the Republican party in Congressional elections. The increase in support for the Republican party should come mostly from Mountain Republicans, who were anti-secessionist, anti-slavery and were generally pro New Deal.

- **Hypothesis 2b**: In the rural South, establishment of REA power plants should increase support for Democratic Party candidates in presidential elections.

To test these hypotheses, I use a measures of rural electrification based on the establishment of REA funded power plants borrowed from Lewis and Severnini (2020). Significant regional differences

3 Data

3.1 Dependent Variables - County Level Electoral Measures

Data for the dependent variables, which include vote share by US county for members of Congress and vote share by US county for presidential candidates between 1930–1960, were retrieved from ICPSR Study 8611: "Electoral Data for Counties

in the United States: Presidential and Congressional Races, 1840-1972" (ICPSR, 1999). This data was restricted to 2,162 rural counties which could have potentially received REA loans, as described in the next section below.

This collection includes county-level data for U.S. presidential and House of Representatives elections from 1840 to 1972. For presidential elections, the data features the percentage of votes cast for major and "significant" minor party candidates. It also includes the total number of votes cast for all candidates and estimates of voter turnout. Similar data is provided for congressional elections, with results reported by party rather than by individual candidate (ICPSR, 1999).

3.2 Independent Variables - County Level Measures of REA Funded Power Plants

To leverage the impact of electrification via Rural Electrification Administration (REA) loans on electoral outcomes for extremist candidates, the main independent variables used was the change in county centroid distance from a "large" power plant (one that contains at least 30MW of capacity) after the passage of the Rural Electrification Act, based on data from a balanced panel of 2,162 rural counties between 1930–2000 collected by Lewis and Severnini (2020) (Lewis and Severnini, 2020).

According to Lewis and Severnini (2020), in this dataset, rural counties are defined according to Census measures "as non-MSA counties with at least 50% rural residents as in 1930," prior to the passage of the Rural Electrification Act of 1936. In this sample, counties that were located more than 200 miles from a power plant in 1930 were excluded as a means of explicitly identifying counties

that benefited from REA loan approvals (Lewis and Severnini, 2020).

A major reason for the lack of electrification in rural areas prior to the passage of the Act was primarily driven by economic factors. As a general rule, the further that electricity has to travel, the higher the cost to send that electricity through transmission lines (Wolff, 1999). This problem is compounded when the areas are both remote and sparsely populated, as few people receive and pay for the transmission, driving the average price per kilowatt hour up greatly (Carr and Stermer, 1937).

Because rural areas were sparsely populated, with few people at long distances from each other, electrical utility companies at the time had to invest a great deal of resources to provide electricity across a wide swath of rural areas with little concomitant benefit. The REA was tasked with closing this electrification gap by providing low-interest loans to rural electricity cooperatives, which were non-profit, member-owned entities formed by groups of rural residents (Saloutos, 1982). These cooperatives used the loans to build and operate their own electric distribution systems, bringing power to areas that were previously without electricity (Brown, 1939).

To qualify for these loans, a cooperative had to operate in a rural area with low population density, and the project had to be deemed financially and technically feasible. Because of this precondition, initial proximity to an electrical power generation plant was a crucial aspect of REA loan approval since, as mentioned above, this determined the extent to which the cooperative could generate and transmit electricity to residents at a reasonable cost (Lewis and Severnini, 2020). According to the REA, "...if a proposed wholesale rate for any project, taking into account variable conditions, is not such as to make an otherwise good project

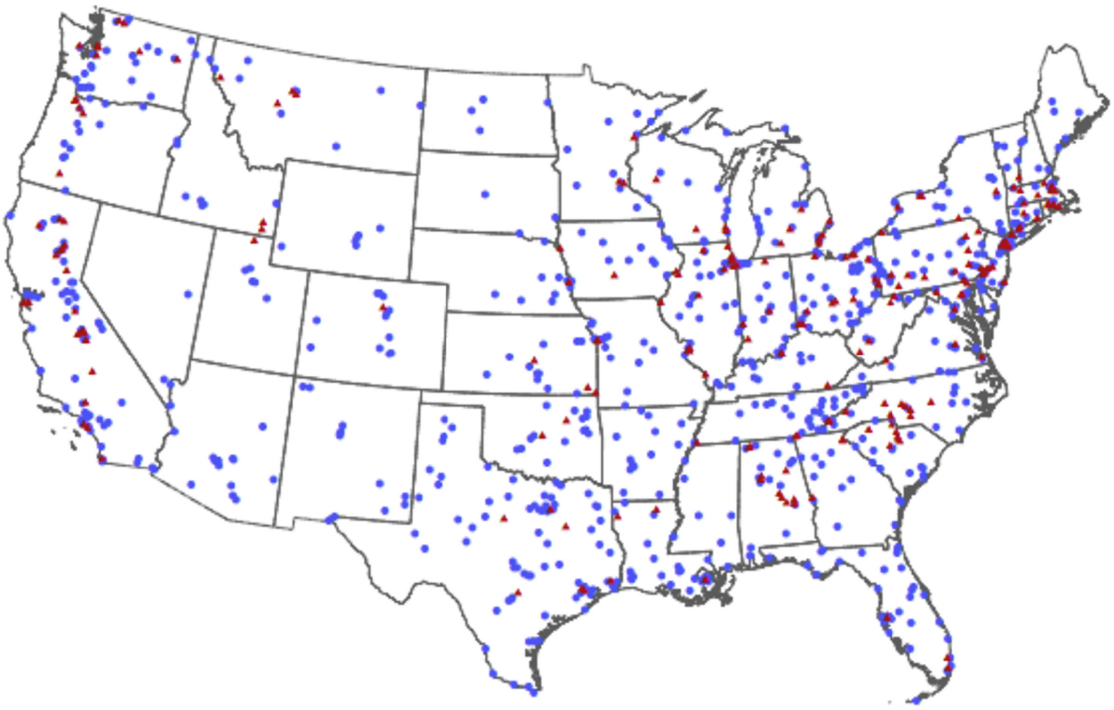

Figure 1: Large power plant openings, 1930–1960. Large power plants are considered to be those that had > 30 megwatt capacity. Red triangles represent power plants in operation in 1930. Blue circles identify power plants that opened between 1930 and 1960. *Note: Reproduced from Lewis and Severnini (2020)*

economically feasible and self-sustaining, REA cannot make a loan. Sometimes a difference of a fraction of a cent per kilowatt-hour in wholesale rate will represent the difference between a sound and an unsound project" (Rural Electrification Administration, 1938, p. 21, quoted from Lewis and Severnini, 2020) (Lewis and Severnini, 2020).

As a result of this, I adopt the strategy of Lewis and Severnini (2020) who use changes in county centroid distance from a major power plant ($\geq$ 30MW of capacity) between 1930-1960 as a proxy for availability of electricity made possible by REA loans. In addition to this measure, the authors include a variable identical to the one above but restricted to private power plants. I also include this variable

as dependent variable because it better identifies those power plants that were explicitly created by REA funding. All power plants enabled by REA funding were registered as private non-profit organizations because funding went towards creating private electricity cooperatives, many of which exist today. Most fully public power plants operating in the United States between 1930-1960 were created by the Tennessee Valley Authority (TVA) and existed mostly in the South but in other cases, states established Public Utility Districts and power plants in these areas were managed by local governments.

Figure 1 above, repeated from Lewis and Severnini (2020) is a plot of large power plants across rural counties in the US. Red triangles represent plants already in operation in 1930, before the passage of the REA while blue dots represent power plants created after passage of the REA in 1936.

This measure was constructed as follows. In 1963, the U.S. Federal Power Commission produced a series of seven maps which identify the historical location of all power plants in the U.S. which also include plant characteristics. Using GIS software, the authors extracted longitude and latitude coordinates for each of the power plants along with the year these plants opened and constructed a single measure of distance from a major power plant as a proxy for increased access to electrification resulting from REA loans. A more in-depth description of how this distance metric was created is described in the Appendix.

3.3 Instrumental Variable - Real Minegate Price of Coal

In the development economics literature a number of instrumental variables have been used to deal with endogeneity concerns regarding the creation of power plants

in rural areas mostly in the developing world and Global South contexts. One of the more common instruments used in this context is land gradient which was first used by Dinkelman (2011) and has generated controversy since that time. While land gradient was a candidate considered in this study, I ultimately decided against its use. Instead, I sought an instrument which would have been specific to the ability of major power plants to have been created locally in rural areas that was dependent in pre-Rural Electrification Act natural resources.

Since the vast majority of power plants constructed in the early 20th century United States relied on coal, easy and cheap access to coal via deposits mined from local areas would make a significant contribution to the ability to receive REA funds and to create and continue to operate large-scale power plants in rural areas once they were established. Furthermore, discovery of these natural resources unearthed before the passage of the Rural Electrification Act were unlikely to have affected electoral decisions for residents of rural areas, most of whom were farmers, except for the ability to continuously fuel local power plants created with REA funds.

Thus, I use plan to use the real minegate price of coal in 1930 as an instrument for REA power plant creation as part of my empirical strategy discussed below. The real mine gate price of coal refers to the actual selling price of coal at the mine, excluding any taxes, transportation costs, or additional handling fees that would occur after the coal leaves the mine. This price is often used as a benchmark for evaluating the value of coal before it enters the market (Matheis, 2016).

4 Empirical strategy

To study the short-run effects of electrification, we employ a continuous difference-in-differences approach, focusing on the decadal timing of power plant openings from 1930 to 1940. This methodology mirrors the identifying assumptions of the more conventional discrete treatment difference-in-differences strategy, as outlined by Angrist and Pischke (2009), but is better suited for evaluating non-discrete treatment effects where treatment intensity varies across units. Similar approaches have been used in evaluating the impacts of gradual policy changes (Card, 1992; Daron Acemoglu and Robinson, 2004).

By comparing electoral changes in rural counties that saw greater increases in electricity access to those that saw smaller increases, we control for within-state trends while accounting for baseline differences. To ensure comparability, we focus on counties that exhibited similar pre-1930 characteristics, allowing for a more accurate comparison of how increased electricity access influenced voting behavior.

4.1 REA Electrification and Rural populism in the North, 1930-1940

To estimate the impact of availability of electrical power provided by REA funding on support for rural populism in Northern US states, we conduct short run analyses of the impact of REA funding on support for the Farmer-Labor party House members in Northern US states as well as Democratic and Republican House members. This involves estimating the following model:

$$Y_{ct} = \beta\, DistPPr_{ct} + \rho\, DistPP_{ct} + \zeta\, Vote_{c,1930} + Y_{c,1930} + \alpha_c + \gamma_s + \delta_t + \lambda_{st} + \theta_t X_{c,1930} + \theta_t MSA_{c,1930} + \epsilon_{ct} \tag{1}$$

We estimate the changes in House vote share for a number of parties Y_{ct}, measured in county c and year t, as a function of the distance to the nearest private large power plant, denoted as DistPPr_{ct}, alongside baseline changes in turnout for House elections $Vote_{c,1930}$, baseline vote share by party, $Y_{c,1930}$ county fixed effects α_c, state fixed effects γ_s, year fixed effects δ_t, state-by-year fixed effects λ_{st}. The regression models also incorporate a vector of baseline socioeconomic conditions for both the rural county, $X_{c,1930}$, and the nearest metropolitan area, $\text{MSA}_{c,1930}$, each interacted with year fixed effects.

The county controls, $X_{c,1930}$, account for geographic variables – longitude, latitude, and distance to the nearest metropolitan statistical area (MSA) – as well as demographic and economic factors: total population, fraction white, agricultural employment, and manufacturing employment, all measured in 1930. Similarly, the MSA controls, $\text{MSA}_{c,1930}$, include total population, fraction white, and manufacturing employment in the nearest MSA, also measured in 1930. These covariates enable us to capture differential trends in outcomes across rural counties based on the initial conditions of both the rural county and its nearest metropolitan area.

4.2 REA Electrification and Rural populism in the South, 1930-1940

To estimate the impact of availability of electrical power provided by REA funding on support for rural populism in Northern US states, a similar strategy is used to measure short run effects with a slight modification. First, we estimate Equation 1 within Southern states which include Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia for Southern Democrats and Republicans overall.

To explore the impact of rural electrification on support for Mountain Republicans specifically, we modified Equation 1 slightly to include a dummy variable for states in which Mountain Republicans were politically actives according to Key (Virginia, North Carolina and Tennessee) (V. O. Key, 1949) and interacted this dummy variable with $DistPPr_{ct}$ along with main effects to produce the following modified version of Equation 1:

$$\begin{aligned} Y_{ct} = {} & \beta DistPPr_{ct} + \pi(DistPPr_{ct} \times Mountain_s) \\ & + \rho DistPP_{ct} + \zeta(DistPP_{ct} \times Mountain_s) + \phi Mountain_s + Vote_{ct} \\ & + Y_{c,1930} + \alpha_c + \gamma_s + \delta_t + \lambda_{st} + \theta_t X_{c,1930} + \theta_t MSA_{c,1930} + \epsilon_{ct} \end{aligned} \tag{2}$$

4.3 Dealing with Endogeneity

4.3.1 Placebo Tests

In order to test for parallel trends and to ensure that changes in vote share were not associated with the creation of REA funded power plants prior to the creation

of the REA, I estimate models similar to the ones above on changes in pre-REA election outcomes, specifically between the years 1930 and 1932. I chose these years for the placebo tests because changes in vote share between 1930 and 1934, while they are still pre-REA, are after the establishment of the Tennessee Valley Authority (TVA) which was created in 1933. Thus, the creation of TVA power-plants in 1934 could potentially introduce post-treatment bias into our models.

4.3.2 Sensitivity Tests

While the models estimated above account for much of the possible variation in both the measure of REA funded power plants and electoral outcomes, two possible explanations for any results obtained could potentially threaten the interpretation of the analyses.

First, it is possible that an overall increase in living standards due to electrification that were not the result of REA funded efforts could have affected support for populism in both the North and the South. This could have been due to the introduction of new power plants funded by private entities which happened to enter rural areas around the same time that REA power plants were being established. This is unlikely given the dire economic conditions of the times as most of the US was still reeling from the 1929 Great Depression in the decade following the stock market collapse and new technologies which would make rural electrification cheaper were not known, the possibility exists nevertheless.

4.3.3 Instrumental Variables

To handle any other additional remaining endogeneity, I also plan estimate the impact of REA funded power plants on electoral outcomes use and instrumental

variables approach using minegate price of coal as an instrument for the creation of REA funded power plants. The first stage of the instrumental variable approach involves estimating the effect of the instrument (metric tons of coal) on the endogenous variable (electrification). The equation can be written as:

$$DistPPr_{ct} = \delta MinegatePrice_{c,1930} + \cdots + \varepsilon_{ct} \tag{3}$$

In Equation 3 change in distance the measure of REA funded power plants is instrumented with the pre-treatment coal minegate price in county c before passage of the REA in 1930. This equation will also include county, state, year and state by year fixed effects as well as all other covariates in Equation 1 mentioned above. I expect δ to be positive and the instrument in the first stage equation to be strong according to Stock-Yogo criteria Stock and Yogo (2005)

4.4 Second Stage Equation

The second stage uses the predicted values of $DistPP_{ct}$ from the first stage to estimate its effect on election outcomes, which is the vote share for different political parties. The second stage equation is:

$$\mathrm{Y}_{ct} = \beta \widehat{DistPPr}_{ct} + \cdots + \nu_{it} \tag{4}$$

For the instrument above to valid two criteria have to be met: relevance and exogeneity. Regarding relevance, county level average coal minegate price in 1930 should be strongly correlated with $DistPPr_{ct}$ conditional on covariates and fixed effects included in the model. Given that coal is a primary input for coal-based power plants, the average price of coal at the mine gate in within counties pre-REA

would likely affect ability of counties to secure to REA funding to build electricity cooperatives.

Regarding exogeneity, the coal mine gate price must be uncorrelated with the error term in the regression of electoral outcomes. This means that coal prices should not directly affect electoral outcomes except through their influence on REA-created power plants. To satisfy this condition, average coal minegate prices in 1930 should not affect changes in electoral outcomes at the county level, conditional on county, state, year, state by year fixed effects and other county level covarariates except through the creation of REA funded power plants.

Coal minegate prices are often determined by broader market forces like supply and demand, transportation costs, and extraction costs, which are typically independent of local political outcomes. In theory, if local or national political dynamics in 1930 affected coal prices and changes in electoral outcomes (for example, through policy interventions or regulations), this could violate the exogeneity condition. However, covariates and fixed effects include in the model will likely account for any of these changes.

5 Results

5.1 Rural Populism in the South

Tables 2 and 3 present the results of DiD models of the change in negative distance to the nearest power plant on Democratic party vote share and Republican Party vote share in Southern counties. Here we see a very different pattern emerge. Here we notice that REA electrification decreased support for Southern Democrats who

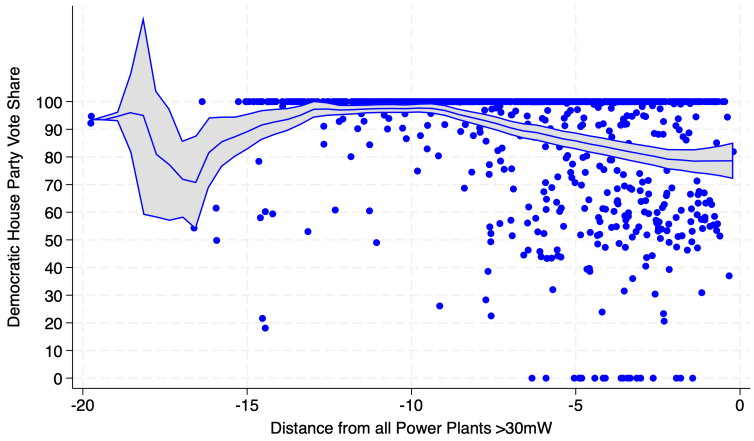

Figure 2: Democratic Party House Vote Share vs. Distance to Nearest Private Power Plant in Southern Rural Counties before 1935

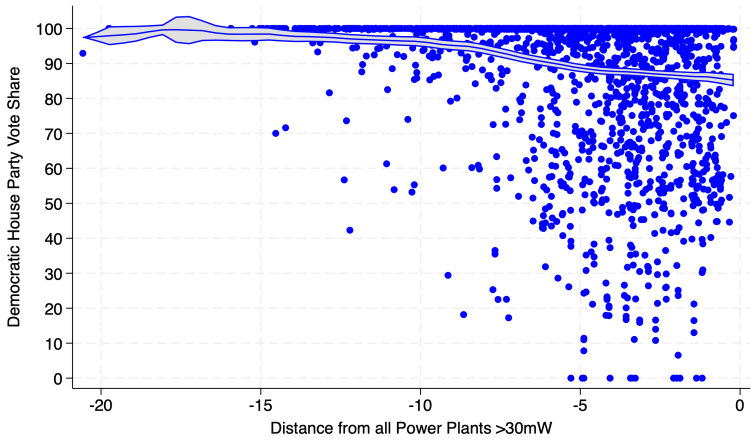

Figure 3: Democratic Party House Vote Share vs. Distance to Nearest Private Power Plant in Southern Rural Counties before 1935

were mostly anti-New Deal, pro-Confederate and pro-segregation and increases support for Southern Republicans. Interestingly, the magnitudes of these effects, for the most part, appear to increase over time in both cases

As mentioned above, however, we hypothesized that REA electrification increased support among so-called Mountain Republicans, as defined by V. O. Key

VARIABLES	(1) Democrat (1930-1940)	(2) Democrat (1932-1942)	(3) Democrat (1934-1944)	(4) Democrat (1936-1946)
DistPP	0.159	-0.041	-0.266	-0.238
	(0.141)	(0.239)	(0.218)	(0.218)
DistPPr	-0.544***	-0.650**	-0.686**	-0.969**
	(0.186)	(0.294)	(0.303)	(0.386)
Democratic Vote Share 1930	0.735***	0.446***	0.499***	0.490***
	(0.043)	(0.091)	(0.082)	(0.090)
Log Votes 1930	-2.363	-1.191	-3.240	-1.582
	(1.832)	(3.879)	(3.575)	(3.898)
Constant	33.462*	-69.267	-42.540	-124.526*
	(17.792)	(67.843)	(62.935)	(75.061)
County FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes	Yes
Baseline Geographic Covariates	Yes	Yes	Yes	Yes
Baseline Employment/Industry Covariates	Yes	Yes	Yes	Yes
Baseline Demographic Covariates	Yes	Yes	Yes	Yes
Observations	1,466	1,554	1,582	1,497
R-squared	0.899	0.876	0.932	0.896

Cluster robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Effect of change in negative power plant distance on Democratic party vote share in Southern rural counties. Standard errors are clustered at the county level and models estimated include fixed effects for county, state, year and state by year.

(1949), practically all of whom lived in North Carolina, Tennessee and Virginia. To test this hypothesis, we interacted negative distance to the nearest power plant with a dummy variable for states dominated by mountain Republicans.

VARIABLES	(1) Republican (1930-1940)	(2) Republican (1932-1942)	(3) Republican (1934-1944)	(4) Republican (1936-1946)
DistPP	-0.130	-0.079	0.231	0.077
	(0.151)	(0.209)	(0.229)	(0.210)
DistPPr	0.667***	0.727***	0.588*	1.168***
	(0.187)	(0.270)	(0.305)	(0.391)
Republican Vote Share 1930	0.816***	0.465***	0.602***	0.619***
	(0.073)	(0.113)	(0.122)	(0.140)
Log Votes 1930	2.361	2.576	4.525	2.288
	(2.262)	(3.480)	(3.720)	(4.235)
Constant	-2.620	118.649*	109.624	206.856***
	(16.568)	(62.272)	(68.771)	(79.022)
County FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes	Yes
Baseline Geographic Covariates	Yes	Yes	Yes	Yes
Baseline Employment/Industry Covariates	Yes	Yes	Yes	Yes
Baseline Demographic Covariates	Yes	Yes	Yes	Yes
Observations	1,466	1,553	1,582	1,497
R-squared	0.904	0.840	0.897	0.881

Cluster robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Effect of change in negative power plant distance on Republican party vote share in Southern rural counties. Standard errors are clustered at the county level and models estimated include fixed effects for county, state, year and state by year.

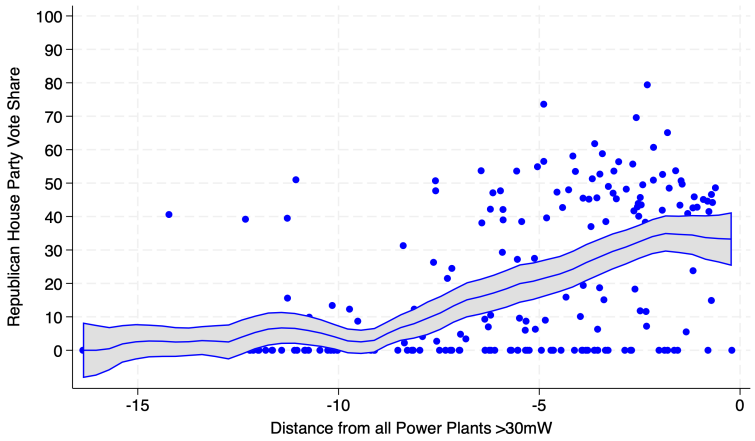

Figure 4: Republican Party House Vote Share vs. Distance to Nearest Private Power Plant in Southern Rural Counties Dominated by Mountain Republicans before passage of the REA in 1935

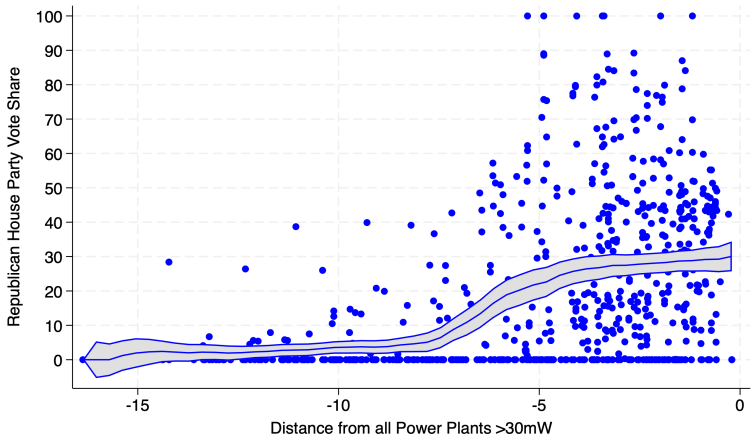

Figure 5: Republican Party House Vote Share vs. Distance to Nearest Private Power Plant in Southern Rural Counties Dominated by Mountain Republicans after passage of the REA in 1935

VARIABLES	(1) Republican (1930-1940)	(2) Republican (1932-1942)	(3) Republican (1934-1944)	(4) Republican (1936-1946)
DistPP	0.059	0.005	0.332	0.323*
	(0.164)	(0.176)	(0.203)	(0.192)
DistPPr	0.099	0.193	-0.130	0.152
	(0.176)	(0.215)	(0.274)	(0.268)
MountainST x DistPP	-0.614	-0.146	-0.146	-0.884
	(0.562)	(0.887)	(0.996)	(0.777)
MountainST x DistPPr	1.630***	1.592*	2.144***	3.070***
	(0.447)	(0.815)	(0.797)	(0.781)
MountainST	10.941***	15.816***	16.406**	24.594***
	(3.617)	(5.638)	(8.190)	(8.643)
Republican Vote Share 1930	0.777***	0.422***	0.546***	0.549***
	(0.069)	(0.111)	(0.119)	(0.135)
Log Votes 1930	2.344	2.664	4.628	2.458
	(1.854)	(3.170)	(3.334)	(3.703)
Constant	0.018	81.376	60.240	130.265**
	(15.721)	(54.506)	(58.487)	(64.977)
County FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes	Yes
Baseline Geographic Covariates	Yes	Yes	Yes	Yes
Baseline Employment/Industry Covariates	Yes	Yes	Yes	Yes
Baseline Demographic Covariates	Yes	Yes	Yes	Yes
Observations	1,466	1,553	1,582	1,497
R-squared	0.907	0.843	0.902	0.889

Cluster robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Effect of change in negative power plant distance on Republican party vote share in Southern rural counties interacted with Mountain Republican counties (MountainST). Standard errors are clustered at the county level and models estimated include fixed effects for county, state, year and state by year.

Table 4 contains the results of the regressions with the Mountain Republican state interaction with power plant distance. Here we notice that power plant distance alone becomes insignificant while the interaction term Mountain Republican State x DistPPr is statistically significant. We also notice that the effect on the interaction term MountainST x DistPPr becomes larger over time. These results suggest that most of the impact of REA funded power plants on voting behavior

occurred in regions dominated by Mountain Republicans.

5.2 Rural Populism in the North

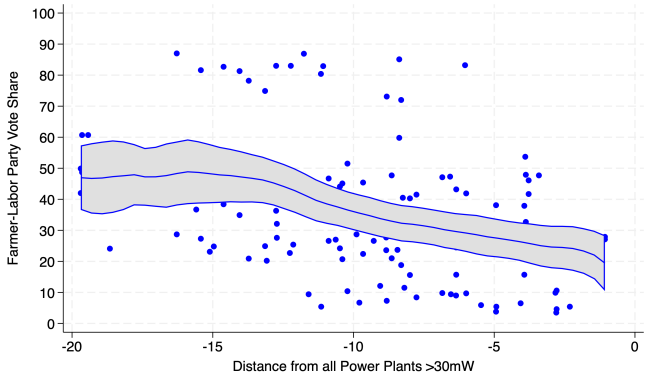

Figure 6: Farmer-Labor Party House Vote Share vs. Distance to Nearest Power Plant in Northern and Midwestern Rural Counties, 1930 and 1940

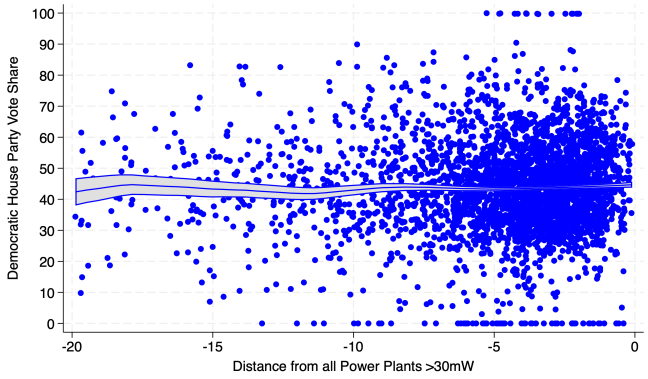

Figure 7: Democratic Party House Vote Share vs. Distance to Nearest Power Plant in Northern and Midwestern Rural Counties, 1930-1940

Table 5 above contains estimates of the effect of REA-funded power plants (*DistPPr*) on Farmer-Labor Party vote share interacted with a dummy variable Minnesota and North Dakota, states where farmer , Democratic Party vote share and Republic Party Vote Share, respectively. Figures 6, 7 and **??** contain plots of negative distance to the nearest power plant in 1930 and 1940, vs. Farmer-Labor, Democrat and Republican party vote shares.

VARIABLES	(1) Farmer-Labor (1930-1940)	(2) Farmer-Labor (1932-1942)
FLState x DistPP	-0.471	-2.032**
	(0.721)	(0.906)
FLState x DistPPr	-0.005	1.659**
	(1.012)	(0.691)
Farmer-Labor Vote Share 1930	0.641***	0.032
	(0.105)	(0.124)
FLState	11.122**	25.898***
	(5.017)	(7.560)
DistPPr	-0.016	-0.014
	(0.020)	(0.033)
DistPP	-0.031	-0.049
	(0.026)	(0.047)
Log Total Vote 1930	0.437	1.565**
	(0.390)	(0.788)
Constant	6.856	11.190
	(7.851)	(17.409)
County FE	Yes	Yes
State FE	Yes	Yes
Year FE	Yes	Yes
State/Year FE	Yes	Yes
Baseline Geographic Covariates	Yes	Yes
Baseline Employment/Industry Covariates	Yes	Yes
Baseline Demographic Covariates	Yes	Yes
Observations	1,968	1,905
R-squared	0.911	0.951

Cluster robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Effect of change in negative power plant distance on Farmer-Labor Party vote share, Democratic party cote share and Republican party vote share in House elections aggregated at the county level in Northern and Midwestern rural counties. Standard errors are clustered at the county level and models estimated include fixed effects for county, state, year and state by year.

The figures suggest evidence of a relationship between Farmer-Labor party vote share and REA funded power plants while no such relationship appears to exist between Democratic and Republican vote share. The differences-in-difference models in Table 5, however, reveal an interesting pattern. While we observe no relationship between power plant creation and changes in Farmer-Labor party vote share initially (Column 1), the creation of private power plants appear to increase Farmer-Labor party vote share between 1932-1942 in an unexpected direction. While the establishment of both public and private power plants appear to decrease support for the Farmer-Labor Party (FLState x DistPP), the creation of REA specific power plants appear to lead to a decrease in support for the Farmer-Labor Party (FLState x DistPPr).

5.3 Placebo Tests

Here we conduct a number of placebo tests using pre-treatment changes in the outcome variable is a method to assess the validity of the parallel trends assumption in difference-in-differences (DiD) analysis. The parallel trends assumption posits that, in the absence of treatment, the treated and control groups would have followed the same trend over time. If the difference-in-differences model applied to this placebo period shows a significant difference in trends between the treated and control groups, it suggests that the groups were already on diverging paths before the real treatment. This would indicate that the parallel trends assumption does not hold, as the treated and control groups had different underlying trends prior to the intervention.

Conversely, if the placebo test reveals no significant differences in trends be-

tween the groups during this pre-treatment period, it supports the parallel trends assumption, suggesting that the treated and control groups were evolving similarly before the actual treatment. This result would imply that any observed divergence in trends after the treatment is more likely due to the treatment itself rather than pre-existing differences.

Table 6 contains the combined results of placebo tests for the Farmer-Labor Party in the North as well as for Republicans overall in the South and Mountain Republicans. In each case we see that our models pass the placebo test, suggesting satisfaction of the parallel trends assumption.

6 Sensitivity Tests

7 Discussion

VARIABLES	(1) Farmer-Labor (1930-1932)	(2) Republican (1930-1932)	(3) Republican (1930-1932)
DistPPr	-0.001	0.257	0.057
	(0.012)	(0.176)	(0.150)
MountainST x DistPPr			0.479
			(0.455)
FarmerST x DistPPr	-1.593		
	(1.021)		
FarmerST x DistPP	0.151		
	(0.512)		
DistPP	-0.004	0.355**	0.269*
	(0.012)	(0.179)	(0.154)
Farmer-Labor Vote Share 1930	0.581***		
	(0.065)		
Log Total Votes, 1930	0.520*	0.515	0.635
	(0.308)	(2.100)	(1.924)
Republican Vote Share, 1930		0.733***	0.710***
		(0.064)	(0.064)
MountainST x DistPP			0.549
			(0.546)
MountainST			8.652***
			(3.248)
Constant	2.016	0.994	7.152
	(3.959)	(13.773)	(13.139)
County FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes
Baseline Geographic Covariates	Yes	Yes	Yes
Baseline Employment/Industry Covariates	Yes	Yes	Yes
Baseline Demographic Covariates	Yes	Yes	Yes
Observations	1,968	1,462	1,462
R-squared	0.959	0.912	0.913

Cluster robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Placebo tests using change in vote share for the Farmer-Labor Party in the North and Republican Party in the South. Standard errors are clustered at the county level and models estimated include fixed effects for county, state, year and state by year.

Keywords: Populism, Jim Crow, rural electrification.

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