



Death and Taxes, Including Inflation: the Public versus Economists

JEFFREY ROGERS HUMMEL*

ABSTRACT

WHY IS THE DISTASTE FOR INFLATION SIGNIFICANTLY GREATER for the average layperson than for the average economist? In the latest edition of his intermediate text, *Macroeconomics* (2007b, 97-8), N. Gregory Mankiw puzzles over this conundrum. “If you ask the average person why inflation is a social problem, he will probably answer that inflation makes him poorer,” writes Mankiw. People believe that inflation hurts their real buying power. But “[t]his complaint about inflation is a common fallacy.” Inflation does have costs—Mankiw elaborates on shoe-leather costs, menu costs, and tax distortions, among others. But the magnitude of these costs, as measured by economists, is significantly smaller than the public seems to think. “Apparently, inflation worries the public much more than it does the economics profession,” but Mankiw remains perplexed as to exactly why.

The puzzle appears in earlier editions of Mankiw’s intermediate text and his best selling principles text (2007a, 676) as well. It also graces the texts of other authors. In *Macroeconomics* (5th ed.), Robert E. Hall and John B. Taylor (1997, 480) write that the “public’s negative view of inflation seems to come from sources other than these identifiable costs of inflation.” Perhaps “some people may be upset about inflation because they do not take the same broad view as an economist, who sees inflation as a general rise in all prices and dollar incomes.” Similarly, David Romer reports in his graduate text, *Advanced Macroeconomics* (2006, 547): “There is a

* Department of Economics, San Jose State University. San Jose, CA 95192.
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wide gap between the popular view of inflation and the costs of inflation that economists can identify.”

Empirical verification of this difference of opinion can be found in an article by Robert J. Shiller (1997), “Why Do People Dislike Inflation?” Shiller extensively surveyed Americans, Germans, and Brazilians, discovering that they all hate inflation. Eighty-four percent of Americans either strongly or somewhat agree with the statement: “The control of inflation is one of the most important missions of U.S. economic policy.” Most of them believe that inflation erodes living standards. The economists Shiller surveyed, on the other hand, were far less concerned. Mankiw (1997) contributed a three-page comment on Shiller’s article to the same collection, in which he suggests that people may be associating inflation with negative supply shocks.

Yet one obvious aspect of this conundrum seems to have been entirely overlooked by mainstream macroeconomists. Mankiw unintentionally hints at it in his principles text when he discusses “The Inflation Tax,” just a few pages before getting into inflation’s costs. The costs that concern economists are inflation’s deadweight loss, its negative effect on net welfare. But that is only a part of the losses that concern the public. No one has problems understanding why people complain about the income tax, despite the fact that those complaints arise from more than just the tax’s deadweight loss. People cannot help also noticing the transfer of some of their income into the hands of government. The fact that the tax may pay for programs they favor is a separate issue.

Similarly, the general public is no doubt conscious of inflation’s implicit tax on their cash balances, the source of government seigniorage. The public’s belief that on average inflation reduces their real buying power is in fact technically right—despite the offsetting gain to government. Even if all prices rise in lock-step together, whatever money people hold declines in purchasing power. The longer they hold it or the more severe the inflation, the greater the decline. Moreover, unlike income and other taxes, which people in democratic countries may think they have some control over through voting, the seigniorage tax appears utterly beyond their control. This separates it further from any allegedly beneficial government programs that it may finance. In fact, people are often aware of their loss without realizing at all that government is gaining.

Admittedly the magnitude of the inflation tax is much lower than that of the income tax, at least in developed countries like the United States. Equaling total government seigniorage, it is best measured as the real additions to the stock of base money (i.e., high-powered or outside

money)—rather than the concomitant flow of annual interest that the government saves by issuing base money in lieu of debt—because people experience most of the transfer as a decline in the purchasing power of their existing cash balances. (That portion of base money growth that does not manifest itself in inflation still transfers resources from the public to the government, as will be elaborated on below). I estimate that during the high inflation of the 1970s in the U.S. seigniorage thus measured covered close to 2 percent of total federal outlays. This agrees with Haslag (1998, 19, n. 2), while Fischer (1982, 308) and Mankiw (2007a, 90) put the number at less than 3 percent of government *receipts*, which have consistently been below *outlays*. With government outlays hovering around 20 percent of GDP throughout the 1970s, we have an implicit tax that was not more than 0.4 percent of GDP.¹ Today it is even lower at the low levels of inflation that the United States has experienced over the last few decades. Because so many dollars are now held abroad, what little seigniorage the United States extracts is partly imposed on foreigners. Which is why public complaints about inflation have been recently quite muted, if not nonexistent. But however low the seigniorage tax, it still necessarily adds a burden felt by taxpayers on top of the deadweight loss.

Moreover, given that the poor hold a higher proportion of their wealth in the form of cash balances than do the rich, the incidence of this implicit tax is regressive. It may even encompass individuals that the federal government does not otherwise tax. Finally, we should add that the period when U.S. inflation hit double digits, the 1970s, was before financial deregulation became comprehensive. With checking accounts unable to legally pay any interest and savings accounts facing interest rate ceilings that were not fully phased out until 1986, the erosion of cash balances tended to be extended from the monetary base to the broader monetary aggregates, M1 and M2, increasing the loss imposed on money holders. To be sure, some of that additional loss was a gain to commercial banks that was *eventually* competed away through non-price competition and financial innovation. NOW accounts, with interest-bearing checking, were first issued by Massachusetts and New Hampshire mutual savings banks in 1972, and later money market mutual funds blind-sided the depositories.

¹ Fischer (1982, 308) estimates 0.5 percent of U.S. GDP for 1973-78. For comparison, see Fischer's seigniorage estimates for other countries, as well as those of Haslag (1998), whose sample of sixty-seven countries over the years 1965 to 1994 finds that seigniorage averaged about 2.0 percent of total output, ranging between as low as 0.25 percent to as high as 9.98 percent (for Ghana). See also Click (1998).

But here again, those who could most readily escape the loss of purchasing power were the most financially savvy, that is, the wealthy.

Inflation broke 10 percent at only two points during the 1970s, both times assisted by supply shocks. Mankiw's suggestion that the public failed to differentiate the two effects has much merit. Therefore, let us explore what would have been the seigniorage take from a steady-state, double-digit inflation fueled exclusively by monetary expansion. By the end of the decade, the ratio of the monetary base to GDP had sunk below 6 percent.² Assuming a constant real growth rate of 3 percent and no further changes in base velocity, the base would have had to grow by 13 percent annually to sustain 10 percent inflation. Seigniorage under those circumstances would have been almost twice as great, consistently taking nearly 0.8 percent of GDP.

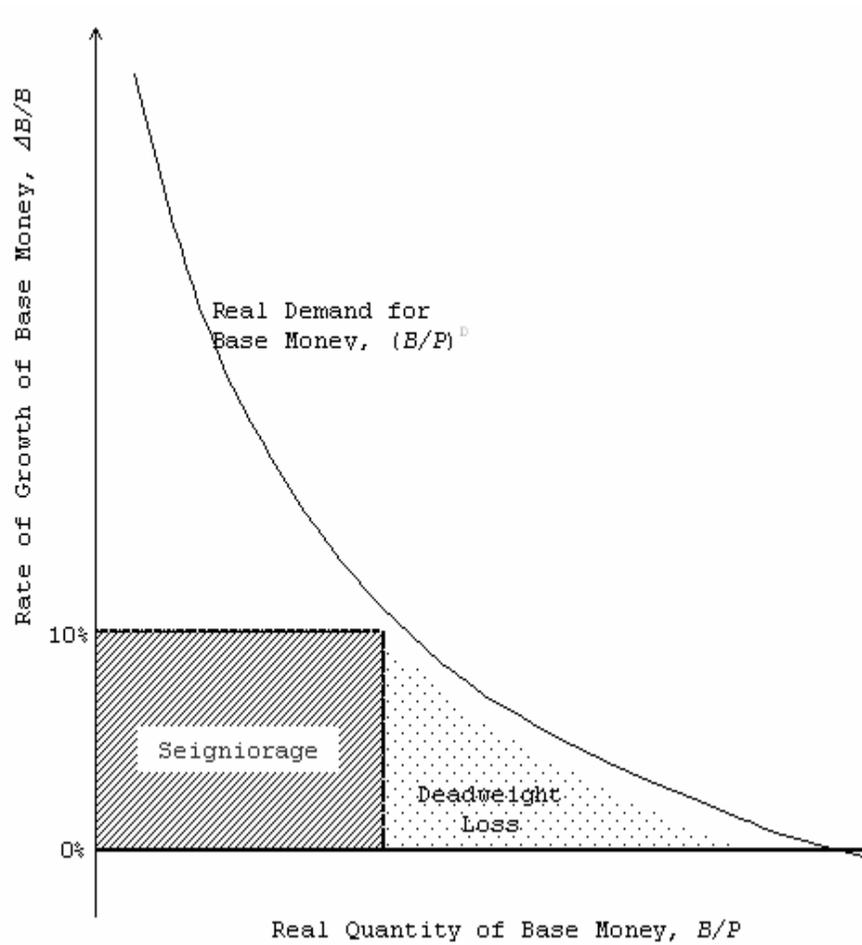
A simplified diagram as adapted by Lawrence H. White (1999, 147-8) from Martin J. Bailey's classic analysis of seigniorage (1956) provides insight into this tax and is shown in Figure 1. Since only increases in base money generate seigniorage, assume for a moment that the money multiplier remains constant. In that case, changes in the base are proportional to changes in the total money stock, and the real demand for base money is proportional to the real demand for the total money stock. Further assume no changes in output, and no changes in income velocity other than those brought about by changes in expected inflation, or what is equivalent, that output and velocity rise at the same rate except when inflationary expectations change. Finally, consider a steady state where expected inflation equals actual inflation. Let B represent the stock of base money and P the price level, so that real seigniorage for any given period equals $(\Delta B)/P$.

Under those assumptions, the rate of expected inflation will equal the rate of base money growth, and the real demand for base money, $(B/P)^D$, is a decreasing function of that growth, as depicted in Figure 1. (Any point along this curve represents a constant ratio of income velocity to output, although moving from one point to another involves a once-and-for-all change in velocity relative to output.) Notice the similarity with the standard analysis of transfers and deadweight loss from explicit taxes. At any given positive rate of base money growth, you will have a rectangle

²The figures I always use for the monetary base are *unadjusted* for changes in reserve requirements. I have found that the more widely reported base figures adjusted for changes in reserve requirements are seriously misleading in this and many other contexts. For instance, for 1980 the unadjusted monetary base was \$158.6 billion while the adjusted monetary base was only \$142.0 billion.

representing the seigniorage transfer from the public to the government, $(\Delta B/B)(B/P) = (\Delta B)/P$, and a triangle representing the deadweight loss.

Figure 1:
Seigniorage and Deadweight Loss from Fully Anticipated Inflation



This welfare loss results from inflation inducing people to hold less base money. It includes so-called “shoe-leather costs,” a term that trivializes and misleads about the resulting increased transaction costs. But the triangle does not necessarily include other costs of inflation, such as tax or relative-price distortions. Nor does it include inflation’s now well-established negative impact on growth. The triangle also ignores any distorting impact of other monetary interventions, among them deposit insurance and reserve requirements. Reserve requirements shift the demand curve for base money outward, at least at low levels of inflation.³ Deposit insurance presumably makes the inside money created by banks more attractive than currency and therefore has the opposite impact, unless that is offset by a simultaneous public shift out of less liquid financial instruments to inside money, with banks increasing their reserves in response. I know of no study that takes into account the welfare implications of these distortions of base money demand.

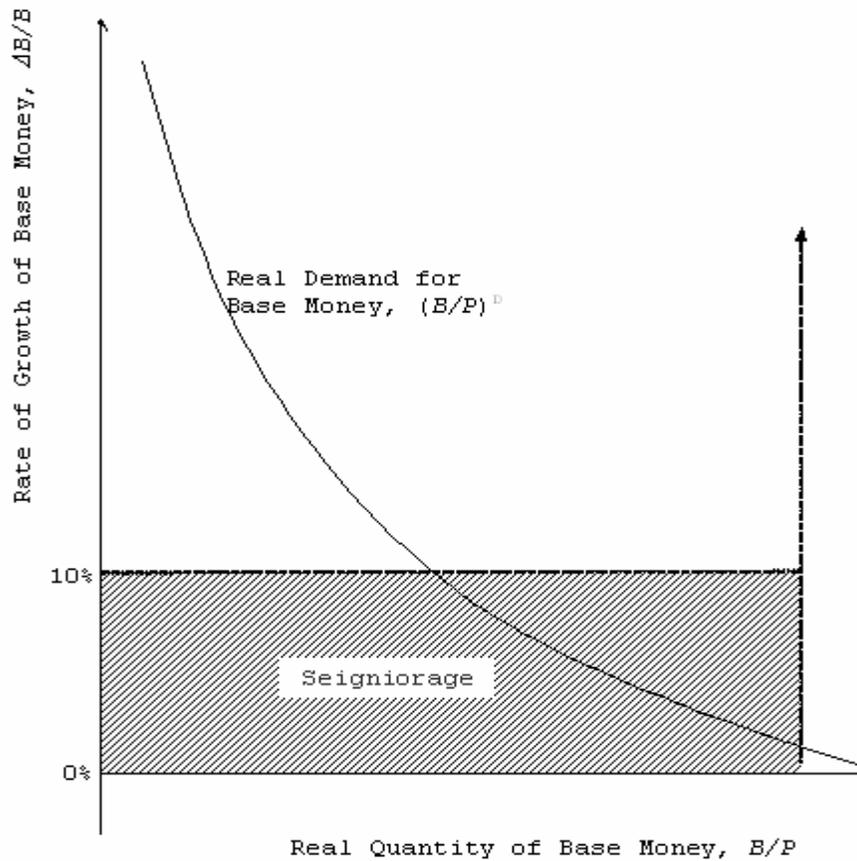
Notice that the diagram can even illustrate unanticipated inflation. If expected inflation is zero, for instance, the holding of base money will be a vertical ray where the demand curve crosses the horizontal axis, as in Figure 2. At the same rate of base money expansion as in Figure 1, seigniorage is greater but deadweight loss is less (in this case zero). The full loss to money holders is now approximately double the steady-state deadweight loss plus the steady-state seigniorage. The case where expected inflation is greater than zero but less than actual inflation could also be represented; it is a case with some welfare loss, while at the same time total losses to the general public rest somewhere between those for fully anticipated inflation and those for completely unanticipated inflation.

Complicating the diagram to make it more realistic unfortunately poses certain problems that have been exposed in an important but neglected Milton Friedman article (1971). Most attempts to estimate inflation’s welfare loss replace monetary growth on the vertical axis with the nominal interest rate, which incorporates anticipated inflation. This change ostensibly permits analysis when the growth of real output is positive. Yet this version of the graph obscures exactly where a constant monetary base and therefore zero seigniorage lie. Early studies measured deadweight loss from the horizontal line representing price stability, with the real and nominal rates of interest equivalent. But this will only correspond to

³See White (1999, 150-3) for the impact of reserve requirements on base money demand, and particularly, why at significantly high rates of inflation reserve requirements actually *decrease* that demand.

freezing the monetary base when velocity and output rise at the same rate. As Friedman has pointed out, growth of population or per capita output increase the demand for base money, *ceteris paribus*, making it possible for the government to extract seigniorage from the issue of new money even without any inflation. (Growth simultaneously causes the diagram's demand curve to shift outward, but that can easily be accommodated by changing the horizontal axis to measuring base money demand as a percent of nominal GDP.)

Figure 2: Seigniorage from Completely Unanticipated Inflation



Other studies put the baseline for determining deadweight loss at the famous Friedman (1969) optimum where deflation makes the return on base money equal the risk-free real rate of interest. Whatever else can be said for Friedman's optimum—and there is an extensive literature on the subject⁴—it is not *necessarily* the appropriate standard for isolating the deadweight loss from seigniorage *alone*. It will be so only if the rate of economic growth exceeds the growth of base velocity by exactly the real rate of interest. At any lower growth rate, Friedman's optimum can only be realized if government generates negative seigniorage (either in the form of interest on base money or a monetary contraction), which in turn must be financed by other taxes with their own deadweight loss. Friedman's optimum then becomes essentially a world where the government is partly paying back the public for *past* seigniorage. Nonetheless, real growth for the U.S. from 1960 on has generally exceeded by a few percentage points growth in base money velocity, despite the fact that any rise in the money multiplier shows up as a rise in base velocity. Thus, the Friedman optimum remains a better baseline for measuring seigniorage's deadweight loss than does zero inflation.

Actual estimates of the welfare loss from a 10 percent inflation in the United States necessarily depend upon specifying the demand function for money. Stanley Fischer (1981) estimated 0.3 percent of GDP. Robert Lucas (1981) came up with 0.45 percent of GDP, but his higher estimate was based on the demand for M1 rather than for the monetary base, because he wanted to capture the deadweight loss from interest-rate restrictions. Kevin Dowd (1994) arrived at a much lower figure for M1: only 0.12 percent of GDP. Thomas F. Cooley and Gary D. Hanson (1989) used a different method to reach similarly low results. Rather than allowing the demand for money to vary, they calibrated a real business cycle model, allowing output to vary while constraining velocity. With 10 percent inflation, holding base velocity constant caused GDP to fall by 0.112 percent, while holding M1 velocity constant caused GDP to fall by 0.387 percent.

All the studies mentioned so far used zero inflation as their baseline and are consequently biased downward. Martin Feldstein (1997), in contrast, bases his estimates on the Friedman optimum. He calculated the annual welfare gain to base money demand if inflation was reduced from only 2 percent to 0 percent at 0.02 percent of GDP. Using his method and parameters, I determined that the welfare loss from a 10 percent inflation was 0.73 percent of GDP. But Bennett T. McCallum's graduate textbook

⁴See Phelps (1973) and Casey and Sala-I-Martin (1997) for highlights.

(1989, 124-8) employed the demand for M1 to estimate a welfare loss of only 0.28 percent of GDP even with Friedman's lower baseline. Max Gillman (1995), a proponent of the Friedman baseline, compared these and myriad other studies, some of which employed the partial equilibrium approach illustrated in Figure 1 and others of which employed an approach similar to Cooley and Hanson with a general equilibrium model. Gillman reports that their estimates of the annual welfare loss from a 10 percent inflation vary all the way from 0.11 to 7.15 percent of real GDP.⁵ But after compensating for failure to use the Friedman baseline as well as other factors, he concludes that the reasonable range is between 0.85 and 3.0 percent of GDP. Even the low end of Gillman's reasonable range for deadweight loss exceeds the potential seigniorage from a sustained 10 percent inflation, 0.80 percent of GDP, suggesting that seigniorage quickly degenerates into a very inefficient tax.

Yet for explaining public fears about inflation, perhaps we should conservatively confine ourselves not to the potential losses from a 10 percent inflation but to the actual losses suffered in the U.S. during the 1970s. Recall that we only know for certain that government's seigniorage gain was approximately 0.4 percent of GDP. If people had been expecting zero inflation throughout the decade, then that percentage represents the entire loss to the general public. The inflation of the 1970s, however, was at least somewhat anticipated. We therefore must add some welfare loss to the seigniorage, possibly doubling the result to 0.8 percent of GDP. Still a small number, it could hardly be the only thing that makes people dislike inflation. Other factors that economists have speculated about could be at work, such as greater uncertainty (including uncertainty about the magnitude of the levy on cash balances), the unanticipated transfers between members of the general public, the difficulty of distinguishing relative price changes from inflation, and perhaps some money illusion. But that hardly justifies economists ignoring or being indifferent to dollars that inflation takes from the public and gives to the government.

So long as we are considering unanticipated inflation, we should also briefly mention other ways that inflation contributes to government revenue. There are two. First, unanticipated inflation benefits net debtors at the expense of net creditors, and government is the economy's largest debtor. Second, inflation enhances explicit taxes either through bracket creep or through taxes on saving. Here again, as in the work of Fischer,

⁵Gillman found an arithmetic error in Fischer's oft-cited original estimate of 0.3 percent of GDP, correcting it to 0.17 percent.

Lucas, and Feldstein cited above, economists have focused mainly on the resulting welfare losses rather than the transfers. Although bracket creep was eliminated from the income tax, it was a major factor during the 1970s (and is today enjoying a minor resurrection with the alternative minimum tax). Yet we can ignore the impact of inflation on explicit taxes under the plausible assumption that it directly feeds public dissatisfaction with those taxes rather than with inflation.

On the other hand, investors in Treasury securities undoubtedly attributed their below expected and even negative real returns during the 1970s to inflation. (Any offsetting gain through reduction of future real taxes required to finance government debt, even in the unlikely event that it was correctly and fully anticipated, was surely not credited to inflation.) And like seigniorage, this expropriation appears more arbitrary than normal taxes. My admittedly crude estimate of this transfer's magnitude during that decade, based on comparing the nominal change in the debt with the real change, is 5.0 percent of federal expenditures or 1.0 percent of GDP. This is an upper-bound estimate of the additional interest government would have had to pay on Treasury securities if investors had correctly anticipated inflation. I was unable to fully adjust for inflationary expectations raising nominal interest rates, although I have eliminated the component of the deficit financed through seigniorage. If the inflation of the 1970s had been perfectly anticipated, there obviously would have been no transfer whatsoever.⁶

At first glance, this loss, however high, may appear to be concentrated on the wealthy. But commercial banks held about 25 percent of Treasuries at the beginning of the 1970s, and member banks have always been *indirectly* required to do so, at capped returns, through their shares in the Federal Reserve. To that extent, government partially recaptured whatever real gains accrued to banks from issuing interest-restricted M1 and M2 liabilities. In any case, when added to our seigniorage estimates above, we now have the actual inflation of the 1970s costing the general public potentially as much as 1.8 percent of GDP, much of it ending up in government coffers. As a percentage of consumption, that amounts to around 3.0 percent.

⁶The work of Robert Eisner—notably (1989; 1986); and Eisner and Pieper (1984)—has done the most to call attention and even celebrate this effect of inflation. But he is unconcerned with the unanticipated transfer and, like me, has no estimates of how much of the real reduction of government debt was offset by higher Treasury interest payments.

Why the apparent failure of economists to consider the tax transfers resulting from inflation? Partially I suspect a holdover from the days when Keynesians still believed that there was a long-run trade off between inflation and unemployment. They therefore tended to minimize inflation's costs. This was exemplified as recently as 1987 in Alan Blinder's popular book, *Hard Heads, Soft Hearts: Tough-Minded Economics for a Just Society* (1987, 51). "I am forced to conclude," he wrote, "that inflations' most devout enemies exhibit verbal hysteria." The losses from inflation "appear to be quite modest—more like a bad cold than a cancer. . . . As rational individuals, we do not volunteer for a lobotomy to cure a head cold. Yet, as a collectivity, we routinely prescribe the economic equivalent of a lobotomy (high unemployment) as a cure for the inflationary cold."

Today, as Feldstein (1997, 123) points out, "[t]here is now widespread agreement in the economics profession that 'high' rates of inflation have significant adverse consequences and that these adverse effects justify the [temporary] sacrifices in employment and output that are generally needed to reduce inflation." But he hastily adds that "[t]here is . . . much less professional support for the goal of 'price stability'." Most macroeconomists now favor a low but still positive rate of inflation. Partly this reflects fears of unanticipated deflationary shocks. But primarily—as attested by the Taylor Rule, essentially a nominal GDP target—macroeconomists still believe that central banks have some role to play in dampening fluctuations in output and unemployment. And central banks can play that role more safely if the trend rate of inflation gives them room for tightening money growth without inducing any price declines.

Even the public finance literature, which quite openly recognizes seigniorage as a tax, reinforces the tendency among economists to ignore the loss to the public. Having become obsessed with determining the least inefficient mix of seigniorage and other taxes, much of this literature verges toward viewing seigniorage as a *net* benefit, because it allegedly reduces distortions from other taxes. Inflation, claims McCallum (1989, 129), just to cite one instance, "provides a benefit in the form of reduced tax collection."⁷ Although the assumption that government expenditures remain fixed may be the proper approach for some economic questions, it clearly does not illuminate public objections to taxation.

In the final analysis, the public may indeed overestimate the costs of inflation, even after counting their losses through seigniorage and other transfers to government. Yet macroeconomists are guilty of

⁷Phelps (1973) initiated this perspective.

underestimating the public's losses by forgetting this usually small but still arbitrary and unpredictable implicit tax.

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ABOUT THE AUTHOR

Jeffrey Rogers Hummel is Assistant Professor in the Economics Department at San Jose State University, where he teaches both economics and history. He received his Ph.D. in history from the University of Texas at Austin. He is the author of *Emancipating Slaves, Enslaving Free Men: A History of the American Civil War*.