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 on election outcomes in the 1920s. We find that counties with higher liberty bond ownership rates turned against the Democratic Party in the presidential elections of 1920 and 1924 relative to other counties. 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 analysis suggests that the liberty bond campaigns had unintended political consequences.

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1. Introduction

The American effort in World War I was partly funded by a series of massive loan drives, in which so-called liberty bonds were marketed to individuals and institutions. Ordinary citizens subscribed to the liberty loans at extraordinary rates, and by 1919 around two-thirds of middle income households owned a liberty bond.[1] This transformation of Americans' finances had likely had far-reaching consequences, not all of which were anticipated by the architects of the loan drives. The liberty bond campaigns induced millions of households not only to become the owners of financial assets, but to become the owners of financial assets whose values could fluctuate in response to changes in interest rates. And beginning in late 1919, in an effort to restrain the growth of credit and prices, the Federal Reserve enacted a series of significant increases in its discount rates. This caused the prices of liberty bonds to fall, and millions of American households suffered capital losses. Then in 1921 the Fed began to ease its rates, causing liberty bonds to appreciate again.

We study the electoral consequences of the liberty bond drives and the Fed's policy changes. 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, 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.

Using new data on liberty bond subscription rates, we test whether owning liberty bonds led to changes in voting outcomes in presidential elections in the 1920s relative to those in the previous decade,

[1] The two-thirds rate is calculated from BLS survey data from 1918-19 discussed in detail below.

in a panel of about 1,400 counties. The results indicate that counties with higher liberty bond participation rates turned against the Democrats, relative to their voting patterns in earlier elections. 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.

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. 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 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.

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 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 liberty bond campaigns, arguing that they "propagate[d] an investor theory of political economy." Yet Ott's book mostly neglects the prices of liberty bonds, which are critical for understanding their political consequences. We argue that the most important political legacy of the liberty loan 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.

Our analysis also contributes to a much larger 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 of these works have argued that the broadening of stock ownership in the late twentieth century 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).[2] Perhaps more importantly, these studies generally do not consider asset returns, and simply argue that holding a stake in financial markets causes households to identify as members of the investor class, shifting their preferences toward business-friendly policies.

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

We advance this literature not only by studying a context with plausibly exogenous variation in financial asset ownership, but also by incorporating the performance of financial assets into the analysis. We argue that owning financial assets does not necessarily lead voters to support the most business-friendly candidates, but instead induces a new set of pocketbook voting concerns focused on the performance of financial markets. An additional advantage of our setting is its focus on bond values. The depreciations and appreciations in 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 stronger than those conducted with modern stock ownership data.

2. Financing World War I

2.1 Bond Finance

The American effort in World War I led to a nearly 25-fold increase in government expenditures; funding these expenditures was an unprecedented challenge. Treasury Secretary McAdoo eventually settled on a plan for a 1/3rd-2/3rd division between taxes and borrowing; tax revenues ultimately accounted for about one fourth of the total (Kang and Rockoff 2015; Garbade 2012; Sutch 2015).

In addition to helping to maintain lower tax rates, McAdoo believed that borrowing offered another advantage: the ownership of government bonds would give the public a stake in the war effort. In his view, Americans at home would welcome a chance to join the effort in the "financial trenches," and those efforts would increase support for the war (McAdoo 1931). It was also believed that bond sales drives would have propaganda value, demoralizing the enemy if the American public subscribed at high rates.

Policymakers were keen to make liberty bonds attractive to ordinary Americans, and marketed them quite broadly. The bonds were sold in denominations as low as $50, and subscriptions could be

fulfilled through installment plans, which made the bonds accessible to a broad range of American households. A $50 liberty bond could be purchased by an initial payment of $4, 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 efforts, tens of millions of Americans became owners of financial assets other than bank accounts for the first time.

Rather than continuously selling bonds as needed, the liberty loans were marketed through a series of four discreet campaigns, each with a specific sales target; an additional victory loan campaign was conducted following the end of the war. Table 1 presents data on each loan. 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 put pressure on credit markets, the later bonds were issued with higher coupon rates. In total, the liberty and victory loans raised around 24 billion dollars, equivalent to more than $5 trillion today as a constant share of GDP. The fourth loan alone raised almost seven billion dollars, with 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.[3] 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 selected local notables to run 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 to participate in selling the bonds (U.S. Treasury, 1919). Shoe leather was augmented by extensive advertising and promotion in newspapers,

[3] For detailed accounts, see St. Clair (1919); Greenough (1922); Ott (2011); Kang and Rokoff (2015); Sutch (2015); and Hilt and Rahn (2016).

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 deductions 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 one of the first-ever surveys of American households' incomes and expenditures, collected by the Bureau of Labor Statistics (BLS) in 1918-19. The BLS surveyed nearly 13,000 families in the middle of the earnings distribution, who resided in 99 cities (Olney 2005; see also Feigenbaum, 2016). Among the surveyed households, nearly 68 percent had purchased a liberty bond in the previous year. 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.[4]

Some of the rhetoric of the liberty loan campaigns emphasized the attractiveness of the returns that the securities would offer, and many liberty bond ads called them the "safest securities in the world." Yet these were negotiable instruments 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. 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.

[4] In the 2016 Survey of Consumer Finances, 51.8 percent of households between the 40th and 60th percentile of the income distribution owned stock, either directly or indirectly.

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 (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 rate increase. 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. 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 ultimately began to ease its rates in April 1921 in a series of 0.5 percent cuts that 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 rates. 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.

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 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 was greater than the coupon income, and the total cumulative returns received by holders of the fourth loan were negative: -5.8 percent (see the Appendix for details). 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 return 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 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" (*Evening Star* [Washington D.C.], 16 October 1920.)

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 [them]…" 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, which mentioned the "serious loss" suffered by the millions of liberty bond subscribers. 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 (*Montgomery Advertiser,* 11 November 1920.) 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" (*Philadelphia Inquirer,* 5 November 1920.)

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)" (*Chicago Daily Tribune,* 10 April 1923). 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 holders of liberty bonds behaved as retrospective voters, we would expect them to "Stay Cool with Coolidge" by rewarding his administration with their votes.

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:

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

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 $\boldsymbol{X}_{it}$ is a vector of 1920 county characteristics, also interacted 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.[5] 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 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 magnitude of the effect of liberty bonds on the Democratic Party vote share decreases significantly in 1928 and 1932, relative to 1924 and 1920.

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.[6] Efforts to promote the fourth loan were hampered by many individuals' reluctance to attend

[5] 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.

[6] 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).

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.[7] Treasury officials stated that the epidemic created "a great handicap" for the loan campaign.[8] 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).

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.[9]

[7] 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).
[8] "Appeal to Nation to Tax Resources in Buying Bonds," *New York Times*, 10 Oct. 1918.
[9] Weekly data on influenza deaths are available for 45 American cities. The raw data are from US Bureau of the Census (1917-1920), and also reported in 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).

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.[10] 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.[11] 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 ideal environment for the spread of the epidemic. The influenza epidemic was in fact so acute within the military that total deaths due to influenza among American military personnel were similar in number to deaths in combat (Byerly 2010). 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" (Crosby 2003: 56; see also Byerly 2005:79).

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.

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

[11] 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).

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. 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 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.[12]

The validity of the distance measure as an instrument for participation in the fourth loan is explored in Table 4. 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

[12] 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).

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 have been 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.*[13] 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.[14]

[13] "Bond Sales Reach 4 Billion Mark, With 2 Days Left," 18 October 1918.
[14] These data are presented in section 3.5 of the Appendix.

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.[15]

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 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

[15] In section 3.5 of the Appendix, we present IV results with election-by-election interactions.

was often quite high in the wheat-growing regions of the upper West.[16] 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 discontent with incumbent politicians. Yet the reduced-form version of our IV model (presented in the Appendix) 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.

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

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 6 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 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.

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 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 7. 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).[17] 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. 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.

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

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

capital gains. This made voters receptive to Republican campaign messages that their leadership promoted prosperity.

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 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."[18] 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. In more ways than one, liberty bonds shaped the evolution of American monetary and fiscal institutions.

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[18] "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.

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Table 1:
Liberty Loan Characteristics and Subscriptions, by Loan

	First	Second	Third	Fourth	Victory
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
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:
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 7:
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)
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)
Kleibergen-Paap F		17.24
R-squared		0.959
State FE, Year FE		YES

Note: this table presents OLS and IV regressions using state data. The instrument for liberty loan participation is the mean population-weighted distance of a state to military camps. All regressions weighted by 1920 state population. The fraction of the states' population in urban areas is included in both the first and second stage regressions (not shown). Robust standard errors clustered by state in parentheses. ** p<0.01, * p<0.05, + p<0.

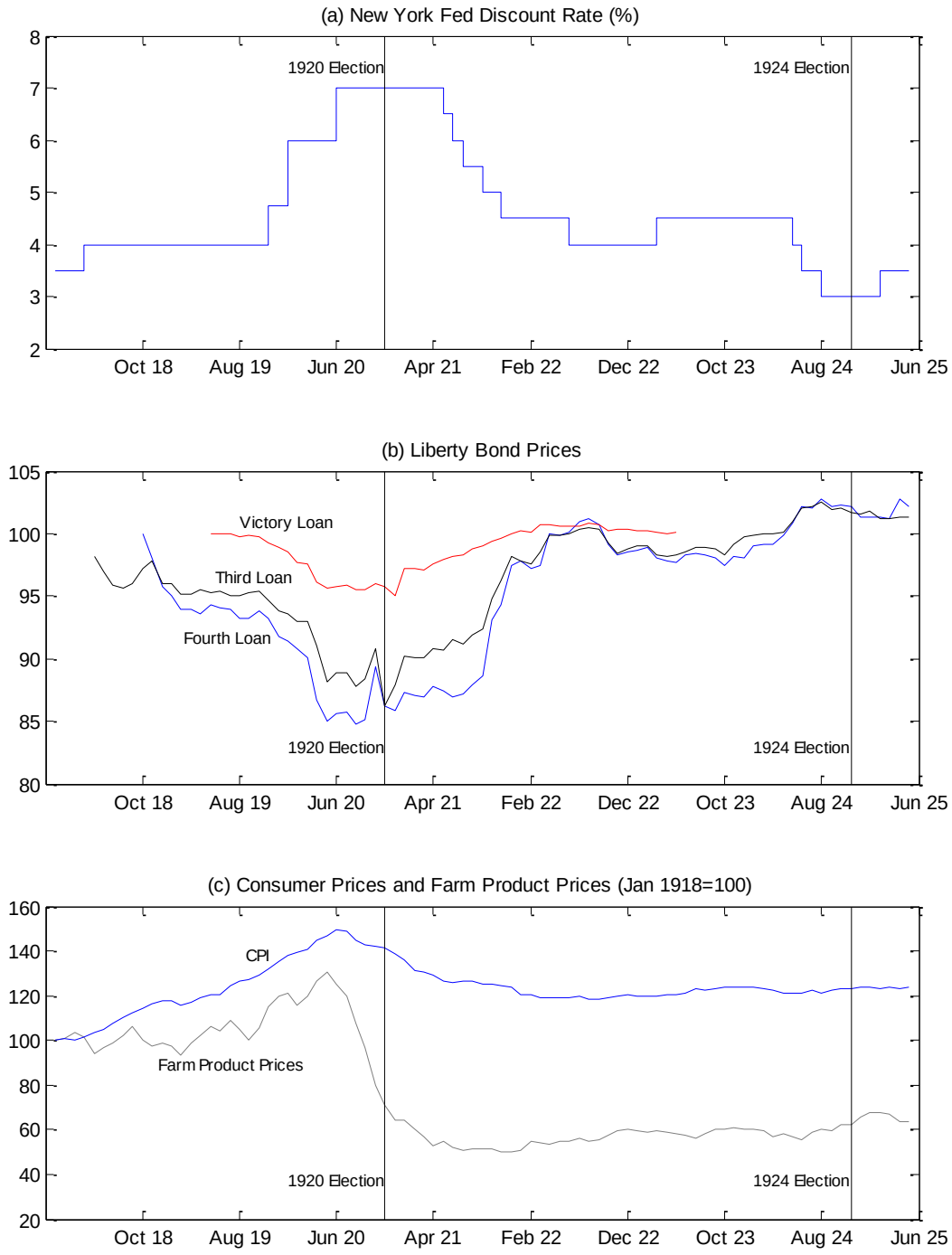

Figure 1:
The Fed's Discount Rate, Liberty Bond Yields, and Liberty Bond Prices

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.

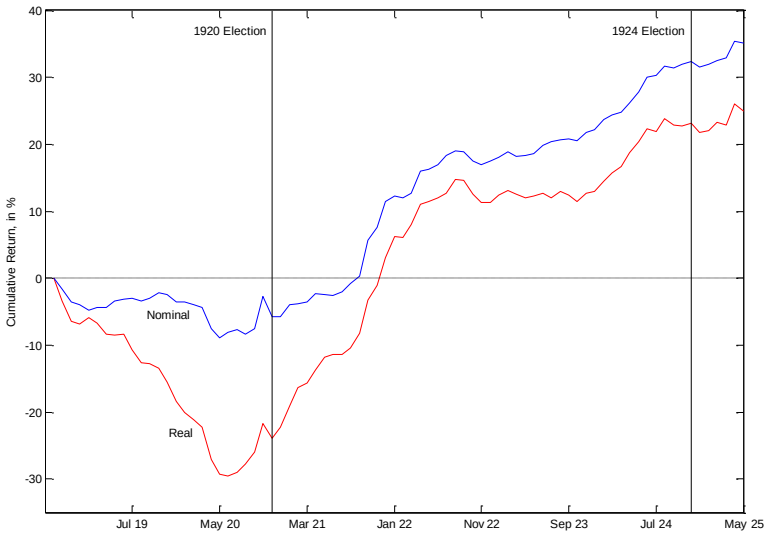

Figure 2:
Cumulative Returns for the Fourth Liberty Loan, 1918-25.
Authors' calculations from monthly liberty bond prices as reported in the *New York Times*, and monthly values of the CPI as reported in FRASER.

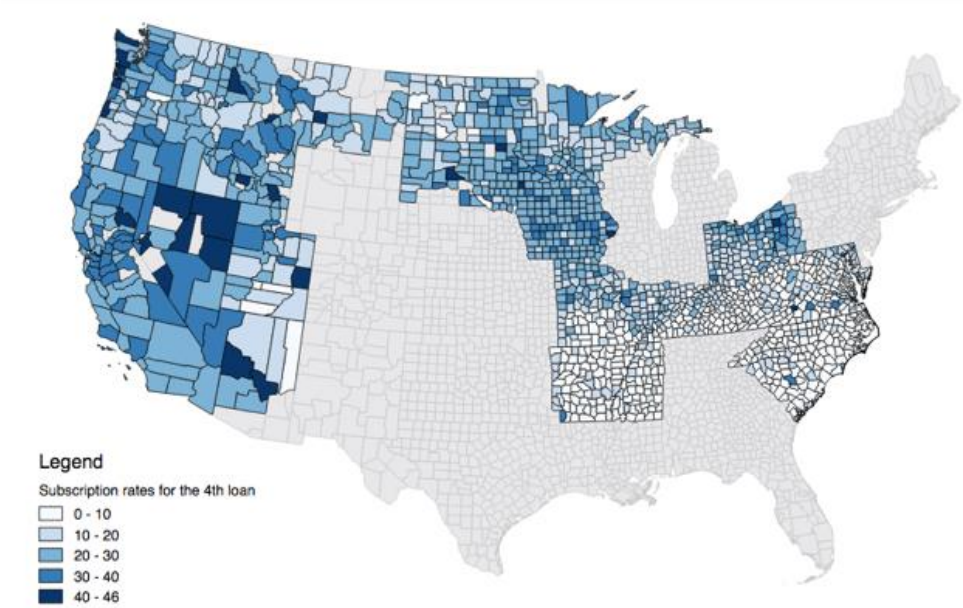

Figure 3:
Subscription Rates, Fourth Liberty Loan

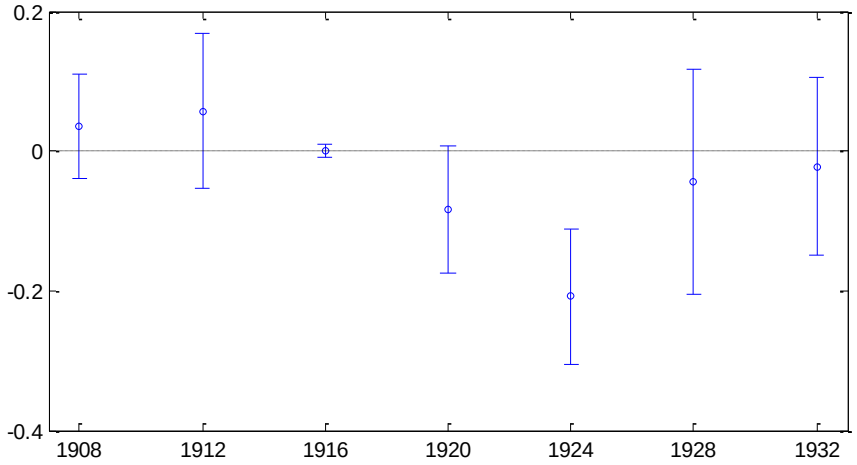

Figure 4:
Estimated Effect of Liberty Bond Participation on the Democratic Vote Share, 1908-32
The figure presents estimates of the effect liberty bond participation rates on the Democratic Party vote share, as estimated from a regression with county and state-year fixed effects. The figure plots the point estimates and their 95 percent confidence intervals.

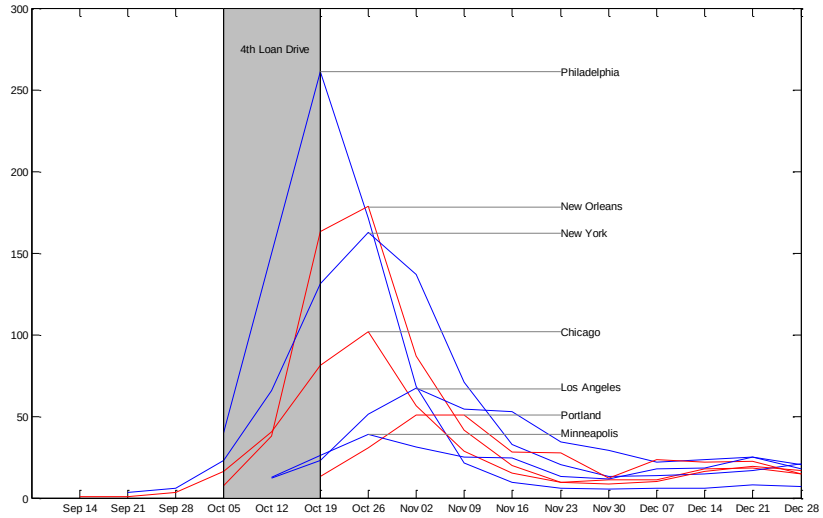

Figure 5: Weekly Deaths Per 100,000 Residents
From Influenza and Pneumonia, 14 September - 28 December 1918
The figure plots the number of deaths each week from influenza and pneumonia relative to the city's July 1 1918 estimated population, per 100,000 residents, for seven cities. Deaths from the 1918 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 Crosby (2003).

Figure 6A: Location of World War I Military Camps
Source: US War Department (1920: 1519).

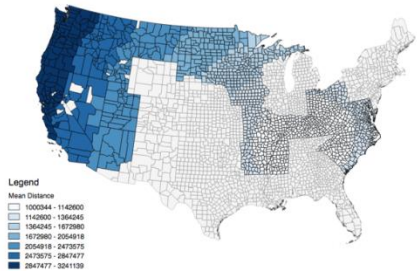

Figure 6B: Average Distance to Military Camps Among Sample Counties

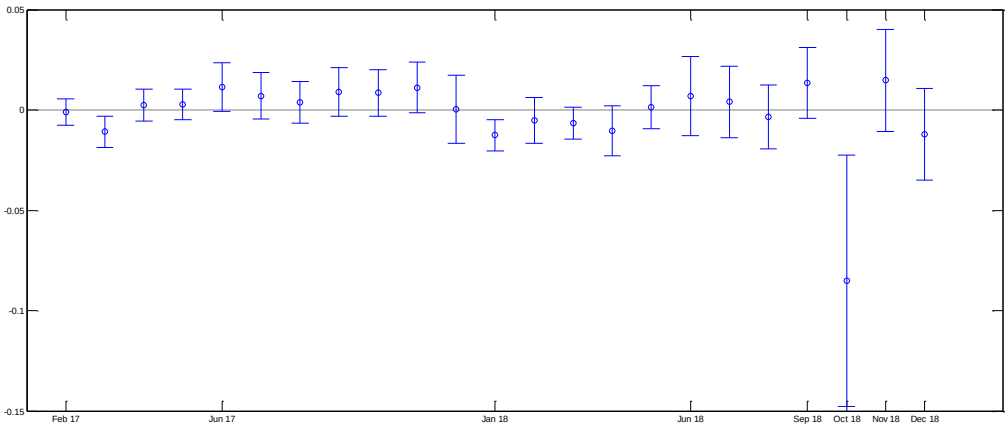

Figure 7: Estimated Effect of Distance to Military Camps on Mortality, 369 Counties, January 1917-December 1918

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.