FINANCIAL ASSET OWNERSHIP AND POLITICAL PARTISANSHIP:
LIBERTY BONDS AND REPUBLICAN ELECTORAL SUCCESS IN THE 1920S

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ABSTRACT

We analyze the effects of ownership of liberty bonds, which were marketed to households during
World War I, on election outcomes in the 1920s. In order to address the endogeneity of liberty
bond subscriptions, we utilize the local severity of the fall 1918 influenza epidemic, which
disrupted the largest liberty bond campaign, as an instrument. We find that counties with higher
liberty bond ownership rates turned against the Democratic Party in the presidential elections of
1920 and 1924. This was a reaction to the depreciation of the bonds prior to the 1920 election
(when the Democrats held the presidency), and the appreciation of the bonds in the early 1920s
(under a Republican president), as the Fed raised and then subsequently lowered interest rates.
Our results suggest the liberty bond campaigns had unintended political consequences and
illustrate the potential for financial asset ownership to increase the sensitivity of ordinary
households to economic policy decisions.

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1. Introduction

Scholars and pundits alike have long argued that ownership of financial assets influences political behavior. Holding a stake in financial markets, the theory goes, causes households to identify as members of the investor class, shifting their preferences towards business-friendly policies. There is even some evidence that the Bush Administration's 2005 proposal to privatize social security was partly motivated by this theory; by reconfiguring retirement finance, they sought to shape the preferences of the electorate.[1] Yet the political consequences of public policy changes that make financial assets more widely held may not be so simple. Owning financial assets exposes households to the flows of income they produce, but also to the fluctuations in those flows of income. In response to such fluctuations, voters who were induced to hold financial assets may be inclined to punish incumbents when markets perform poorly, or reward them in response to strong returns, in a pattern consistent with models of retrospective voting behavior. Such models (e.g., Achen and Bartels 2016; Healy, Persson, and Snowberg 2017; Hibbs 2000; Key 1966; Kramer 1971) argue that voters' choices are driven by backwards-looking assessments of how well the government has performed during an incumbent's tenure.

We study the electoral consequences of the liberty bond drives of World War I, which induced millions of American households to purchase government bonds for the first time. Prior to the war, relatively few Americans held financial assets other than bank accounts. But ordinary citizens subscribed to the liberty loans at extraordinary rates, and by 1919 the fraction of American households that owned a liberty bond was likely greater than the percentage of modern American households that own stocks.[2] As a result, a large share of the U.S. electorate held financial assets whose value was sensitive to fluctuations in financial markets. And beginning in late 1919, in an effort to restrain the growth of credit and prices, the Federal Reserve enacted a series of extraordinary increases in interest rates. This caused the market

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[1] See Jacobs (2007), Conlan (2008), and Rozell and Whitney (2009).
[2] Data from a 1918-19 BLS survey discussed below indicated that two-thirds of middle-income households owned a liberty bond. Gallup survey data indicates that in 2016, 52 percent of American households own stocks, down from a peak of 65 percent in 2007 (McCarthy, 2016).

prices of liberty bonds to fall, and millions of American households suffered capital losses. Then in 1921 the Fed began to lower interest rates, causing liberty bonds to appreciate again.

Using new data on liberty bond subscription rates, we test whether liberty bonds led to changes in voting outcomes in presidential elections in the 1920s relative to those in the previous decade, in a panel of about 1,400 counties. The 1920s were a period of Republican dominance in presidential politics, with Harding, Coolidge and Hoover winning substantial majorities of the popular and electoral votes in 1920, 1924 and 1928. Previous scholarship has attributed these victories to the breakdown of the coalition that had supported Wilson (Bagby, 1962; Burner, 1968; Murray, 1976). We posit instead that voters responded to changes in liberty bond prices by voting against the incumbent Democrats when they depreciated in value, and later voting for the incumbent Republicans following their appreciation. The results of our empirical analysis indicate that counties with higher liberty bond participation rates did indeed turn against the Democrats, relative to their voting patterns in earlier elections.

Our estimation framework includes county and state-year fixed effects, which control for any time-invariant county characteristics, such as a historical propensity to vote for a particular party, as well as trends in states' political preferences. Yet liberty bond subscriptions may have been influenced by unobservable county attributes not reflected in historical voting patterns, which nonetheless influenced voting behavior in the 1920s. For example, the level of per capita wealth in a county, which was likely an important determinant of liberty bond subscriptions, may have influenced voting outcomes in the 1920s to a greater extent than in the previous decade, as high wartime tax rates made income tax policy questions more politically important. In order to address this possibility, we instrument for liberty bond participation using a measure of the predicted local severity of the fall 1918 influenza epidemic.

The most lethal wave of the epidemic, which occurred in October 1918, coincided the largest of all of the liberty bond drives, the fourth loan. Our measure of the predicted severity of the influenza epidemic is based on a county's distance to large military training camps, which were the most likely source of the epidemic within the civilian population. Greater distance from military camps was strongly correlated with participation in the fourth loan, as the bond drive was hampered by both the influenza

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epidemic itself, and by efforts to control the spread of the epidemic. Our IV estimates of the effect of liberty bond ownership on the Democratic Party vote share indicate that a one-standard-deviation increase in a county's liberty bond participation rate led to a decrease in the Democratic share in presidential elections of 3.3 percentage points on average over the 1920-32 period. The liberty loan campaigns were guided by the ideal of increasing support for the war and sharing the burdens of war finance equitably (Sutch 2015), but their unintended consequences contributed to an electoral backlash against the party that created them.

In order to assess whether the electoral effects of liberty bonds could have been decisive, we estimate the same empirical model using state-level data. We focus on the 1920 presidential election, in which Democrat James Cox won only 12 states and Harding won 37, for electoral vote totals of 127 to 404. Counterfactual estimates of the Democratic Party vote share for the 1920 presidential election by state indicate that in the absence of the liberty bonds, the Democratic Party would have won 12 additional states, but would still have lost the electoral vote. That is, the effect our analysis attributes to liberty bonds contributed significantly to Republican electoral margins but was unlikely to have been decisive.

This paper contributes to the literature on the relationship between the composition of households' wealth and their political beliefs and voting behavior (Guiso et al., 2003; Schreiner and Sherraden, 2006; Ansell, 2014; Lewis-Beck, Nadeau, and Foucault 2013; Rahn and Dancy 2009). Some have argued that the broadening of stock ownership in recent years has led to greater identification with the Republican Party and increases in the Republican vote share (Cotton and Davis, 2012; Duca and Saving, 2008, Lewis-Beck and Nadeau 2011; Rahn and Dancy 2009). However, this literature generally cannot convincingly address the problem that financial asset ownership may itself be influenced by party identification, or by other factors related to party identification (Huberty 2011).[3] This paper contributes to that literature by studying a context with plausibly exogenous variation in financial asset ownership. An additional advantage of our setting is its focus on bond values. The depreciations and appreciations in

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[3] One exception is Jha and Shayo (2017) who experimentally assign financial assets to Israeli and Palestinian voters. See also Jha (2015).

the prices of liberty bonds that occurred between 1919 and 1924 were clearly related to changes in monetary conditions that originated in decisions by the Fed and by the Treasury. In contrast, booms or crashes in the stock market can have a broad range of plausible explanations and in some cases may be seen as only indirectly related to government policy choices. The more direct connection between economic policy and bond prices likely makes our test of pocketbook concerns in retrospective voting somewhat stronger than those conducted with modern stock ownership data.

Our analysis also contributes to the literature on policy feedback. Reversing the notion that public policies result from mass preferences and political participation, the policy feedback literature argues that "policies make politics" by affecting how people define their self-interest, calculate the stakes of politics, understand the meaning of citizenship, and express their political identities (Campbell 2012). Much of this work is focused on social policies, although recently a number of other areas have become part of the literature.[4] A few contributions have considered feedback from policies that stem from military engagements.[5] We contribute to this body of work by analyzing war financing issues, which have not been considered in the literature. We argue that the policy choices political elites make about how to pay for a war "affect what individuals think, feel, and do as members of the polity" (Mettler and Soss 2004). In the case of World War I, bonds were sold to ordinary households not only to help finance the war, but to give them a financial stake in the war effort. Marketing these assets to American households likely had its intended effect on attitudes toward the war. But as we show, it also had more complex and longer-term effects on public attitudes towards economic policy. Turning ordinary Americans into bond owners made them sensitive to changes in interest rates, and likely shifted their preferences towards greater stability and conservatism in public finance.

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[4] These include same-sex marriage (Kreitzer, Hamilton, and Tolbert 2014), tax expenditures (Mettler 2011), criminal justice (Weaver and Lerman 2010), health policy (Barabas 2006, Pacheco 2013) and disaster relief (Chen 2013).

[5] Theda Scokpol's (1992) landmark book on civil war veterans' pensions, in fact, is often seen as field-defining. Another well-known example is Suzanne Mettler's (2005) study of the effects of the GI Bill on veteran's civic participation. And a spate of recent articles has examined the impact of military casualties on support for war (Althaus, Bramlett, and Gimpel 2012), the fate of political incumbents (Grose and Oppenheimer 2007; Kriner and Shen 2010; Karol and Miguel 2007), and voter turnout (Davenport 2015; Koch and Nicholson 2016).

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The policy feedback effects of debt finance have long played a role in American public policy. For example, in 1790 Treasury Secretary Alexander Hamilton argued for the issuance of federal debt to finance the assumption of state debts from the Revolutionary War in part because he understood that doing so would give the wealthy individuals who would buy the new debt an incentive to support his efforts to strengthen the federal government (see Hamilton, 1790). Conversely, the efforts by the Jacksonians to pay off the federal debt were enacted in part to end this source of support for a strong federal government. The liberty loan campaigns of World War I represent a later example of the operation of the same principles, but one in which the longer-term political consequences of the financing decisions may not have been anticipated by policy makers.

Finally, this paper also contributes to a growing literature on the significance of the liberty bond campaigns in American economic history (Garbade, 2012; Sutch, 2015; Kang and Rockoff, 2015; Hilt and Rahn, 2016). Closely related is Julia Ott's *When Wall Street Met Main Street* (2011:54), which analyzes the political significance of the loan drives, arguing that they "propagate[d] an investor theory of political economy." Yet Ott's book mostly neglects the prices of liberty bonds, which we argue are critical for understanding their political consequences. Republican political campaigns in the early 1920s made frequent references to the fact that liberty bonds were trading well below the prices subscribers paid for them. We argue that the most important political legacy of the liberty bond campaigns, which the literature has overlooked, is that they created a large popular class of securities holders who suffered a significant depreciation in the value of their investments under a Democratic president, and then experienced a significant appreciation in the value of their investments under the Republicans.

2. Financing World War I

2.1 Bond Finance

The scale of the expenditures required for the American effort in World War I were completely unprecedented. By 1919, total expenditures of the federal government had grown to $18.5 billion, a

nearly 25-fold increase over the expenditures over those of the years 1913 to 1916.[6] While Treasury

Secretary McAdoo was considering his options for financing the war effort, vigorous debates raged

outside and inside Congress about whether to rely on taxes or debt. McAdoo eventually settled on a plan

for a 1/3rd-2/3rd split between taxes and borrowing; in the end, taxes financed about one-quarter of the cost

the war (Kang and Rockoff 2015; Garbade 2012; Sutch 2015).[7]

In addition avoiding heavy taxation, financing the war through borrowing offered another

advantage. Purchases of war bonds were seen as giving American households a financial stake in the war

effort and increasing support for the war. McAdoo believed that people who were unable to support the

country by fighting would welcome a chance to do their share in the "financial trenches" at home

(McAdoo 1931). It was also believed that bond sales drives would have propaganda value, demoralizing

the enemy if the American public responded with great enthusiasm to the chance to demonstrate their

patriotism.

Policymakers were keen to make liberty bonds attractive to ordinary Americans: "This was

important because the strength of Government finance, like the strength of Government policies, rests on

the support of the people" (U.S. Treasury 1918:7). Several features of their marketing were designed to

facilitate purchases by people of relatively moderate means. The bonds were sold in denominations as low

as $50, and subscriptions could be fulfilled through installment plans, both of which made the bonds

accessible to a broad range of American households.[8] For example, a $50 liberty bond could be

purchased by a payment of $4 up front, and then 23 weekly payments of $2.   In addition, Treasury

allotments were weighted toward smaller investors (Garbade 2012; Sutch 2015). As a result of these

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[6] Carter et al., 2006: table Ea584-587. See also Eisner (2001).

[7] The various War Revenue Acts put in place a steeply progressive income tax structure, lowered personal exemptions, thereby subjecting more American households to the federal tax, added income surtaxes, including a 65% surtax on incomes over $1 million, and levied taxes on "excess" corporate profits, a measure popular with the public and progressive politicians (Gilbert 1970, Rokoff 2012, Saldin 2011; Witte 1985).

[8] Adjusting for inflation, $50 in 1919 is equivalent to about $673 in today's money. This was not an insignificant sum, but an amount similar in magnitude to the cost of many common household appliances. It was feared that bonds of smaller denominations might circulate as money, contributing to inflation.

efforts, tens of millions of Americans became owners of financial assets other than bank accounts for the first time.

Borrowing on such an enormous scale required extraordinary efforts to market the bonds. McAdoo studied the experience of the Civil War for insights into the design of such efforts. As one method of raising revenue, then-Treasury Secretary Salmon Chase tapped the financier Jay Cooke to try and sell government debt directly to ordinary Americans. Cooke did so by organizing a sales force paid on commission. Motivating sales agents through financial self-interest, McAdoo believed, was a "fundamental error…Chase did not capitalize the emotion of the people, yet it was there and he might have put it to work" (McAdoo, 1931, p. 374). McAdoo put the emotion of the American people to work in the marketing of liberty bonds. Rather than the continuous sale of a single issue, the loans were marketed in a series of campaigns, each with a specific opening and closing date and sales goal, in order to keep engagement levels high. A final victory loan drive was conducted after the Armistice.

Table 1 presents summary data on each of the individual loan drives. The bonds were all sold to investors at par, meaning that their initial yield to maturity was equal to their coupon rates. As the high levels of government borrowing began to put pressure on credit markets, the later bonds were issued with higher coupon rates. All told, the five bond drives raised around 24 billion dollars. As a constant share of GDP, this would be equivalent to more than $5 trillion today.[9] Sales of the fourth Liberty Loan alone totaled nearly seven billion dollars, with nearly twenty-three million people, more than 20 percent of the U.S. population, subscribing.

2.2 The Liberty Loan Drives

The organization and conduct of the liberty loan campaigns has been described in detail elsewhere.[10] Briefly, the Treasury Department directed the Federal Reserve Banks to manage bond sales within their geographic districts. They did so by creating state liberty loan committees that in turn

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[9] Calculations based on Williamson (2015).
[10] See St. Clair (1919); Greenough (1922); Whitney (1923); Kennedy (2004); Ott (2011); Kang and Rokoff (2015); Sutch (2015); and Hilt and Rahn (2016).

selected local notables to comprise county- and city-level organizations. Virtually all of civil society was

enlisted by these committees, and organizations as diverse as women's clubs, the Boy Scouts, and

fraternal and religious organizations all contributed to the effort.   Local committees recruited a salesforce

from these associations, forging "patriotic partnerships" (Skocpol et al. 2002) to market the bonds as

broadly as possible. Over two million people volunteered as foot soldiers for McAdoo's financial army

(U.S. Treasury, 1919). Shoe leather was augmented by extensive advertising and promotion in

newspapers, magazines, movie theaters, and department stores. The nation's economic institutions did

their part too. Employers released their workers for liberty loan events, larger companies offered payroll

deduction to employees as a way to pay for liberty bond subscriptions, and the nation's commercial banks

advertised the loans to their customers, processed their subscriptions, and offered them safety deposits

boxes free of charge for their liberty bond certificates.

Some perspective on the extent to which ordinary households were induced to purchase the bonds

can be found in data collected by the Bureau of Labor Statistics (BLS) in 1918-19. In those years, the

BLS conducted one of the first-ever surveys of American households' incomes and expenditures.

Although it was unconnected to the liberty loan drives, the households' responses to the survey's

comprehensive questions revealed whether they had purchased liberty bonds within the previous year.

The BLS surveyed nearly 13,000 families in the middle of the earnings distribution, who resided in 99

cities.[11] Among the surveyed households, nearly 68 percent had purchased a liberty bond in the previous

year.[12] This is considerably higher than the rate at which households near the median of the income

distribution today own shares of corporate stock, the most widely held risky financial asset.[13]

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[11] The data from the original survey manuscripts were are collected and presented in Olney (2005).   Further
information on the surveyed households is presented in Feigenbaum (2016).
[12] Authors' calculations from the data in Olney (2005).
[13] In the 2016 Survey of Consumer Finances, 51.8 percent of households whose income was between the 40th and
60th percentile of the income distribution owned stock, either directly or indirectly.

Some of the rhetoric of the liberty loan campaigns emphasized the attractiveness of the returns that the securities would offer.[14] Yet these were negotiable securities whose values were subject to market forces, and uninformed investors with no experience with financial assets may not have understood that the prices of the bonds could fall. Secretary McAdoo's later testimony in Congress suggests he did not anticipate that a depreciation of liberty bond prices would anger ordinary investors:

> There is a curious feeling in the breast of the average man that if he buys a Government bond…[and then] gets tired of his investment and wants to get his money back, that he ought to be able to sell that bond at par…It is extraordinary the extent to which that feeling exists…It is a perfectly unreasonable feeling…[15]

The Treasury did offer non-negotiable war savings stamps to investors of more modest means; for example, stamps that paid $5 in 1923 were sold for just above $4 in January 1918 and could be redeemed prior to 1923 on a fixed schedule of prices (see Garbade, 2012: 66-67). Many investors would likely have been better off purchasing war savings stamps, or some vehicle like them, but the Treasury did not promote them as aggressively.

2.3 Evolution of Liberty Bond Prices

The World War I years were a period of high inflation in the United States, due in part to rapid expansion of money and credit (see Friedman and Schwartz, 1963). Yet even after the Armistice in November of 1918, money and credit growth continued, as did inflation. National banks had committed to lend to subscribers to the fourth loan and the victory loan at 4.25 percent until late 1919, as part of a "borrow and buy" program that helped sell the issues (Meltzer, 2003: 93). The Fed supported this program by offering a discount rate that generally ranged from 4.0 to 4.25 percent, and then-Treasury Secretary Carter Glass, who was by nature of his office Chair of the Federal Reserve Board, opposed any

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[14] For example, an article in *McClure's* magazine in November 1917 stated, "when peace comes liberty bonds will have no rivals as investments. Remember, therefore, that when you subscribe you are not only helping the Government, but yourself as well" ("Line forms to the Right for Liberty," pg. 48).
[15] Testimony before the House Ways and Means Committee, 1918, reproduced in U.S. Treasury (1921).

rate increase.[16] Inflation continued, and concerns mounted that artificially low interest rates were fueling speculation.

Finally, in December 1919, the Treasury withdrew its objection to rate increases, and the Federal Reserve Banks began to raise their discount rates, with the blessing of the Board. Partly as a result of its inexperience with such matters, these rate increases were "not only too late but also probably too much" (Friedman and Schwartz, 1963: 231). The New York Fed's discount rate was increased from 4 percent to 4.75 percent in December 1919, then 6 percent in January 1920, and finally 7 percent in June 1920, an extraordinary level that was not reached again until the 1970s.[17] Some of the Reserve Banks began to impose "progressive" or increasing rates on banks that were heavy borrowers at their discount windows as well (Melzer 2003: 106). This induced a rapid contraction in financial markets and in economic activity, triggering a severe recession. The Fed began to lower its rates in April of 1921 in a series of 0.5 percent cuts that ultimately brought the discount rate back down to four percent by June 1922.

Liberty bond prices were closely connected to these changes in the Fed's policies. The increases in the Fed's rates in 1919-20 led to increases in the yields on liberty bonds, which were produced by a fall in prices. In addition, large quantities of the issues that had been purchased through the "borrow and buy" policies were sold by the original subscribers when the rates on loans collateralized by liberty bonds increased; this selling pressure likely contributed to the fall in prices as well.[18]

Figure 1 shows how this process unfolded. Panel (a) shows the New York Fed's discount rate, and how it ratcheted up quite steeply in late 1919 and early 1920 and was then lowered beginning in 1921. Panel (b) presents the steep drop in the prices of the loans that resulted, in a pattern that varied

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[16] On the struggle between the Fed and the Treasury over the appropriate course of monetary policy during this era, see Meltzer (2003) and Wicker (1966).
[17] Whereas today, the Federal Reserve quotes a single discount rate, in the 1920s each of the twelve Federal Reserve District Banks could quote their own somewhat different rates, subject to the approval of the Federal Reserve Board. By December of 1920, five of the twelve reserve banks' discount rates had been raised to 7 percent; the remaining rates were all 6 percent.
[18] As Wicker (1966: ch. 3) notes, part of the goal of the change in discount rates was exactly to stimulate such sales, as the Fed was concerned that too much of the liberty bond issues were held by the commercial banking system.

inversely with the New York Fed's discount rate. Beginning in 1921, those prices begin to recover, and the price increases continued into 1922-24.

An indication of the effects of these fluctuations for ordinary investors during the presidential campaigns of 1920 and 1924 can be found in Figure 2, which presents the cumulative returns received by subscribers to the fourth loan, in both nominal and real terms. Over the two years between the issuance of the bond and the 1920 election, the depreciation in the prices of the bonds dominated the coupon income, and the total cumulative returns received by holders of the fourth loan were negative: -5.8 percent.[19] The subsequent appreciation of the bonds produced very strong returns over 1921 and 1922, and by the time of the 1924 election, cumulative returns had risen to 32.3 percent, slightly better than what a constant 4.25 percent annual yield would have produced.

Panel (c) of Figure 1 presents an additional consequence of the Fed's tightening: deflation, and in particular a sharp decrease in commodities prices. The collapse of farm product prices in 1920-21 had devastating effects on rural areas and presents an alternative potential source of discontent regarding incumbents in the 1920 elections that will be addressed below.

3. Political Impact of Liberty Bond Price Changes: Narrative Evidence

The fall in liberty bond prices in 1919-20 was widely reported in the financial press and aroused considerable agitation. Given that millions of households had been induced to become bond holders by the federal government, the collapse in their values was perceived as a betrayal. In one response, Representative Walter Magee, a Republican from New York, introduced HR 501 in April of 1920, calling for the appointment of a special bipartisan committee to investigate the decline in liberty bond prices. In a hearing before the House Rules Committee a month later, Magee inserted in the Congressional Record a variety of written material from around the country accusing the government of reneging on its promise to provide its patriotic citizen investors with the safest investment in the world. The public, the committee

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[19] The cumulative returns paid by the third loan up through November 1920 were -3.8 percent. The details of these calculations are presented in the Appendix.

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was informed by the editors of the *Syracuse News*, was "disillusioned—distressingly so…It is sore and disgusted and does not disguise the fact." The editorial went further, averring that the people of the United States "will not care to be singed twice in the same place" should the government need to come calling again (U.S. Congress 1920).

For most liberty bond owners, the capital losses suffered as a result of the price depreciation were probably relatively modest. At its nadir, the price of a $50 share of the forth liberty loan was about $42.50, implying a loss of about $7.50. For comparison, the median income of liberty bond owners in the BLS survey was about $1,500. In the context of a deep recession and rise in interest rates, many households likely suffered far greater losses on the values of their homes, on crop income due to the fall in agricultural commodity prices, or in labor income if they became unemployed or saw their hours reduced. But this is precisely why the depreciation of the bonds aroused such rancor: at a time when the money was needed most, 15 percent of it was gone. Although these were merely paper losses that would be reversed if the bonds were held to maturity, many subscribers of modest means had to sell their bonds at the bottom of the market "to furnish cash for living expenses."[20]

During the 1920 campaign, the Republicans seized the opportunity to criticize the Democrats for the financial mismanagement that they claimed had led to the price declines. The Republican National Committee ran newspaper advertisements in several states that pointed out that after making sacrifices to buy the bonds, subscribers "must make further sacrifices, if compelled to sell those Liberty Bonds, in order to meet the abnormal conditions confronting you…"[21] But perhaps the clearest indication that the welfare of liberty bond subscribers was central to the 1920 election campaign was their prominent appearance in the Republican Party platform:

> The fact is that the war to a great extent, was financed by a policy of inflation, through certificate borrowings from the banks, and bonds issued at artificial rates sustained by the low discount rates established by the Federal Reserve Board…The results have been a greatly increased war cost, *a serious loss to the millions of people who, in good faith, bought liberty bonds and victory notes at par* (emphasis added).

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[20] *Evening Star* [Washington D.C.], 16 October 1920.
[21] *Logan [Utah] Republican*, 21 October 1920. This ad was run in many other papers; see the Appendix.

The Republicans appealed to securities holders who had seen their investments fall in value, and their message likely resonated among a broad segment of the electorate.

Harding won with a substantial popular and electoral majority. Some commentary following the election did suggest that the depreciation of liberty bonds was among the "fundamental causes" of the Democrats' defeat.[22] One commentator suggested a connection between the enfranchisement of women and the turn against the Democrats: since many women "pinched and saved" to purchase liberty bonds, only to see those investments lose value, "women changed many normal Democratic votes to Harding."[23]

As the Fed eased interest rates in 1921 and 1922, liberty bonds appreciated in value. Senator Simeon D. Fess of Ohio, in a speech construed to be a semi-official announcement of Harding's re-election bid, extolled the accomplishments of the President and invited the public to behave just like models of retrospective voting say they ought to: "President Harding has been in office just two years. Those two years have been crowded with a great volume of constructive and remedial work. *The record is now made up; the results are apparent upon which the people must give their verdict of approval or disapproval* (emphasis added)."[24] The return of liberty bonds to par was specifically mentioned by Fess as an indicator of the prosperity occasioned by the Administration's policies.

Harding did not live to see himself re-nominated. His vice-president, Calvin Coolidge, succeeded him, and received the Republican nomination for president the next year. Despite Democratic charges of corruption and a whistle-stop campaign featuring a Signing Teapot (Shulman 2015), Coolidge went on to a comfortable win. The Republican Party platform of 1924 began by reminding voters just how bad things were when the party took over: "there were four and half million unemployed; industry and commerce were stagnant; agriculture was prostrate; business was depressed; *securities of the government were selling below their par values*" (emphasis added). Now, thanks to Republican rule, especially its economic policies, things were considerably improved: The federal budget deficit had been erased, taxes lowered, and "*[g]overnment securities increased in value more than $3,000,000,000.*" If

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[22] *Montgomery Advertiser*, 11 November 1920.
[23] *Philadelphia Inquirer*, 5 November 1920.
[24] "Harding Certain 1924 Candidate, Fess Declares." *Chicago Daily Tribune*, 10 April 1923, p. 7

holders of liberty bonds behaved as retrospective voters, we would expect them to "Stay Cool with Coolidge" by rewarding his administration with their votes.

Although some portion of the fluctuations in liberty bond prices that occurred during 1919-24 was clearly beyond the immediate control of the President or Congress, retrospective voters who owned liberty bonds and attributed at least some part of the fluctuations in their value to their elected officials would have been critical of the Democrats in the 1920 election, and supportive of the Republicans. The historical record indicates that political elites were aware of this potential, and the Republicans incorporated statements about liberty bond prices and returns into their appeals to voters. But it remains to be seen whether those appeals were effective, and whether liberty bond ownership actually mattered for election returns.

4. Data and Methods

For the purposes of this paper, we assembled a new dataset of county liberty bond subscriptions for several Federal Reserve Districts. In this section we provide a brief overview of our sources and variable definitions; more detail is provided in the Appendix.

Our subscription data were collected from pamphlets published by the Federal Reserve Banks' liberty loan committees, which presented information on sales of one or more liberty loans to help with marketing a subsequent loan. We focus our analysis on the Fourth Liberty Loan, the largest issue, and the one for which we found data for the greatest number of counties. As we are interested in voting outcomes, we utilize data on subscription rates, defined as the number of subscribers reported for a county, divided by the county's 1920 population. The fourth loan had the highest participation rates of all the loans, and the subscription rate for that loan provides a reliable indicator for the minimum extent to which the county participated in the liberty bond drives.

We match these liberty bond subscription rates to data on county voting patterns from a dataset compiled by Clubb, Flanigan and Zingale (2006). In order to control for county characteristics, we also match these counties to 1920 county characteristics reported in historical federal censuses, compiled in

Haines (2010). Summary statistics for the 1920 values of the main variables in the dataset are presented in Table 2. As we are focused on electoral outcomes, these summary statistics, and all of the subsequent statistical analysis, are weighted by 1920 population.

Our liberty bond subscription data is illustrated in Figure 2, which presents a map of the counties for which we have data for the fourth loan, shaded by the level of subscriptions. The irregular pattern of coverage reflects the fact that we have data for this loan from the Fourth District (Cleveland Fed), Fifth District (Richmond), Eighth District (St. Louis), Ninth District (Minneapolis), and Twelfth (San Francisco), plus the state of Iowa. The data in the figure present some clear regional patterns: subscription rates were relatively low south of the Mason-Dixon line and higher in the upper Midwest and West.

This presents a challenge for the analysis: geographical variation in liberty bond participation rates may produce spurious correlations with variables with similar geographic patterns, including voting outcomes. In order to address this issue, we estimate the effects of liberty bonds in a panel framework with county fixed effects and state-year fixed effects, so that the influence of any fixed county characteristics (such as location) are eliminated, and the differences over time are estimated only from variation within states' borders. Later in the analysis, we will also utilize an instrumental variables framework to address the endogeneity of liberty bond participation rates.

5. Estimation

5.1 OLS Results

In order to analyze the effects of liberty bond participation on election outcomes, we estimate the following model of the democratic vote share in presidential elections, from 1908 to 1932:

$$Demshare_{ist} = \alpha_i + \gamma_{st} + \delta libloanparticip_i \times post18_t + \beta X_{it} + \varepsilon_{it}, \qquad (1)$$

where α_i is a county fixed effect, γ_{st} is state-by-year fixed effects, $libloanparticip_i \times post18_t$ is an interaction between the county's liberty loan participation rate and an indicator for elections in the years following the liberty loan campaign, and X_{it} is a vector of 1920 county characteristics, also interacted

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with a post-1918 indicator. The main coefficient of interest is δ, which represents the differential effect of liberty loan participation in elections following the liberty loan campaigns.

Table 4 presents the results. Column (1) in Panel A presents the estimates from a baseline specification which includes post-1918 interactions with 1920 county homeownership rates and the fraction of the population residing in major urban areas, variables that likely influenced both liberty bond participation and electoral outcomes. The estimated effect of liberty bonds implies that a one-standard-deviation increase in participation led to a decrease in the Democratic Party vote share of about 1.3 percentage points (=-0.12 × 11.1). As the median margin of victory for the Republican Party among the sample counties was 5.6 percentage points, this effect is modest, but not irrelevant.

The recession induced by the Fed's tightening in 1919-20 created significant financial distress, which was concentrated in agricultural areas (Jaremski and Wheelock, 2018). If the geographical intensity of these shocks was correlated with liberty bond participation, then this may account for the change in voting patterns attributed to liberty bond participation in column (1). In order to address this possibility, in the remaining columns of Panel A, we include variables related to the extent of economic distress in agriculture as additional controls. Consistent with economic dislocations causing voters to turn against the Democrats, change in crop income from 1919-24 (column (2)) had a positive effect on the Democratic vote share, and the amount of suspended bank deposits per capita in 1920 (column (3)) had a negative effect. During the war years, wheat prices were partly controlled, whereas cotton prices were not, and wheat farmers resented the Democrats' preferential treatment of Southern cotton growers (Bagby, 1962; Burner, 1968). Although the collapse of wheat prices beginning in mid-1920 was not as severe as that of cotton prices (see the Appendix), wheat farmers may have been especially likely to turn against the Democrats, and the estimate associated with the fraction of acres devoted to wheat (column (4)) indicates that this was indeed the case. Yet none of these variables substantially changes the estimated magnitude of the effect of liberty bonds on election outcomes in the 1920s.

Many German-Americans opposed Wilson's decision to enter World War I and resented the terms of the Treaty of Versailles, while immigrants from other countries opposed the League of Nations

and the Democrats' anti-immigration agenda (Bagby, 1962; Burner, 1968). For these reasons, immigrants turned against the Democrats in the early 1920s (Tabellini, 2017). As immigrants were singled out by the liberty loan campaigns and purchased the bonds at high rates (Hilt and Rahn, 2016), their voting patterns in the 1920s, which may not have been driven by the returns to owning liberty bonds, could be responsible for our results. Yet including measures of the fraction German born or foreign born (Panel B of Table 3, columns (1) and (2)) does not affect the magnitude of the estimated effect of liberty bonds on the Democrats' vote share.[25] Finally, in columns (3) and (4) of Panel B, measures related to wealth and inequality—tax returns per capita, and farm tenants per capita—are included. Again, the parameters associated with liberty bonds are not substantially changed.

To explore the timing of the estimated effects in greater depth, we re-estimate equation (1) with a modified specification in which we replace the post-1918 liberty bond interaction with election-by-election interactions. This enables us to observe the changing magnitudes of the effects over time, and also to address the possibility that the estimated post-1918 effects represent the outcome of an ongoing differential trend. The estimates of a specification with all the same controls as that of column (1) in Table 3 is presented in Figure 4.

Reassuringly, the pre-1920 estimates display no apparent downward trend over time; the large negative effect of liberty bond participation appears for the first time in 1920. Liberty bond prices were relatively stable in the second half of the 1920s, and over time the amount in the hands of the initial subscribers decreased, and the U.S. Treasury purchased outstanding shares with the proceeds of new debt offerings. As a result, liberty bond prices lost their political salience over time, and one would expect the effect of liberty bond subscriptions to diminish substantially after 1924. Consistent with expectations, the

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[25] The positive sign of the parameters for German born and foreign born reflects the fact that it is estimated for all post-1918 presidential elections. In the Appendix, we show results for election-by-election interactions which indicate a strong negative effect for the share German born in the 1916, 1920 and 1924 elections, which are then reversed in the 1928 and 1932 elections.

magnitude of the effect of liberty bonds on the Democratic Party vote share decreases significantly in 1928 and 1932, relative to 1924 and 1920.[26]

5.2 An Instrument: Predicted Severity of Influenza

The campaign for the fourth loan, which was conducted between September 28 and October 19, coincided with the beginning of the most significant wave of the 1918 influenza epidemic in the United States.[27] Efforts to promote the fourth loan were hampered by many individuals' reluctance to attend public events for fear of exposure to influenza, by sickness and incapacitation among the members of the organizations tasked with promoting bond sales, by lost incomes due to illness and business closures, and by measures imposed to halt the spread of the epidemic, such as prohibitions against public assemblies.[28] Treasury officials stated that the epidemic created "a great handicap" for the loan campaign.[29] The goals for the campaigns' total sales were ultimately met, but the subscription rates within the population—the focus of this study—were likely reduced, as the campaign organizers leaned more heavily on institutional purchasers to meet their sales goals. If the epidemic reduced subscription rates to varying degrees around the country, and if it had no consequences on election outcomes beyond those resulting from its effects on the loan campaigns, then it would represent the source of a valid instrument.

With regard to the exclusion restriction, there is some evidence that the influenza epidemic did not have significant direct electoral consequences. Achen and Bartels, for example, review the existing literature and present a careful analysis of the 1918 Congressional elections. They conclude that voters "thought of the pandemic as part of the natural world rather than as part of the social world" and did not punish incumbents in places where the outbreak was more severe (2004: pg. 34).

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[26] One concern that might be raised about these estimates is that they focus only on the fourth loan, whereas the population clearly also subscribed to the other loans. In the Appendix, we show that these results are robust to controlling for participation in the second and third loans for the limited set of counties for which we have data for all three loans.

[27] The 1918 influenza epidemic occurred in three waves: the first around March of 1918, the second and most widespread and deadly in the fall of 1918, and the third in early 1919. See Crosby (2003) and Byerly (2005).

[28] The latter included prohibitions against public gatherings, which resulted in the cancellation of some Liberty Loan parades and rallies; the closure of movie theaters, where the bond purchases were promoted; and the closure of churches and schools. See Bootsma and Ferguson (2007).

[29] "Appeal to Nation to Tax Resources in Buying Bonds," *New York Times*, 10 Oct. 1918.

The severity of the outbreak did vary significantly across the country. Influenza deaths per 100,000 residents for seven major cities are plotted in Figure 5. Among the cities in the figure, there was considerable variation in the severity of the influenza epidemic, both during the fourth loan campaign and overall, with Philadelphia enduring more than 600 deaths *per day* during the week of October 19, whereas Portland and Minneapolis suffered to a far lesser extent. Unfortunately, data on influenza deaths are available only for a small number of cities, and deaths from all causes are available only for a few hundred.[30]

Yet the observed death rate from the disease may not, in fact, accurately reflect the extent to which the influenza epidemic hampered the fourth loan campaign. Efforts to halt the spread of the disease, such as local prohibitions against public gatherings, likely suppressed both influenza and the bond drive.[31] Alternatively, in cities where the campaign was permitted to be prosecuted aggressively with large parades and public rallies, the bond drive may have spread influenza and increased the number of deaths from the epidemic.[32] Both cases would produce a positive correlation between liberty bond participation and influenza deaths, obscuring the deeper negative relationship between the two.

Instead, we utilize a measure of the predicted severity of the epidemic, based on proximity to its source within the United States: military camps. During the war, draftees were sent mainly to 32 large camps to receive training, and sometimes later sent to a handful of additional camps to prepare for deployment overseas. These camps were often quite overcrowded, and as they were populated by young men—those at an age that made them unusually vulnerable to the 1918 influenza—they constituted an

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[30] Weekly data on influenza deaths are available for 45 American cities. Unfortunately, the cities are not geographically representative (five are located in Massachusetts alone), and are often incomplete—many cities made influenza a reportable cause of death well after the death rate from influenza had risen significantly. The raw data are from US Bureau of the Census (1917-1920), and also reported in Ministry of Health (1920) and Crosby (2003). Monthly data on deaths from all causes are available for about 530 cities in about 370 counties in US Bureau of the Census (1920).

[31] Suggestive evidence of the effectiveness of these measures is presented in Hatchett et al (2007), Bootsma and Ferguson (2007), and Markel et al (2007).

[32] For example, the decision of the Mayor of Philadelphia to permit a huge Liberty Loan parade to be held on September 28, against the objections of some local public health officials, may have contributed to the severity of the outbreak in that city (Hatchett et al., 2007). Crosby (2003:53) notes that public health officials in Chicago permitted a Liberty Loan parade to be held, but in a reflection of the state of medical knowledge at the time, "instructed all of the marchers to go home right afterwards, remove all clothing, rub the body dry, [and] take a laxative" in order to reduce the risk of contracting influenza.

ideal environment for the spread of the epidemic.[33] Although the camps were put under quarantine when large numbers of soldiers fell ill, these quarantines were often enacted too late and enforced imperfectly, making the armed forces "the foci from which the civilian population received the disease."[34]

The locations of the military's camps are shown in Figure 6. Proximity to these camps has been linked to the severity of the influenza epidemic; Crosby (2003:71), for example, suggests that Philadelphia's location near both Camp Dix and Camp Meade contributed to the outbreak in that city. In addition, the movements of troops spread influenza not only among the camps, but also into the civilian populations along the routes followed by railroads that connected the camps' locations. We therefore use the average distance from a county to each of the camps, depicted in Figure 6A, as our measure of predicted flu severity. These distances for our sample counties are illustrated in Figure 6B.

To verify that these distances are correlated with the severity of the 1918 influenza outbreak, we investigate their relationship with mortality rates within the 369 counties for which deaths from all causes can be observed.[35] And in order to verify that any October 1918 mortality effect does not simply reflect something present in all months (say, due to persistent differences in public health conditions or demographics), the relationship between county distance to the camps and mortality is estimated for every month in 1917 and 1918, in a framework with county fixed effects. The estimated coefficients, presented in Figure 7, show very clearly that distance to the camps was an important determinant of county mortality in October 1918, but not in other months. The negative effect on mortality in October 1918 has a large standard error but is nonetheless consistent with a substantial mortality advantage during the fall influenza outbreak.

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[33] The influenza epidemic was so acute within the military that total deaths due to influenza among American military personnel were similar in number to deaths in combat. See Byerly (2010).

[34] Crosby (2003: 56). Similarly, Byerly (2005: 79) notes that "the epidemic in the United States most likely originated in military installations."

[35] These data are constructed from monthly death rates from around 530 cities located in 369 counties. The city data are summed for each county, and then divided by the county's 1920 population. This introduces some noise into the measure, both because some counties contained cities for which no death data are reported, and because the county population was likely different in 1918.   The raw data are from U.S. Bureau of the Census (1920).

The validity of the distance measure as an instrument for participation in the fourth loan is explored in Table 6. The table presents cross sectional regressions of the relationship between distance to camps and participation in the fourth loan for the 1,426 counties for which we have liberty bond data. (These are cross-sectional versions of the first stage from the panel regressions presented below.) The regressions include state fixed effects, which means that the parameter on the distance to camps variable is estimated only from within-state variation in those distances. The results in columns (1) and (2) indicate that distance from military camps had a robust positive effect on liberty bond participation, consistent with greater distances resulting in a less severe outbreak of influenza, and therefore fewer influenza-related problems in the conduct of the bond drive. In order to address any remaining concern that the result could be somehow driven by the South, in column (3) all counties from Southern states are deleted from the sample, and the result remains largely unchanged.

The mechanism behind the distance measure proposed here is that its effects operate through the influenza outbreak, and not through other institutional or economic characteristics that may also be correlated with distance from the camps. In order to address the latter possibility, column (4) presents a falsification test: the distance measure (and other county characteristics) are regressed on participation rates for the third liberty loan, which was conducted in April 1918—before the lethal influenza outbreak in the fall. If distance to the camps led to higher participation in the fourth loan because it was correlated with institutional or economic characteristics associated with greater wealth or higher levels of civic engagement, then it should also be correlated with higher participation in the third loan. Yet the estimate in column (4) indicates that its effect on the third loan is far smaller. Reassuringly, most of the other estimates are similar to those in column (2), indicating that the determinants of participation in the third loan were generally similar to those of the fourth loan.

Additional evidence in support of the hypothesized relationship among distance from the camps, influenza, and the fourth loan campaign can be found in an official account of the progress of the drive for

the fourth loan printed in newspapers on October 18, including the *New York Times*.[36] The statement

included one-sentence accounts of the state of the campaign in each district, some of which mentioned

problems related to influenza, whereas others did not. For example, the statement from the Federal

Reserve Bank of Philadelphia was "Making a real battle against enormous odds caused chiefly by

influenza," whereas that of San Francisco said simply "Maintaining steady increase in face of bad

agricultural conditions in some sections." Comparing the average distance to military camps among the

counties in districts where influenza was and was not mentioned as an important hindrance to the loan

drive reveals that the districts where influenza was not mentioned were indeed located farther away from

the military camps, by about 215 km.[37]

5.3 IV Estimation

We now turn to IV estimation of our model. The equation to be estimated is the same as (1), with

county and state-year fixed effects, only the $libloanparticip_i \times post18_t$ variable will be instrumented with

$distancetocamps_i \times post18_t$. The results are presented in Table 5.[38]

Column (1) in the table presents baseline OLS results, and column (2) presents the results of the

same specification estimated with 2SLS. The main parameter of interest, the effect of liberty bond

participation on the Democratic Party vote share, is more than twice as large than the OLS estimate.   The

greater magnitude of the estimate may reflect the subset of the population from which the parameter is

identified: persons who were induced to purchase liberty bonds, or not to purchase liberty bonds, purely

as a result of their county's distance to military camps (and therefore, the local severity of the influenza

epidemic). The severity of the influenza epidemic impacted the conduct of the liberty loan campaign,

often resulting in canceled parades and rallies. Investors who purchased liberty bonds due to the relative

mildness of the influenza epidemic in their area were therefore likely induced to do so by attending one of

those events. They are therefore likely to have been less committed to purchasing liberty bonds, either

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[36] "Bond Sales Reach 4 Billion Mark, With 2 Days Left," 18 October 1918.
[37] These data are presented in section 3.5 of the Appendix.
[38] In section 3.5 of the Appendix, we present IV results with election-by-election interactions.

due to financial resources or ideology, and probably can be thought of as marginal investors in the bonds. These are exactly the investors for whom a fall in the bond's prices would have constituted a surprise and betrayal, and it is not unreasonable to imagine that they may have responded to a greater extent in their voting than the average liberty bond investor. It is not surprising that the local average treatment effect for this subgroup could be quite large.

Columns (3)-(5) add some of the same controls as in Table 4; the first stage of each equation is presented in the lower panel. Particularly important is the regression in column (5), where we control for the fraction of the county's agricultural acreage devoted to wheat. As noted above, wheat farmers may have been particularly resentful against the Democrats, and the average distance to military camps was often quite high in the wheat-growing regions of the upper West.[39] The positive correlation between the instrument and this marker for differential hostility to the Democratic Party could therefore explain our IV results. Yet controlling for wheat acreage does not change our main estimates.

Our preferred specification is that of column (2). The estimated effect of liberty bonds implies that a one-standard-deviation increase in subscription rates led to a 3.3 percentage point (=-29.9 × 0.11) decline in the Democratic Party's vote share in the elections of the 1920s. Another way to judge the size of this effect is to note that it implies that the Democratic Party's vote share fell by a population-weighted 6.1 percentage points on average across all sample counties, due to the effects of liberty bonds. This is a reasonably large effect, but it is estimated for only about half of American counties. To determine whether it was actually decisive, we later estimate a similar model at the state level.

One natural concern about these results relates to the exclusion restriction for the instrument. One can certainly imagine channels through which proximity to military bases may have influenced electoral outcomes that were unrelated to influenza. However, it is worth noting that many of these potential channels would operate in the opposite direction of the one observed. For example, some of the military camps were closed at the end of World War I, and one might imagine that the decline of economic activity associated with the demobilization in the areas surrounding the camps may have led to

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[39] The correlation between the distance instrument and wheat acreage is 0.171.

discontent with incumbent politicians. Yet Table 6 presents the reduced-form version of our IV model and shows that the effect was the opposite: the closer a county was to military camps, the less likely they were to turn against the incumbent Democrats in 1920 or toward the incumbent Republicans in 1924. Similarly, one might imagine that high levels of influenza mortality may have led to frustrations with the public response to the epidemic, leading to discontent with incumbents. Yet once again, the effect is the opposite: places with *lower* flu mortality were more likely to turn against the incumbent Democrats to a greater extent, relative to their historical voting patterns.

5.4 Further Validation of the Instrument: Household-level Data

Additional insight into the mechanisms through which the instrument influenced liberty bond subscriptions can be found in the micro-level data from the 1918-19 BLS survey, available in Olney (2005). The survey was administered in 99 different cities, creating variation in the distance measure among the responding households, and the survey instrument accounted for all household income, expenditures, and savings. In addition, the survey dates ranged from July 1918—before the fourth liberty loan and the influenza outbreak—until February 1919, well afterwards. Comparisons between surveys from before and after the fourth loan can therefore serve as additional falsification tests for the instrument; distance to the military camps should not matter for liberty bond subscription rates until the fourth loan and the influenza outbreak of October 1918.

Table 7 presents the results of household-level regressions of a binary indicator for the purchase of a liberty bond within the previous year on various household characteristics. Column (1) presents a baseline specification, using surveys administered following the fourth liberty loan campaign. The reported estimates indicate that greater log income was associated with a higher probability of liberty bond purchases, and, consistent with the IV results presented above, greater distance from the military camps was also associated with a higher probability of a liberty bond purchase. But in addition, the regression includes an interaction between log income and distance, and the estimated effect is negative: in cities farther away from military camps, the effect of log income on liberty bond subscriptions was

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smaller. If this is an indication that the more extensive loan campaigns conducted in regions where the influenza outbreak was less severe, then this could account for the greater magnitude of the IV estimates presented above.

Column (2) adds an indicator equal to one if a household subscribed to a newspaper in the past year (as indicated in the survey by some amount spent on newspapers). This is positively associated with liberty bond purchases, indicating that better-informed households were more likely to subscribe. The estimated interaction between newspaper subscriptions and distance reported in the table is negative, a possible indication that the more extensive liberty loan campaigns in the regions where influenza was less severe reached less-informed households. However, this effect is imprecisely estimated.

Finally, columns (3) and (4) estimate the same regressions using the responses to the survey administered prior to the fourth loan and the influenza outbreak. These likely reflect the effects of the third liberty loan campaign. The results indicate that, as in columns (1) and (2), household income was an important determinant of liberty bond purchases. However, distance to the military camps was not, and there was no income-distance gradient as with the fourth loan. This is inconsistent with the notion that distance to the camps led to liberty bond subscriptions through some mechanism other than influenza.

5.5 Mechanisms Behind the Effects

We argue that fluctuations in the liberty bonds' values induced voters to punish or reward incumbents in presidential elections. An alternative explanation for our results could be that the ownership of financial assets caused voters to join the investor class and support business-friendly politicians. As the business-friendly candidates were the Republicans, the empirical implications of the alternative story are the same.

Some suggestive evidence of the importance of the price fluctuations can be found in Republican political rhetoric, which appealed to liberty bond subscribers not merely as securities holders, but as the owners of depreciated securities. For example, among the most contentious issues in 1920s politics was the plight of World War I veterans, and proposals to pay them a bonus in compensation for the low (real)

value of the wages they had received during the war. Harding rejected such proposals during the 1920

campaign, arguing that the additional borrowing they required would cause a further depreciation in

liberty bond prices.[40] When Congress later passed a bonus bill, President Harding vetoed it.[41]

Additional evidence can be found by examining the outcomes of Congressional elections. The

sale of the liberty bonds and the subsequent policy decisions that influenced liberty bond prices, were

conducted by the executive branch. Voters upset about price depreciations or pleased with price

appreciations should have responded by punishing or rewarding the incumbent in presidential elections.

They would therefore be more likely to vote in Congressional elections in presidential election years. In

contrast, if voters' holdings of liberty bonds made them feel like members of the investor class and

supportive of business-friendly policies, they should have voted for Republicans at higher rates in all

elections, including mid-term Congressional elections.

In Table 8, we present results of regressions of the same specification as above, but for

Congressional elections. Columns (1) and (3) present the results for presidential election years, whereas

(2) and (4) present results for mid-term elections. The estimated effect of liberty bond subscriptions on

the Democratic vote share in presidential election years is quite similar to those presented in Tables 3 and

5. But the effect in mid-term elections is considerably smaller, and statistically insignificant. This

implies that voters were not simply turning to the Republicans in all elections, but were voting

Republican in elections in which the policymakers responsible for liberty bond values were on the ballot.

6 The 1920 Election: Results from State Data

Finally, we investigate whether or not the estimated effects of liberty bonds on election outcomes

were decisive, by re-estimating (1) using OLS and 2SLS with state data. Our instrument for liberty bond

participation is re-calculated as the population-weighted average distance of all of a state's counties to the

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[40] *The New York Times*, "Harding In Doubt As to Bonus Bonds," 4 September 1920: "After remarking that a cash bonus would cost perhaps $2,000,000,000 Mr. Harding said: 'Now, with our present Liberty bonds below par, what would be the result if we proceeded to issue more bonds?'"
[41] A veteran's bonus was finally paid in 1936; see Hausman (2016).

military camps. As we are limited to 48 states, we view this analysis as a simple exercise in which we can assess the plausibility of our estimates and determine whether they could have been decisive. But it also enables us to verify that the effects we found for our sample of counties are not unique to those regions of the country, as the state data includes the entire United States.

The results are presented in Table 9. The baseline OLS estimate presented in column (1) is larger than that obtained from county data, reflecting both the differences in the level of aggregation of the data, and the fact that the state data covers a broader geographical area. The 2SLS estimate in column (2) is again larger than the OLS estimate but the ratio of the two is roughly similar to that obtained from the county data. As with the county data, the distance measure creates a strong first stage, minimizing any concerns regarding weak instruments.

In order to determine whether these effects were decisive, we calculate counterfactual Democratic Party vote shares for the 1920 election, assuming that the liberty loan campaigns had never been held, and therefore the subscription rates for liberty loans were zero. That is, for each state, we calculate a new Democratic vote share as the old one plus the added share from setting the liberty bond subscription rate to zero, or $-\hat{\delta} \times libloanparticip_i$.

The 1920 election was a Republican landslide, with electoral vote totals of 404 to 127. Our estimates imply that in the absence of the liberty bond campaigns, the Democrats would have won 12 additional states, and the electoral vote totals would have been 292(R) to 239(D).[42] Thus, this exercise indicates that the effects of liberty bond ownership likely did not tip the balance in the outcome of the election. The Republicans still would have won, only in less of a landslide.

7. Conclusion

This paper has investigated the political effects of the liberty bond drives of World War I. Our analysis indicates that counties that subscribed to the bonds at higher rates turned against the Democratic Party in the 1920 and 1924 presidential elections, relative their voting patterns over the previous decade.

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[42] The actual and counterfactual vote shares for each state are presented in section 3.6 of the Appendix.

The 1920s were a period in which the Republicans dominated American politics, and the effects of liberty bond ownership contributed significantly to that development, although they were unlikely to have had decisive effects.

As David Mayhew (2005) reminds us, wars have had significant consequences for the path of American political development. Wars "generate new ideas, issues, programs, [and] preferences," the effects of which set policy agendas and forge new electoral coalitions. The need to finance the massive expenditures required for America's participation in the Great War led Treasury Secretary McAdoo to conceive of Liberty Bonds and a new way to market the government's war debt. Their very design embodied a hoped-for policy feedback effect in the form of greater support for the war. However, an unintended consequence of this attempt to engineer policy feedback was to turn citizen investors into Republicans.

This outcome likely reflected voters' assessments of economic policy outcomes under Democrats and Republicans. Liberty bonds depreciated substantially in late 1919 and in 1920, which came as a shock to many subscribers who had not understood the risks of their investments. This was partly due to McAdoo's decision to mass-market negotiable securities to inexperienced investors, and to his successors' reluctance to allow the Fed to increase interest rates in early 1919, which contributed to the Fed's decision to increase them quite dramatically when they were finally permitted to do so. Then subsequent Republican Administrations benefitted from the timing of those rate increases, as the Fed finally eased rates in 1921 and 1922, and again in 1924, and liberty bond holders experienced substantial capital gains. This made voters receptive to Republican campaign messages that their leadership promoted prosperity.

Our results constitute clear evidence that the composition of assets owned by households can influence their political behavior. In our context, bond ownership made the finances of ordinary American households more sensitive to changes in financial markets, which led them to reject incumbents who had presided over asset price decreases, and to support political candidates who claimed that they had brought fiscal stability and higher bond prices. This is consistent with a 'pocketbook' view of

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retrospective voting behavior. But this result may not generalize to modern households. During World War I Americans were pressured to buy liberty bonds by their government. This made the impacts on households' wealth in response to market fluctuations a direct consequence of government policy.[43] Although the ownership of equities by modern households is related to government policy choices, such as the changes in the tax code that led to the proliferation of 401(k) plans or the creation of new, tax-exempt investment vehicles such as 529 college savings plans, the connection is less direct, and government promotion of asset ownership more subtle and less nationalistic, than in the early twentieth century. The value of modern households' financial assets may therefore not have the same political significance.

Policymakers learned lessons, both positive and negative, from the Liberty Bonds experience. When the federal debt grew during the Great Depression, then-Treasury Secretary Morganthau introduced "baby bonds" (savings bonds)—government securities sold through the nation's post offices on a continual basis, that were, by design, *nonnegotiable*. These bonds protected investors from price fluctuations, and they could be redeemed on demand according to a schedule that incentivized longer holding periods (Garbade 2012). The "baby bonds," known formally as Series A, B, C, and D, were described as "a Share in America" (Olney 1971), and Morgenthau, like McAdoo before him, believed that their ownership would increase the attachment of ordinary Americans to their nation (Kimble 2006). The safety of Depression-era "baby bonds" provided the blueprint for the Series E savings bonds used to finance World War II (Morse 1971; Olney 1971). The marketing of Series E bonds replicated the liberty loan drives, including the use of short, concentrated, campaigns, and the mobilization of civil society organizations as a salesforce. To the toolkit inherited from World War I, organizers added the modern medium of radio and hired social scientists to evaluate bond messaging and "segment" the bond-buying

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[43] Achen and Bartels (2016) recently have questioned whether retrospective voting is desirable from the standpoint of democratic accountability given evidence that voters appear to punish political incumbents for events over which they have no control such as shark attacks, droughts, or college football team losses (Healy, Malhotra, and Mo 2010). Our view is that liberty bond holders were "reasonably," rather than "blindly," retrospective given government promotion of bond ownership, and policies, such as the Bond Purchase Fund, to protect their prices. In addition, Republican party campaign rhetoric encouraged voters to blame to Democrats for low bond prices in 1920 and to credit Republicans for their recovery in 1924.

public into discrete target audiences (Samuel 1997). But most importantly, the bonds retained the non-negotiability of Morganthau's "baby bonds," protecting the ordinary households that were induced to support the war effort from subsequent fluctuations in interest rates.

But another important legacy of liberty bonds was the experience of one noteworthy subscriber, Harry Truman. After returning from World War I, Truman had to sell his family's liberty bonds at severely depreciated prices to raise money, an experience that apparently infuriated him and made him suspicious of the motives behind Fed policy. He of course became President in 1945, and at that time the Fed maintained a wartime policy of actively supporting the prices of government securities by purchasing large quantities of them. After the end of World War II, in response to high inflation, the Fed sought to end this policy, but was vigorously opposed by Truman and the Treasury. In 1951, with the Korean War underway and very high inflation prevailing, the conflict between the Fed and Truman intensified, and Truman took the extraordinary step of asking the entire Federal Open Market Committee to meet with him in the Oval Office. In that meeting, Truman stated that he did not want "the people who hold our bonds now to have done to them what was done to him."[44] The conflict escalated further, and was ultimately resolved through the negotiation of the Treasury-Fed Accord, which established the foundations of the Fed's modern independence.[45] In more ways than one, liberty bonds shaped the evolution of American monetary and fiscal institutions.

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[44] "Summary of Meeting of President Truman and the Federal Open Market Committee," January 31, 1951, Marriner Eccles documents, Box 62 Folder 1, fraser.stlouisfed.org. Truman apparently did not understand that the Series E war bonds sold to small investors were non-negotiable.
[45] On the origins of Fed independence, see Conti-Brown (2016).

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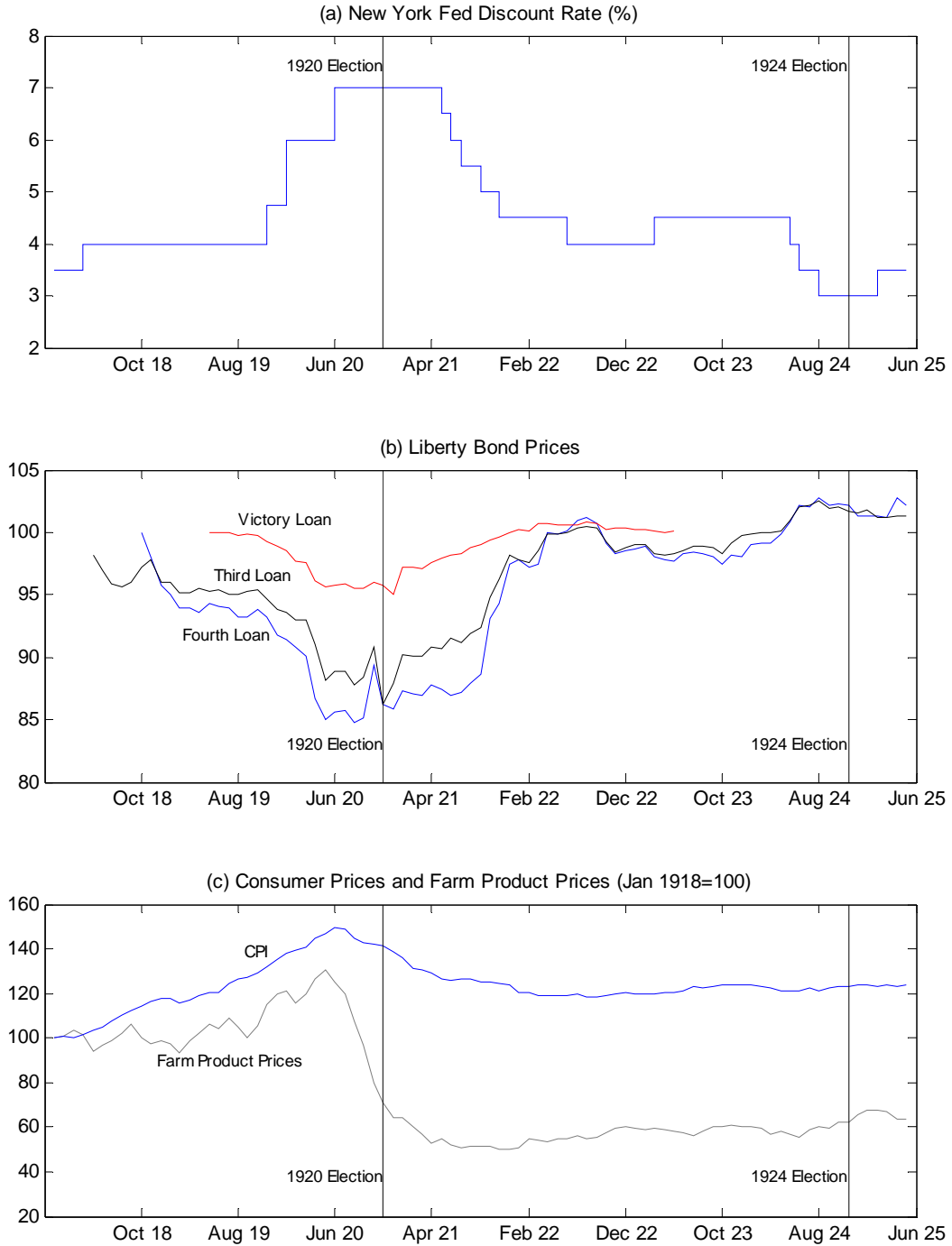
Figure 1:
The Fed's Discount Rate, Liberty Bond Yields, and Liberty Bond Prices

Note: Panel (a) shows the New York Fed's discount rate, as reported in Federal Reserve (1943). Panel (b) presents monthly market prices reported in the *New York Times*. The victory loan matured in early 1923. Panel (c) presents monthly data for the CPI from FRASER and for the BLS's index of farm product prices, collected from *Wholesale Prices: Bulletin of the Bureau of Labor Statistics* (various issues) with the January 1918 values set to 100.
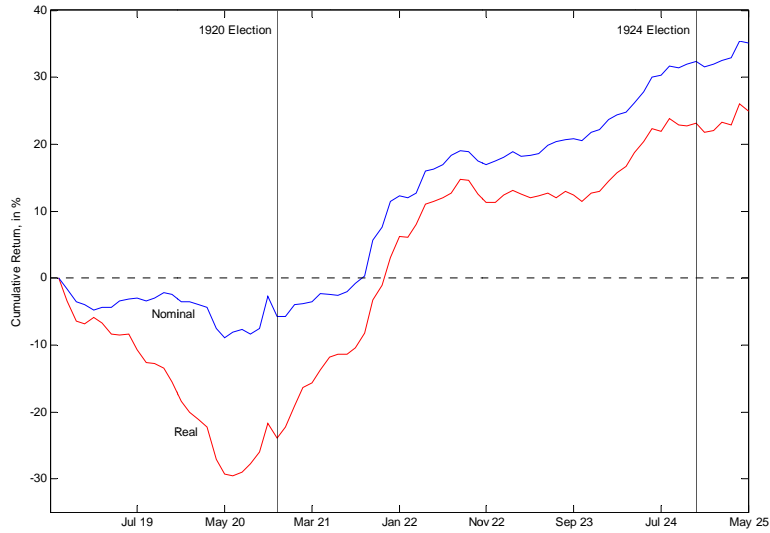
Figure 2:
Cumulative Returns for the Fourth Liberty Loan, 1918-25.

Authors' calculations from monthly liberty bond prices as reported in the *New York Times*, and monthly values of the CPI as reported in FRASER.
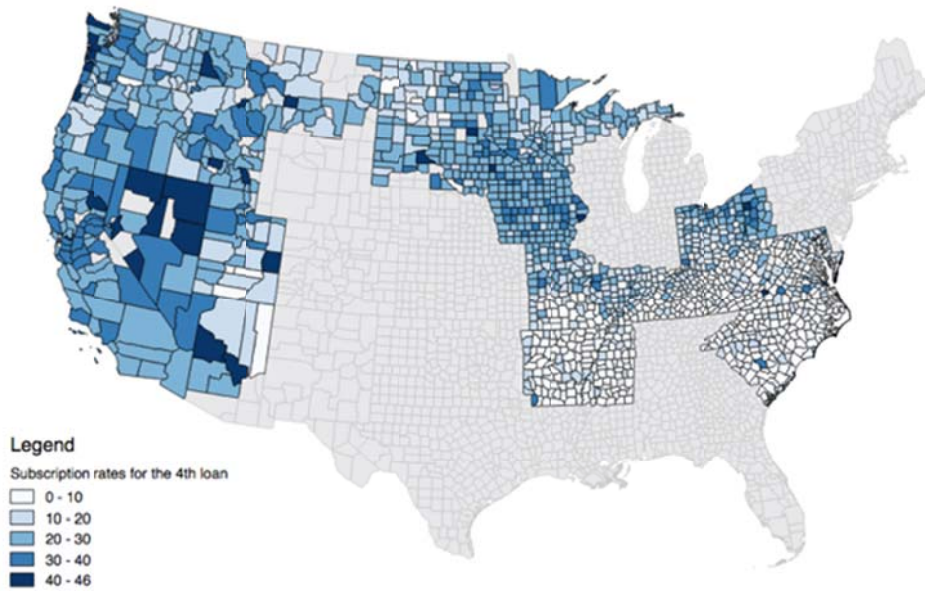
Figure 3:
Subscription Rates, Fourth Liberty Loan
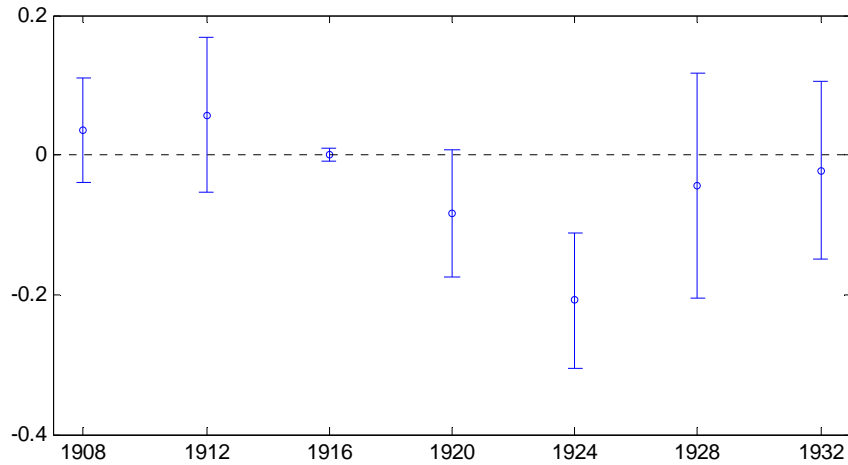
Figure 4:
Estimated Effect of Liberty Bond Participation on the Democratic Vote Share, 1908-32
The figure presents estimates of the effect liberty bond participation rates on the Democratic Party vote share, as estimated from a regression with county and state-year fixed effects. The figure plots the point estimates and their 95 percent confidence intervals.
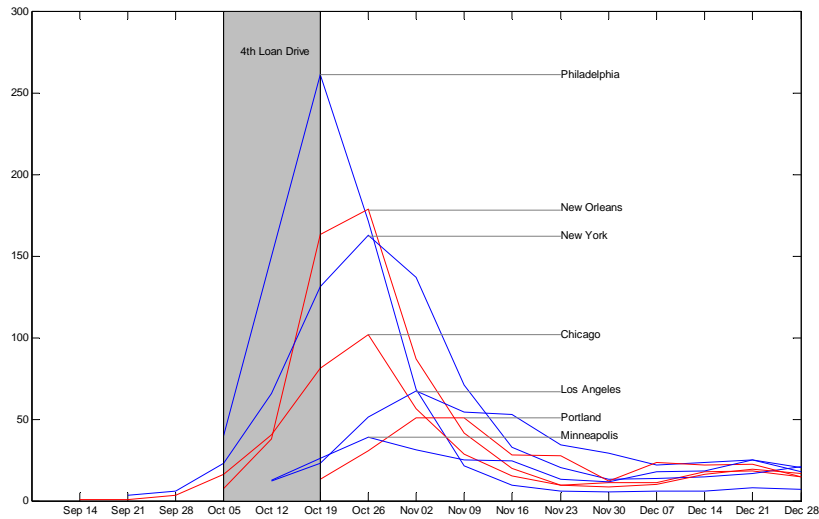
Figure 5: Weekly Deaths Per 100,000 Residents
From Influenza and Pneumonia, 14 September - 28 December 1918
The figure plots the number of deaths each week from influenza and pneumonia relative to the city's July 1 1918 estimated population, per 100,000 residents, for seven cities. Deaths from the 1918 influenza were associated with acute bronchial pneumonia; thus deaths from pneumonia are also included. The line for each city is labeled at the point of its peak death rate. The first data point for each city corresponds to the first week during which influenza is reported as a cause of death. The raw data are from US Bureau of the Census (1917-1920), and also reported in Ministry of Health (1920) and Crosby (2003).

**Figure 6A: Location of
World War I Military Camps**
Source: US War Department (1920: 1519).
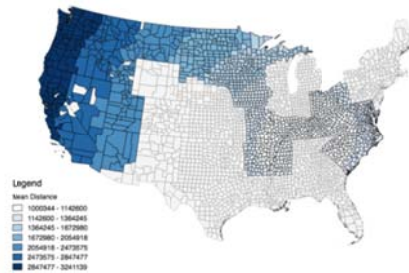
**Figure 6B: Average Distance to Military
Camps Among Sample Counties**
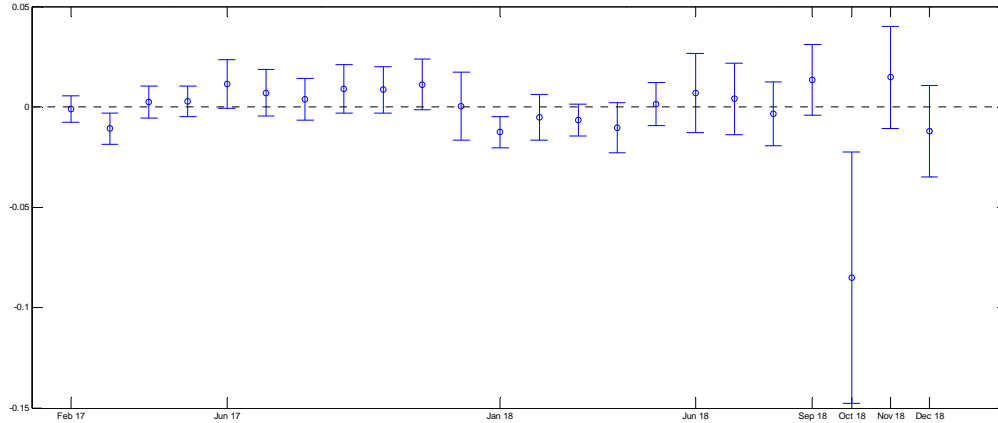
**Figure 7: Estimated Effect of Distance to Military Camps on Mortality,
369 Counties, January 1917-December 1918**

The figure presents estimates of the effect of average distance from military camps on monthly mortality rates, as estimated from a regression of the form: $d_{it} = \alpha_i + \gamma_t + \sum \theta_t Dist_i \times month_t + \varepsilon_{it}$, where α_i is a county fixed effect, γ_t is a month fixed effect, and $Dist_i$ is the county's average distance to military camps. The estimated θ_t coefficients, along with error bars representing 95 percent confidence intervals, are presented, and represent differences relative to the excluded month of January 1917.

Table 1:
Liberty Loan Characteristics and Subscriptions, by Loan

	First	Second	Third	Fourth	Victory
A. **Bond Characteristics**					
Coupon rate	3.50%	4.00%	4.25%	4.25%	3.75% or 4.75%
Dated	Jun 1917	Nov 1917	May 1918	Oct 1918	May 1919
Maturity (years)	30	25	10	20	4
Income tax exemption	Full	Normal, Corporate	Normal, Corporate	Partial	Full or Partial
Conversion option	Yes	One time only	None	None	None
B. **Subscriptions**					
Total Subscriptions (Bill. $)	2.000	3.809	4.177	6.959	4.500
Number of subscribers (Mill.)	4	9.4	18.4	22.8	11.8
Mean Subscription Amount ($)	759	491	227	306	445

Note: the first and second loans could be converted into subsequent loans bearing higher coupon rates Their initial rates are reported here. In addition, some of the victory loan bonds were issued at a lower coupon rate. *Sources*: Annual Reports, U.S. Treasury; Garbade (2012).

Table 2:
Summary Statistics, County Dataset

	Mean	SD	Min	Max
Participation rate, 4th Loan	0.207	0.112	0.007	0.463
Home ownership rate, 1920	0.492	0.138	0.076	0.861
Banks per square mile, 1920	0.001	0.001	0	0.006
Fraction residing in major urban areas, 1920	0.255	0.371	0	1
Log(population), 1920	10.979	1.409	5.991	13.986
Share of population engaged in agriculture, 1920	0.336	0.258	0	1
Suspended bank deposits per capita, 1920	0.002	0.009	0	0.162
Farm tenants per capita, 1920	0.121	0.142	0	0.831
Change in crop income per capita, 1919-24	-59.81	88.34	-774.79	334.59
Change in farm values per capita, 1920-25	472.92	657.79	-94.18	3403.86
Tax returns per capita, 1921	0.072	0.045	0.001	0.914
Fraction acres devoted to wheat, 1924	0.045	0.058	0	0.365
Democratic vote share:				
1916	54.089	16.073	8	100
1920	41.063	21.607	4.2	100

Note: all statistics weighted by 1920 county population.

Table 3:
Effect of Liberty Loan Participation on the Democratic Vote Share, 1908-32: OLS

	(1)	(2)	(3)	(4)
A. Controls Related to Agriculture				
Post-1918 x				
Participation in 4th Liberty Loan	-12.032**	-11.032**	-11.181**	-10.985**
	(3.741)	(3.366)	(3.401)	(3.357)
Fraction in Major Urban Areas	-3.820**	-3.741**	-3.336**	-3.414**
	(0.975)	(0.972)	(0.924)	(0.927)
Home Ownership Rate	-13.141**	-14.333**	-14.500**	-14.216**
	(2.258)	(2.139)	(2.138)	(2.126)
Change in Crop Income, 1919-24		0.003+		
		(0.002)		
Suspended Bank Deposits (1920)			-41.153*	
			(16.803)	
Fraction Acres Devoted to Wheat				-7.758+
				(2.431)
Constant	72.911**	73.476**	73.305**	73.407**
	(1.497)	(1.425)	(1.408)	(1.415)
Observations	9,855	9,838	9,698	9,838
R-squared	0.957	0.957	0.957	0.957
County FE	YES	YES	YES	YES
State x Year FE	YES	YES	YES	YES
B: Controls Related to Immigration, Inequality				
Post-1918 x				
Participation in 4th Liberty Loan	-10.744**	-13.832**	-9.367**	-10.722**
	(3.666)	(4.102)	(3.617)	(3.786)
Fraction in Major Urban Areas	-3.986**	-4.208**	-2.820**	-2.906**
	(0.990)	(0.993)	(0.932)	(0.996)
Home Ownership Rate	-13.716**	-12.695**	-14.877**	-11.409**
	(2.564)	(2.339)	(2.132)	(2.479)
Fraction German Born	7.104			
	(21.444)			
Fraction Foreign Born		9.515		
		(6.733)		
Tax Returns Per Capita			-11.985*	
			(5.909)	
Farm Tenants per Capita				5.800*
				(2.431)
Constant	72.379**	72.173**	73.569**	70.851**
	(1.642)	(1.602)	(1.360)	(1.814)
Observations	8,393	8,393	9,824	9,855
R-squared	0.957	0.956	0.957	0.957
County FE	YES	YES	YES	YES
State x Year FE	YES	YES	YES	YES

Note: this table presents OLS regressions of the effect of liberty loan participation on the Democratic Party vote share in presidential elections, in a panel of counties. All regressions weighted by 1920 county population. Robust standard errors clustered by county presented in parentheses. ** p<0.01, * p<0.05, + p<0.1

Table 4:
"First Stage" Regressions of the Relationship between
Distance to Camps and Participation in the Fourth Loan

	Baseline	County Controls	Drop South	Falsification: Participation in Third Loan
	(1)	(2)	(3)	(4)
Mean Distance to Camps	0.013**	0.012**	0.014**	0.004
	(0.004)	(0.004)	(0.004)	(0.004)
Fraction in Major Urban Areas	12.917**	3.234*	2.910+	3.413*
	(1.596)	(1.412)	(1.660)	(1.499)
Home Ownership Per Capita		-2.681	-4.092	1.628
		(2.992)	(6.359)	(3.892)
Banks (000s) Per Square Mile		3,738**	4,330**	3,839**
		(576)	(726)	(432)
Share in Agriculture		-13.889**	-16.231**	-10.391**
		(1.557)	(3.959)	(1.899)
Log(Population)		1.439+	1.284	0.214
		(0.707)	(0.819)	(0.633)
Constant	-2.014	-10.095	-8.497	5.675
	(5.988)	(10.789)	(13.502)	(11.193)
Observations	1,426	1,407	897	1,041
F stat, Mean Distance	11.0	10.66	12.71	1.39
R-squared	0.735	0.799	0.644	0.757
State FE	YES	YES	YES	YES

Note: This table presents cross-sectional regressions of the determinants of county-level participation In the fourth Liberty Loan. (This is the cross-sectional analog of the first-stage regressions in the panel specifications presented below.) All regressions weighted by 1920 population. Robust standard errors clustered by state presented in parentheses. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table 5:
Effect of Liberty Loan Participation on Electoral Outcomes, 1908-32: IV Results

	OLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS
	(1)	(2)	(3)	(4)	(5)
Post-1918 x					
Participation in 4th Liberty Loan	-12.032**	-29.870*	-24.490+	-25.392+	-29.049+
	(3.741)	(14.790)	(14.723)	(15.192)	(15.041)
Fraction in Major Urban Areas	-3.820**	-2.049	-2.443	-1.936	-1.670
	(0.975)	(1.739)	(1.706)	(1.775)	(1.753)
Home Ownership Rate	-13.141**	-15.271**	-15.830**	-16.007**	-16.226**
	(2.258)	(3.241)	(3.603)	(3.069)	(3.131)
Change in Crop Income			0.003+		
			(0.002)		
Suspended Bank Deposits (1920)				-37.139**	
				(14.117)	
Fraction Acres Devoted to Wheat					-7.549+
					(4.217)
Observations	9,855	9,854	9,837	9,697	9,837
R-squared	0.957	0.849	0.851	0.851	0.851
County FE	YES	YES	YES	YES	YES
State x Year FE	YES	YES	YES	YES	YES
Number of counties	1,426	1,426	1,426	1,403	1,423
			First-Stage Regressions:		
Post-1918 x					
Mean Distance to Military Camps		0.00016**	0.00015**	0.00014**	0.00015**
		(0.00003)	(0.00003)	(0.00003)	(0.00003)
Fraction in Major Urban Areas		0.095**	0.092**	0.094**	0.093**
		(0.011)	(0.011)	(0.011)	(0.011)
Home Ownership Rate		-0.130**	-0.122**	-0.118**	-0.123**
		(0.025)	(0.023)	(0.022)	(0.023)
Change in Crop Income			-0.000008		
			(0.00002)		
Suspended Bank Deposits (1920)				0.286	
				(0.197)	
Fraction Acres Devoted to Wheat					0.050
					(0.058)
Kleibergen-Paap F statistic		26.54	28.82	24.56	26.02
County FE		YES	YES	YES	YES
State x Year FE		YES	YES	YES	YES

Note: this table presents OLS and IV regressions of the effect of liberty loan participation on the Democratic Party vote share in presidential elections, in a panel of counties. The instrument for liberty loan participation is the mean distance of a county to military camps, a determinant of the severity of the 1918 influenza epidemic. All regressions weighted by 1920 county population. Robust standard errors clustered by county presented in parentheses. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table 6:
Effect of Distance to Camps on Democratic Vote Share (Reduced Form)

	(1)	(2)
Post-1918 x		
Mean Distance to Military Camps	-0.006*	-0.005*
	(0.002)	(0.002)
Fraction in Major Urban Areas		-4.875**
		(0.862)
Home Ownership Rate		-11.396**
		(2.143)
Observations	9,862	9,855
R-squared	0.955	0.956
County FE	YES	YES
State x Year FE	YES	YES

Note: this table presents reduced-form regressions of the democratic vote share regressed on the distance instrument , in a panel of counties. All regressions weighted by 1920 county population. Robust standard errors clustered by county presented in parentheses. ** p<0.01, * p<0.05, + p<0.1

Table 7:
Determinants of Liberty Bond Purchases among BLS Survey Households, 1918-19

	Survey Dates: Oct 1918 - Feb 1919		Falsification: Survey Dates: Jul 1918 - Sep 1918	
	(1)	(2)	(3)	(4)
Log(total family income)	0.689**	0.659**	0.365*	0.357*
	(0.076)	(0.070)	(0.158)	(0.163)
Distance from military camps	1.012*	0.982*	-0.471	-0.468
	(0.392)	(0.379)	(0.593)	(0.592)
Log(income) x Distance	-0.129*	-0.119*	0.070	0.072
	(0.052)	(0.048)	(0.078)	(0.080)
Subscribed to newspaper		0.188*		0.076
		(0.072)		(0.164)
Newspaper x Distance		-0.048		-0.020
		(0.045)		(0.080)
Constant	-4.434**	-4.397**	-2.071+	-2.088+
	(0.574)	(0.544)	(1.173)	(1.177)
Observations	9,267	9,267	3,126	3,126
R-squared	0.104	0.107	0.076	0.077

Note: this table presents OLS regressions of the effect of household characteristics on a binary measure of liberty bond purchases, from BLS survey data. The dependent variable is equal to 1 if the household purchased a liberty bond within the previous year from the survey date, and its mean value is 0.68. Robust standard errors clustered by city presented in parentheses. ** p<0.01, * p<0.05, + p<0.1.

Table 8:
Effect of Liberty Loan Participation on Democratic Vote Share in Congressional Elections

	OLS:		IV-2SLS:	
	Pres. Yr.	Mid-Term	Pres. Yr.	Mid-Term
	(1)	(2)	(3)	(4)
Post-1918 x				
Participation in 4th Liberty Loan	-0.148**	-0.063	-0.434+	-0.152
	(0.057)	(0.076)	(0.226)	(0.203)
Fraction in Major Urban Areas	-0.860	0.773	1.931	1.683
	(1.635)	(1.676)	(2.576)	(2.503)
Home Ownership Rate	-12.021**	-3.799	-15.461**	-4.842
	(3.208)	(3.383)	(4.245)	(3.694)
Observations	7,574	6,778	7,564	6,725
R-squared	0.884	0.878	0.567	0.320
County, State x Year FE	YES	YES	YES	YES
Kleibergen-Paap F			33.75	30.78

Note: this table presents OLS regressions of the effect of liberty loan participation on the Democratic Party vote share in Congressional elections, in a panel of counties. County-years in which the Democratic share is less than 10 or more than 90 percent are dropped. All regressions weighted by 1920 county population. Robust standard errors clustered by county presented in parentheses. ** p<0.01, * p<0.05, + p<0.1

Table 9:
Effect of Liberty Loan Participation on Electoral Outcomes, 1908-32—State Data

	OLS	IV-2SLS
	(1)	(2)
Post-1918 x		
Participation in 4th Liberty Loan	-23.481*	-44.747*
	(9.802)	(21.902)
Fraction in Urban Areas	3.975	9.897
	(2.976)	(7.106)
Observations	334	334
R-squared	0.892	0.653
State FE, Year FE	YES	YES
		First Stage
Post-1918 x		
Population-Weighted Distance to Military Camps		0.00005**
		(0.00001)
Fraction in Urban Areas		0.257**
		(0.043)
Kleibergen-Paap F		17.24
R-squared		0.959
State FE, Year FE		YES

Note: this table presents OLS and IV regressions of the effect of liberty loan participation on the Democratic Party vote share in presidential elections, in a panel of states. The instrument for liberty loan participation is the mean population-weighted distance of a state to military camps, a determinant of the severity of the 1918 influenza epidemic. All regressions weighted by 1920 state population. Robust standard errors clustered by state presented in parentheses. ** p<0.01, * p<0.05, + p<0.1

Appendix: Sources, Data and Additional Results
(For Online Publication Only)

Table of Contents

1. Data: Sources and definitions

1.1 Liberty bond subscription rates

For the purposes of this paper, we assembled a dataset of liberty bond subscriptions at the county level for several Federal Reserve Districts from documents found in a number of different archives. These were mostly pamphlets published by the Federal Reserve Banks' liberty loan committees or by state-level liberty loan committees, which were produced as part of the effort to market the victory loan.

The sources were as follows. For the fourth district, *Figuregram for the Fifth or Victory Liberty Loan in the Fourth Federal Reserve District, Also Important Data on the First Four Loans.* Cleveland, OH: Federal Reserve Bank of Cleveland. For the fifth district, *Report on Subscriptions to the Fourth Liberty Loan of 1918 for the 5th Federal Reserve District.* Compiled by the Federal Reserve Bank of Richmond. For the eighth district, *Subscriptions to the Fourth Liberty Loan* [Separate Issues by State]. War Loan Organization, St. Louis. For the ninth district, the September 8 1919 issue of the *Liberty Bell* magazine, published by the Minneapolis Fed, included county-level subscription data. For the twelfth district, Fourth Liberty Loan: *Report of Amount of Subscriptions, Quotas, Percentage Subscribed, Number of Subscriptions, and Percentage Population Subscribed.* Issued by Liberty Loan General Executive Board, San Francisco CA. Finally, we also have data for Iowa, which is part of the seventh district, from *Sale of War Bonds in Iowa*, by Nathaniel B. Whitney, published by the State Historical Society of Iowa in 1923. Most of these publications were found at the National Archives, in Princeton University's Mudd Manuscript Library, or the Library of Congress.

Most of these pamphlets do not describe how the data they present were compiled. The pamphlet from the Richmond Fed, however, does present some information on the methods they used in producing their tables. They reported that they sent forms to all the banks in the district asking for the number of subscribers, and in cases where they did not get a reply, they sought information from the leadership of county liberty loan committees. They also stated that they allocated the subscriptions obtained from large corporations to the counties where the individual subscribers resided, and they also allocated all other subscriptions to the counties where the subscribers resided, even if they subscribed through a bank located in another county.

We lack data for the first district (Boston Fed), second (New York), third (Philadelphia), sixth (Atlanta), seventh (Chicago), tenth (Kansas City) and eleventh (Dallas.) These districts do not appear to have published any county level records for subscriptions to the fourth loan. In the cases of Boston, Philadelphia and New York, this likely reflects the fact that those reserve banks were more focused on the sales of liberty bonds to wealthy individuals and institutions; compiling subscription data for small rural counties in their districts for use in marketing subsequent bond issues in those districts, was probably seen as not very cost-effective. The New York Fed, for example, grouped its New York, New Jersey and Connecticut counties into six 'districts' and compiled some limited data for those, whereas the Chicago Fed seems to have compiled only state-level data.

Table A1 presents some data obtained from an internal memorandum found in the archives of the New York Fed, which help explain why that institution was less focused on compiling county level data.

Table A1:
Subscriptions, Second Liberty Loan, Second Federal Reserve District (NY Fed)

Amount Subscribed	Number of Subscribers	Amount Subscribed	% of Total
<10,000	2,173,884	$441,101,150	28.4
10,050 - 50,000	5,868	168,326,200	10.9
50,050 - 100,000	1,097	100,722,650	6.5
100,050 - 200,000	413	68,166,700	4.4
200,050 - 400,000	309	87,975,800	5.7
400,050 - 1,000,000	340	227,698,950	14.7
>1,000,050	106	456,462,000	29.4

Source: Memorandum to Wm McAdoo, Secretary of the Treasury, 3 Nov. 1917, in: Correspondence and Circulars, Liberty Loan Campaign, Benjamin Strong Papers, NY Fed Archives

These data show that the total value of the subscriptions of the 106 individuals and institutions who subscribed to $1 million or more of the bond issue was actually greater than the total amount purchased by the 2.17 million individuals who subscribed for $10,000 or less. Clearly, in order to effectively sell large amounts of these bonds, the Liberty Loan Committee in the second district needed to focus on a relatively small number of institutions and individuals, nearly all of whom were likely located in New York City. (The fact that the smallest amount reported is $10,000 or less is a further indication that they were less focused on small subscribers.)

Liberty bond subscription rates are calculated as the total number of subscribers divided by the county population, as reported in the 1920 federal census.

1.2 Voting outcomes

We obtain county level data on the Democratic Party vote share in presidential elections from 1908 to 1932 from Clubb, Flanigan and Zingale (2006). State level data on election outcomes was obtained from uselectionatlas.org.

1.3 County characteristics

Most of the 1920 county characteristics were obtained from Haines (2010). We obtained banking data for 1920 from FDIC (1992), and some additional county data from the 1925 agricultural census was shared with us by Price Fishback. The definitions of the main variables are as follows, with the variable names from Haines (2010) or FDIC (1992).

Home ownership rate, 1920: owned homes (OWNHOM)/total homes (TOTHOM)

Banks per square mile, 1920: total number of banks, 1920 (V42 in ICPSR 7) / total area of county (AREA).

Fraction residing in major urban areas, 1920: fraction of the population residing in cities of 25,000 or more (URB25) /total 1920 population (TOTPOP).

Log(population), 1920: log value of TOTPOP.

Share of the population engaged in agriculture, 1920: this is calculated as total number of farms (FARMS)/total number of families (FAMILIES).

Suspended bank deposits per capita, 1920: [suspended deposits of national banks (V93) + suspended deposits of state banks (V127)]/TOTPOP.

Farm tenants per capita, 1920: farm tenants (FARMTEN)/total families (FAMILIES)

Change in crop income per capita, 1919-24: (value of crops, 1924 - value of same crops, 1919 [from Fishback])/TOTPOP.

Change in farm values per capita, 1920-25: from Fishback: (value of farm land and buildings, 1925 [from Fishback] – FARMVAL – FARMBUI)/TOTPOP.

Tax returns per capita, 1921: from Fishback: total number of tax returns, 1921[from Fishback] / TOTPOP.

Fraction acres devoted to wheat, 1924: wheat acres, 1924 [from Fishback] / total acres in farms, 1925 [from Fishback].

1.4 Distance to camps instrument

The names and states of all World War I military training camps inside the United States were obtained from U.S. War Department (1920: 1519). Other sources were then consulted to find the county in which each camp was located. The average distance measure to the camps for each county (the instrument) was then calculated as the mean value of the distance from each county centroid to the centroids of the counties in which the camps were located.

2. Campaign advertisements, editorials: Examples

In order to investigate whether liberty loan prices were reflected in campaign advertising and rhetoric, full-text searchable newspaper indexes were used to find articles and advertisements containing terms such as Harding and liberty bonds in the presence of terms such as 'depreciated' or 'below par.'

Among the most prominent results was an ad, identified as having been paid for by the Republican National Committee, which ran in a number of western and border states in October of 1920. This ad, an excerpt of which is displayed as Figure A1 below, prominently mentioned the depressed prices of liberty bonds, and the "sacrifices" subscribers had to make if they need to sell their bonds to raise money in the "abnormal conditions" of the fall of 1920. The low prices of liberty bonds were then linked to what the ad described as mismanagement and waste in the war effort and in public finances generally.

At the time, American newspapers were generally quite partisan. Many Republican newspapers during the campaign season ran editorials attacking the Democrats for the low prices of liberty bonds, and praising Harding's statement that they "should make" liberty bonds "worth all its patriotic citizens paid in purchasing them." Typical examples of editorials in local Republican papers are presented as Figures A1 to A5 below.

Figure A1:
Excerpt of an ad which is identified as being paid for by the National Republican Committee. This ad was run in newspapers in Idaho, Washington, Kentucky, Oregon, Utah, Tennessee, and Montana, and possibly others.

Figure A2:
Excerpt from a full-page editorial in the *Alma (Michigan) Record*, published 28 October 1920.

HARDING FOR 100 PER CENT LIBERTY BONDS.

"This government should make its liberty and victory bonds worth all its patriotic citizens paid in purchasing them."

That is the language of Senator Harding in a recent declaration.

It means that Senator Harding believes the bonds the men and women and children of America bought in the war period and which have gone below 100 cents on a dollar should be brought back to 100 cents on a dollar.

As a liberty bond buyer where do you disagree with the republican nominee for president?

Harding For 100 Per Cent Liberty Bonds

" 'This government should make its liberty bonds worth all its patriotic citizens paid in purchasing them.'"

Figure A3:
Editorial in the *Morning Olympian (Olympia, WA)*, published 14 September 1920.

BUNGLED THE PEOPLE'S BONDS.

The national convention of democrats at San Francisco of course commended the financial achievements of the administration. But the platform made no mention of the deplorable mismanagement of the treasury department and the federal reserve system by which millions of Liberty bond-buyers have been bitterly disappointed.

Nor are the party nominees mentioning the depreciation of the securities in the hands of the people, or making any declarations in favor of redeeming the credit of the country by making the bonds being constantly what the government charged for them.

Senator Harding, on the other hand, has declared that "this government should make Liberty bonds worth all that patriotic citizens paid in purchasing them." He says that if he is elected president he will do all in his power to bring that about.

In making that statement the republican candidate has indulged in no idle reflection, for as long ago as September Hon. John W. Works of Massachusetts outlined to the senate a plan whereby billions of dollars could have been saved to the people through the issuance of serial bonds instead of those having a single maturity.

It will be possible for President Harding to collaborate with a republican congress in securing legislation authorizing the refunding of all Liberty bonds into a single serial bond issue bearing interest at 5 1-4 per cent, and costing the taxpayers no more than the present cumbersome sinking fund method of retirement. And not only would additional cost be avoided, but Liberty bond owners would have the satisfaction of seeing their holdings go to par the moment the interest rate was increased and restore to them the $2,600,000,000 loss endured under the democratic administration.

Bungled The People's Bonds

"The national convention of democrats at San Francisco of course commended the financial achievements of the administration. But the platform made no mention of the deplorable mismanagement of the treasury department and the federal reserve system by which millions of Liberty bond-buyers have been bitterly disappointed…"

"Senator Harding, on the other hand, has declared that 'the government should make Liberty bonds worth all that patriotic citizens paid in purchasing them.' He says that if he is elected president he will do all in his power to bring that about."

Figure A4:
Editorial from the *Albuquerque Morning Journal*, 27 August 1920

Woman Sums Up Sins of Democratic Party

"…McAdoo said that liberty bonds would never go below par. Look where they are now."

Woman Sums Up Sins of Democratic Party

Wilson was elected because he "kept us out of war," but he has since confessed that he knew at the time that war was inevitable.

The only three people whom Wilson "kept out of war" were Gen. Leonard Wood, Theodore Roosevelt and Edsel Ford.

McAdoo said that liberty bonds would never go below par. Look where they are now.

No czar of Russia ever traveled in Europe in such magnificence as Wilson and his retinue.

Mr. Wilson brought home the league of nations and said to the senate, "Sign on the dotted line." When they wished to consider he called these "pussy-minded." The league of nations has not proved that it will hold on its first test, that of Poland and Russia.

A flag has even been planned for the league of nations. God forbid that any flag should fly above the stars and stripes.

Cox is in entire accord with the president. He says so and we have no reason to doubt that he will not fulfill the Wilson promises as far as he may be will.

The democrats are trying to conceal the cockscrews in their campaign, but it will out.

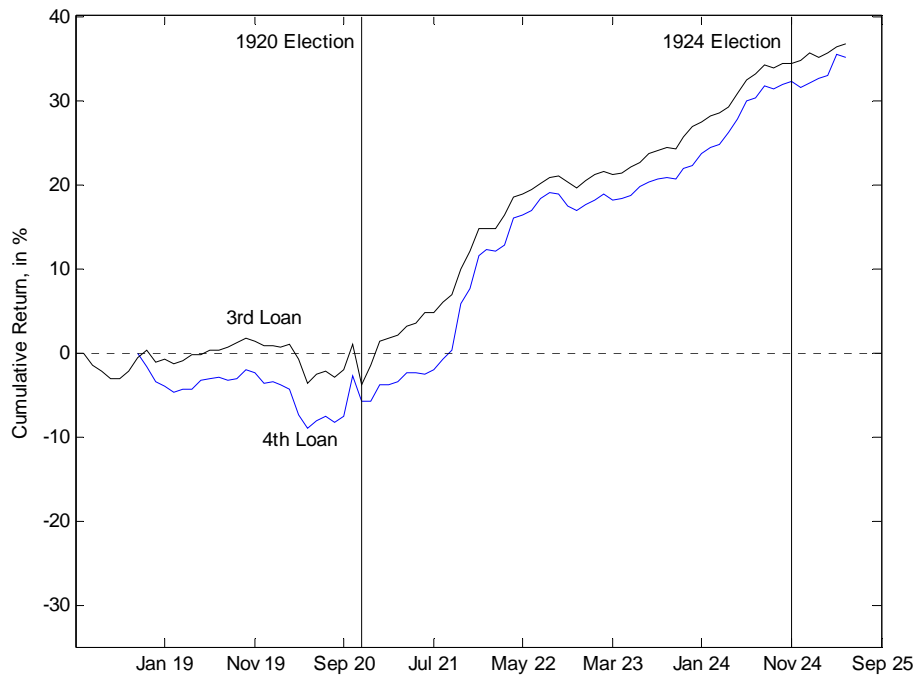**Figure A5:**
Editorial from *Tulsa Daily World*, 19 September 1920

3. Analysis: Additional details and results

3.1 Cumulative returns

Figure 2 in the paper presents nominal and real cumulative returns for the fourth liberty loan. Each point in the graph represents the total return earned by a subscriber to the bonds from the time of issue. The nominal cumulative return at month t is calculated as $\prod_{t=0}^{T}\left(1 + \frac{.0425}{12} + \frac{P_t - P_{t-1}}{P_{t-1}}\right) - 1$, where P_t is the price of the bond in period t. The annual coupon rate was 4.25%; these calculations effectively assume that 1/12 of the coupon income is received in each month. The real rate of return is calculated as $\prod_{t=0}^{T}\left(\frac{1 + \frac{.0425}{12} + \frac{P_t - P_{t-1}}{P_{t-1}}}{1 + \pi_t}\right) - 1$, where π_t is the monthly inflation rate as reflected in the CPI.

Figure 2 also presents cumulative returns only for the 4th loan. Below in Figure A6, we present cumulative returns for both the 4th and the 3rd loan, which was the second most widely held issue.

Figure A6:
Cumulative Returns, 3rd and 4th Liberty Loans

The patterns over time are fundamentally similar, but the 3rd loan did not depreciate to the same extent as the 4th, and its cumulative returns by late 1920 were not as negative.

3.2 Including additional liberty bond issues in the analysis

All of the analysis of the paper focuses on the participation rates for the fourth liberty loan, which was the largest and most widely-held of all the liberty loan issues. Yet the population clearly subscribed to the other loans as well, and those subscription rates are not included in the analysis. The fourth loan subscription rights might therefore be regarded as measuring the overall subscription rates with error. If

this were the case, our instrumental variable estimates will address the problem. However, a different way to conceptualize the issue would be that we have a problem of omitted variables. If, say, one of the other loan campaigns were independently politically important, the regression estimates based on the fourth loan only would suffer from omitted variable bias. We explore this possibility in Table A2 below, which presents regressions of changes in the Democratic vote share on the participation rates in loans 2 through 4, for the limited set of counties for which we have data for all three.[46]

Table A2:
Effect of Liberty Loan Participation on Electoral Outcomes, 1908-32:
Controlling for Additional Loan Participation

	All Counties (1)	Counties With Data For Loans 2 through 4 (2)	Counties With Data For Loans 2 through 4 (3)
Post-1918 x			
Participation in 4th Liberty Loan	-18.633**	-19.549**	-20.251*
	(4.259)	(7.398)	(10.283)
Participation in 3rd Liberty Loan			-17.433
			(12.087)
Participation in 2nd Liberty Loan			29.487
			(24.800)
Constant	63.147**	57.346**	57.634**
	(0.738)	(1.529)	(1.408)
Observations	9,855	3,869	3,869
Counties	1,428	555	555
R-squared	0.935	0.938	0.938
County FE	YES	YES	YES
Fed District x Year FE	YES	YES	YES

Note: this table presents OLS regressions of the effect of liberty loan participation on the Democratic Party vote share in presidential elections, in a panel of counties. In column (1), all counties for which we have data for the fourth loan are used. In column (2), counties for which we have data for loans 2-4 are used. And in column (3), participation rates in loans 2 and 3 are included in the regressions. All regressions weighted by 1920 county population. Robust standard errors clustered by county presented in parentheses. ** $p<0.01$, * $p<0.05$, + $p<0.1$

In column (1), we present the results of a regression in which we include only the fourth loan, with no additional county characteristics included as controls, using the full sample of counties for which we have data for the fourth loan. The set of counties for which we also have data for the third and second loans is considerably smaller, and to verify that the effects of the fourth loan are the same in those counties, in column (2) we restrict the analysis to the counties for which we have data for all three loans. The estimated effect of participation in the fourth loan is quite similar. Finally, in column (3) we add the participation rates for the second and third loans. The estimated effect of the forth loan is essentially unchanged, implying that excluding participation in the other loans from the regressions in the paper does not substantially bias the estimated effect of participation in the fourth loan.

---

[46] We do have some data for the first and 5th victory loans as well, but the set of counties for which we have data for all of the loans is extremely small, just a few hundred.

It should be noted that in the regressions in the table, the usual state-by-year fixed effects are replaced by Fed district-by-year fixed effects, because with the Fed district-by-year fixed effects, the estimates using the small sample of counties for which we have data on all three loans are somewhat more precise.

3.3 Wheat price controls and the 1920 election

During the war years, wheat prices were partly controlled, whereas cotton prices were not. As we document in the paper, this contributed to resentments against the Democratic Party in wheat growing areas, which was seen as favoring Southern cotton producers.   Here we document the evolution of wheat and cotton prices in order to assess the significance of this issues.
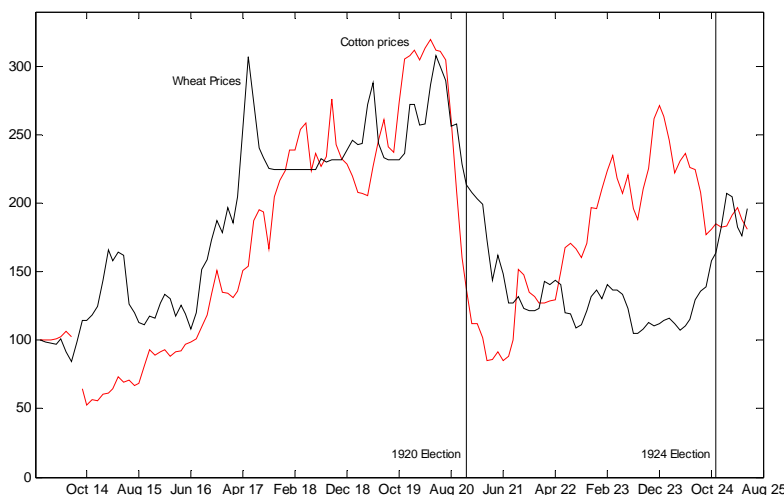
Figure A7:
Wheat and Cotton Prices, 1914-1925
The figure plots monthly prices for number 2 red winter wheat, as quoted in Chicago, and for middling cotton, as quoted in New Orleans, as reported in US Dept of Labor, Bureau of Labor Statistics *Wholesale Prices: Bulletin of the Bureau of Labor Statistics* (various issues). The values for January 1914 are set to 100.

Figure A7 presents monthly indexes of wheat and cotton prices from 1914 to 1925, where the January 1914 value is set to 100. The period in which wheat prices were actually is visible in the figure, and followed a large spike in wheat prices. That cotton prices were rising around the time that wheat prices were controlled likely contributed to the resentments of wheat farmers.

On the other hand, wheat prices were relatively quickly uncontrolled, and cotton prices actually fell much more than wheat prices prior to the 1920 election. We conclude that although the decision to control wheat prices and leave cotton prices uncontrolled may have contributed to political resentments against the Democrats for favoring the South, the economic harm suffered by the wheat farmers in the months prior to the 1920 election was unlikely to have been greater than that suffered by cotton farmers.

3.4 Effect of the German born on election outcomes

Regression estimates presented in the Table 3 of the paper do not offer any support for the notion that the German born or foreign born were responsible for the effects of liberty bonds on election outcomes that are the focus of this paper. One somewhat puzzling element of those results is that the

estimated effects of the German born and foreign born population on the Democratic vote share are *positive* for the post-1918 period, whereas Bagby's (1962) analysis, and Tabellini's (2017) results, suggest that it should be negative. To investigate this further, regressions with election-by-election interactions were estimated. The estimates for the effect of the share German born are presented in Figure A8.
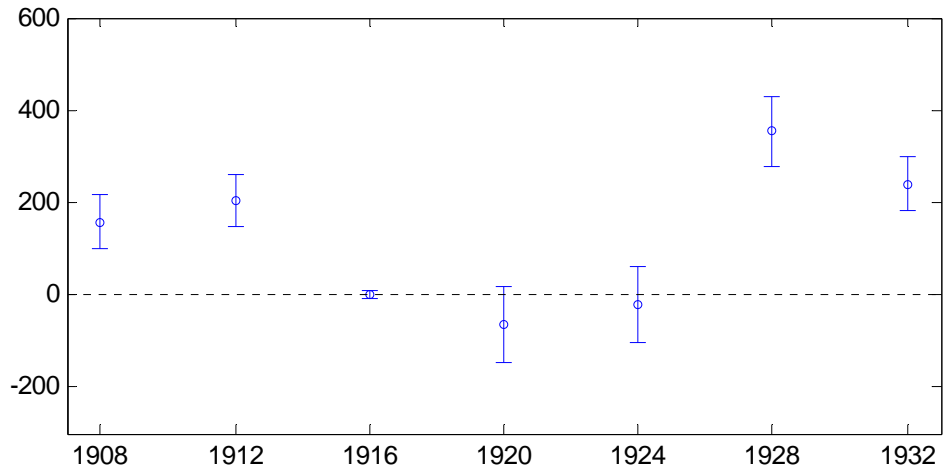
Figure A8:
Election-by-Election Effects of German-Born Population

The estimates in Figure A8 make it clear why the post-1918 effect of the German born was found to be positive and imprecisely estimated. Counties with large numbers of German born residents turned against the Democrats in 1916, 1920 and 1924 only; in 1928 and 1932, those counties voted for the Democrats at roughly the same rate as they did in 1908 and 1912. The effects identified by Bagby (1962) were apparently reversed in 1928 and 1932. (The estimated effects of liberty bond participation in the regression that produced those estimates is substantially the same as in regressions in which the fraction German born are excluded.)

3.5 Evidence of influenza's effect on fourth loan from the *New York Times*

An official account of the progress of the fourth loan, released by the CPI and printed in newspapers on October 18, including the *New York Times,* included one-sentence accounts of the state of the campaign in each district, some of which mentioned problems related to influenza, whereas others did not. If the mention of influenza in these accounts can be interpreted as a rough indication that the epidemic inhibited the loan campaign to a greater extent, then comparing the average distance to the camps for the districts that did and did not mention influenza can provide an additional test of the mechanisms behind the distance instrument.

Table A3 presents these comparisons. For each district, the average distance to the camps, calculated as the population-weighted average distance among every county within the district, is presented. Those mentioning influenza were indeed located closer to the camps, although the difference between the two groups, 215 km, is not statistically significant.

Table A3:
Influenza, Distance to Camps, and the Fourth Loan Campaign,
By Reserve District

Reserve District	Population-Weighted Distance (km)
Influenza Not Mentioned as Impairing Campaign	
New York	1,446
Cleveland	1,140
Atlanta	1,127
Chicago	1,218
Minneapolis	1,683
Dallas	1,430
San Francisco	2,840
Average:	1,555
Influenza Mentioned as Impairing Campaign	
Boston	1,674
Philadelphia	1,353
Richmond	1,155
St Louis	1,091
Kansas City	1,429
Average:	1,340

Note: this table presents the population-weighted average distance of the counties in each reserve district to the military camps, and compares the districts where influenza was specifically mentioned as a hindrance to the fourth loan campaign to those where influenza was not mentioned, in an official statement of the campaign's progress as of October 17.

3.6 IV results with election-by-election interactions

In most of the specifications in the paper, we focus on the interaction between liberty bond subscription rates and in indicator for all post-1918 elections. In order to analyze the temporal pattern of the effects in greater detail, and to verify that the post-1918 effects do not represent the continuation of a preexisting trend of some kind in the differences in political behavior of counties with different liberty bond subscription rates, here we present election-by-election interactions for our IV specification.

With the IV estimation, the standard errors are quite large. In an effort to gain more precision in our estimates, we replace the state-by-year fixed effects with Fed district-by-year fixed effects, and estimate regressions of the form:

$$Demshare_{idt} = \alpha_i + \gamma_{dt} + \sum \delta_t libloanparticip_i \times year_t + \beta X_{it} + \varepsilon_{it}, \quad (A1)$$

where α_i is a county fixed effect, γ_{dt} represents Fed district-by-year fixed effects, $\sum \delta_t libloanparticip_i$ is a series of interactions between a county's liberty loan participation rate and each election year, and X_{it} includes the same 1920 county characteristics as in column (1) of Table 5 in the paper, the home ownership rate and the share of the population residing in major urban areas, but interacted with each election year as well.

In order to estimate equation A1 with 2SLS, we instrument for each liberty bond participation by year interaction with the county's mean distance to the military camps interacted with that same year. We therefore have six first-stage regressions for our six included liberty bond interactions.

We begin with plots of the results, first for OLS. (Figure 4 in the paper presents results for a similar specification using state-year fixed effects; here we present the results with district-year effects to be completely consistent with the IV results that follow.) These are presented in Figure A9.
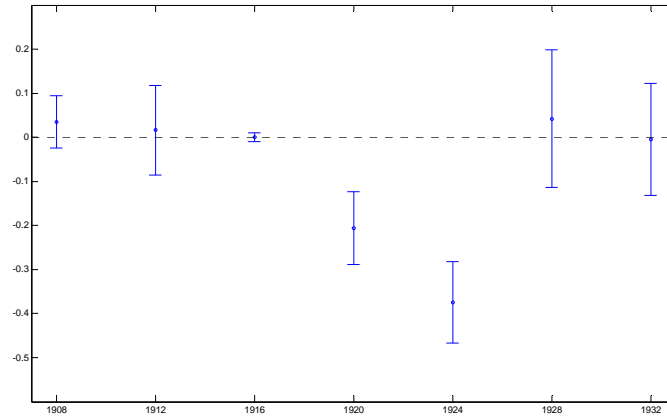
Figure A9:
Election-by-Election Effect of Liberty Bond Participation on the
Democratic Vote Share (OLS)

As in Figure 4 in the paper, these results do not indicate that there was any preexisting trend in the effect of liberty bond participation on election outcomes. The effect is essentially zero, then becomes negative for the 1920 and 1924 elections, and then zero again.
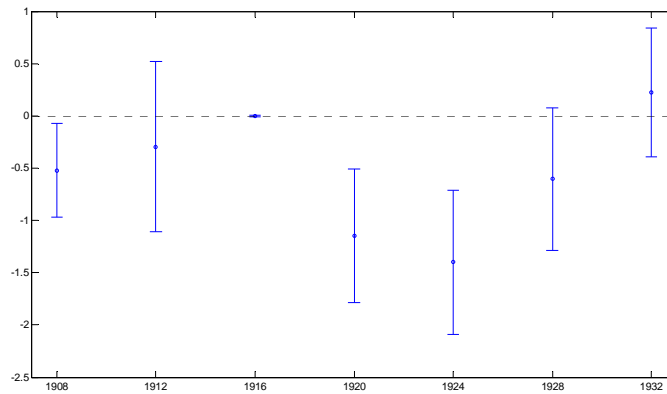
Figure A10:
Election-by-Election Effect of Liberty Bond Participation on the
Democratic Vote Share (IV)

The corresponding IV results are presented in figure A10. In general, the temporal patterns of the effects are similar to those for OLS, but there are some differences. Most notably, the magnitudes of the point estimates are much larger. There also seems to be suggestive evidence of an effect in the 1928 election, whereas this was not the case with OLS. And finally, there seems to be an effect in 1908. However, if anything, combined with the estimate for 1912, this seems to suggest that the counties with high subscription rates for liberty bonds were seeing greater success for the Democrats prior to the 1916 election. If we can call these points a trend, it was in the opposite direction of the effects following 1918.

The parameter estimates and some additional details regarding the estimation are presented in Table A4. Column (1) of the table presents the regression plotted in Figure A8, and column (2) presents the IV regression plotted in A10. The Kleinbergen-Paap F test in column (2) is 18.9, helping to rule out concerns regarding weak instruments (p=0.000). Finally, in column (3), we add some additional 1920 county characteristics interacted with year, and find that the parameter estimates are not meaningfully changed.

Table A4:
Effect of Liberty Loan Participation on Electoral Outcomes by Year

	(1) OLS	(2) IV-2SLS	(3) IV-2SLS
Participation in the 4th Liberty Loan x			
1908	0.035	-0.522*	-0.555*
	(0.030)	(0.228)	(0.237)
1912	0.016	-0.295	-0.292
	(0.052)	(0.416)	(0.434)
1916	0	0	0
	(0)	(0)	(0)
1920	-0.206**	-1.146**	-1.220**
	(0.042)	(0.327)	(0.330)
1924	-0.375**	-1.400**	-1.458**
	(0.047)	(0.353)	(0.377)
1928	0.042	-0.605+	-0.627+
	(0.080)	(0.348)	(0.370)
1932	-0.005	0.222	0.220
	(0.065)	(0.314)	(0.334)
Kleinbergen-Paap F	--	18.918	20.024
Observations	9,855	9,854	9,837
R-squared	0.942	0.736	0.751
Baseline controls x Year	YES	YES	YES
Additional controls x Year	NO	NO	YES
County FE	YES	YES	YES
District x Year FE	YES	YES	YES
Number of counties	1,427	1,426	1,423

Robust standard errors adjusted for clustering by firm in parentheses.

** $p<0.01$, * $p<0.05$, + $p<0.1$

3.7 Results for the 1920 election, by state

Table 9 in the paper presents estimates of the effect of liberty bond subscriptions on election outcomes, which the paper then uses to compute counterfactual Democratic vote shares. Here we show the actual and counterfactual Democratic vote shares for each state.

These are presented in Figure A11 below. The actual Democratic Party vote share in the 1920 presidential election in each state is shown as the solid bar; the outlined bar extending to the right shows the additional vote share that would have been received had there been no liberty bond subscriptions.

As the figure makes clear, the effects of the liberty loans were substantial; setting the subscription rates to zero increases the estimated Democratic Party share significantly in many states.
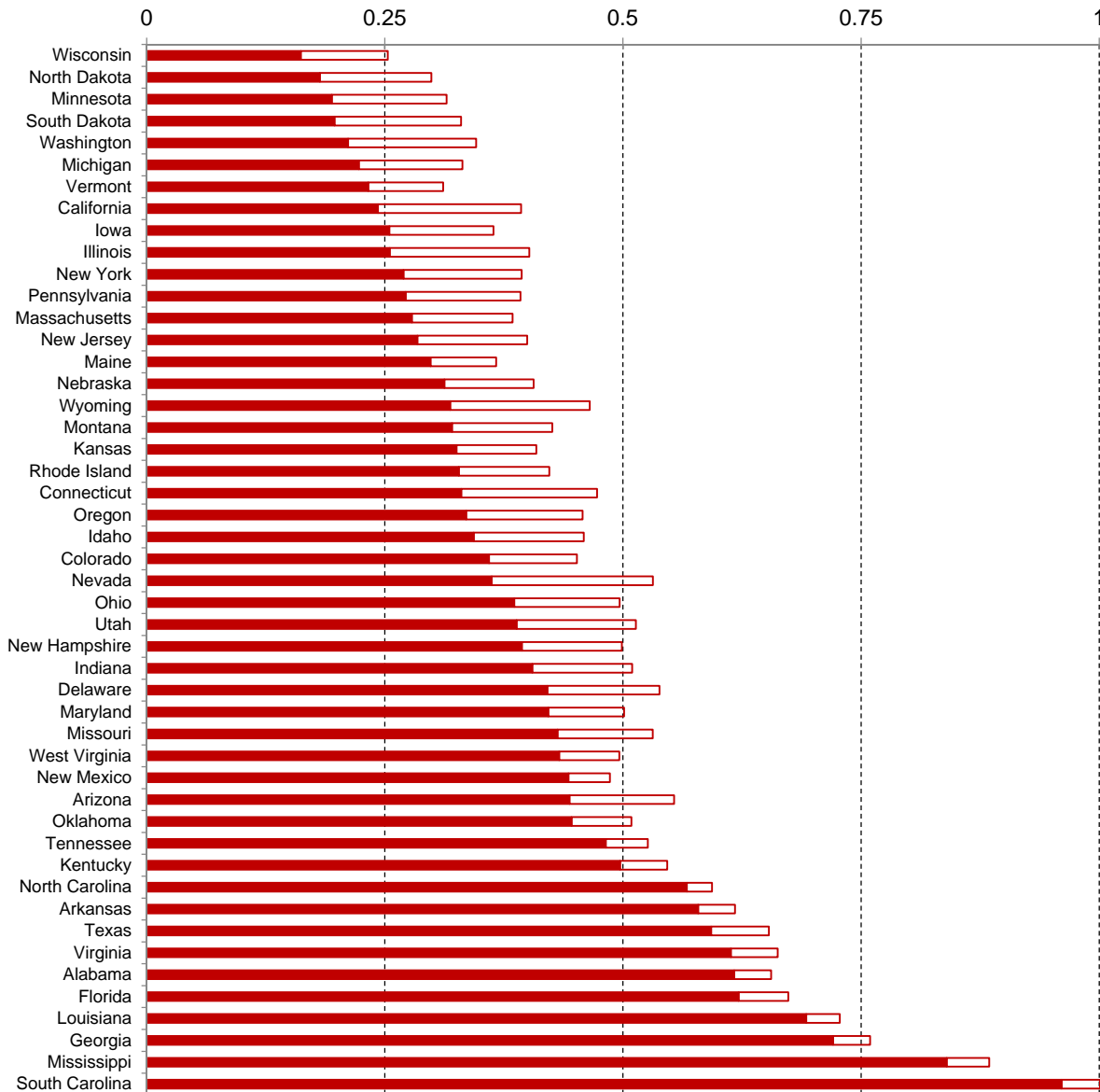

Figure A11: Actual and Counterfactual Democratic Party Vote Shares, 1920