

Comment on Giavazzi and McMahon, ‘The Household Effects of Government Spending’¹

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This is an excellent paper on the effects of government spending that is well worth studying. Most of my discussion focuses on the background and motivation for the analysis. I begin by describing what it is about the current economic situation in the US and other countries which motivates interest in the economic effects of government spending. Perhaps the natural place to look for information on the effects of government spending is the time series data. I review the information in the US time series data since 1940 using the different approaches taken by Ramey and Hall in this volume. I show that whatever information there is in the data about the effects of government spending primarily stems from the Korean War and World War II episodes. I explain why the evidence on the government spending multiplier (i.e., the output effect of an increase in government spending) in these episodes is probably of limited value from the perspective of the current situation. This is why it is important to study other sources of evidence on the multiplier. This paper studies such other evidence by examining the response of consumption and labor in a cross section of states of the United States. As the authors themselves emphasize, however, inferring information on the multiplier from the evidence they gather is problematic. Still, the work they do is important because it clarifies some of the channels by which government spending affects household decisions.

1 One Set of Reasons for Taking an Interest in the Effects of Government Spending

The authors’ work can be appreciated from many different angles and I begin by describing one of them. There is widespread concern in the United States and other countries about the weak level of economic activity and high level of unemployment since 2008. One view is that the low level of activity reflects a failure of aggregate demand. A popular version of this view holds that the failure of aggregate demand stems from reduced spending by households and others as they struggle to reduce their levels of debt. In models of well-functioning markets, this kind of situation would trigger a fall in the relative price of current goods (i.e., the real interest rate), thus encouraging other people (e.g., the people who own the debt of the heavily indebted people) to shift expenditures away from future goods and towards present goods. In this way, the price mechanism minimizes what would otherwise be a waste of the resources available for current production. The aggregate demand failure view holds that, for various reasons,

¹I am very grateful for discussions with Benjamin Johannsen. I am particularly grateful for his assistance on the computations for Valerie Ramey’s vector autoregression, reported below.

the fall in the real interest rate just described is prevented from occurring. To see why, consider the real rate of interest

$$\frac{R_t}{\pi_{t+1}^e},$$

where R_t denotes the gross nominal rate of interest and π_{t+1}^e denotes the public's expectation of inflation. In the US and other countries, the nominal rate of interest is near its lower bound of unity. At the same time, π_{t+1}^e does not rise, presumably because of the credibility of central banks' commitment to low inflation. According to the aggregate demand failure view of the current slump, the inability of the real rate of interest to fall sufficiently is the cause of the low current rate of utilization of capital and labor.

Various policies have been proposed for addressing the problem of low aggregate demand. One set of policies would use various types of taxes to stimulate spending (see, e.g., Correia, Fahri, Nicolini and Teles (2010)). Another set of policies would directly boost aggregate demand by increasing government spending (see, e.g., Christiano, Eichenbaum and Rebelo (2011) and Eggertsson (2010)). Those who argue for government spending note that low utilization of resources suggests the benefits, net of the social cost, of additional spending is high. For example, unemployed teachers could be working to raise the human capital of children. Layed-off construction workers could be doing much-needed repairs to crumbling US infrastructure. Proponents of government spending also note that financial markets are willing to lend funds to the US Federal government at virtually zero interest.

A key question, in evaluating government spending as a way to help get us out of the current slump, is how much will it boost output? If for every bridge the government repairs, a factory somewhere else goes unbuilt, then it is not so obvious that government spending is desirable. A rise in government spending could in principle even have a negative effect on output if it creates large enough tax distortions either through standard deadweight loss effects or by creating a climate of uncertainty.²

These considerations are what motivate interest in the size of the government spending multiplier, the ratio of the increase in output divided by the increase in government spending. The objective of this paper is to shed light on the government spending multiplier using data and a minimum of economic assumptions. Of course, in this endeavor it is important that the evidence be drawn from circumstances that resemble our current situation. That is, we are interested in the effects of an increase in government spending that (i) must presumably be financed eventually, but not by an immediate rise in taxes; (ii) is most likely temporary; and (iii) is unlikely to be accompanied by a rise in the nominal rate of interest, since the zero bound on that rate appears to be very binding.

²See Baker, Bloom and Davis (2011).

2 Time Series Evidence

The amount of relevant information in the time series about the government spending multiplier appears to be limited. Consider, for example, the vector autoregression (VAR) study in Valerie Ramey’s contribution to this volume. The three panels in Figure 1 display the implications of her ‘News EVAR’ VAR for the government spending multiplier. For the purpose of these calculations, I define this multiplier as follows:

$$\text{multiplier} = \frac{\sum_{j=0}^{\infty} \left(\frac{1}{1+r}\right)^j \bar{Y}_{t+j}}{\sum_{j=0}^{\infty} \left(\frac{1}{1+r}\right)^j \bar{G}_{t+j}}.$$

Here, \bar{Y}_t and \bar{G}_t denote the responses in GDP and government spending, respectively, to a government spending news shock. Also, the real interest rate, r , was set to 3.6 percent, at an annual rate.

The calculations in Figure 1 were performed as follows. The vector of variables, y_t , in the VAR (kindly provided by Valerie Ramey) is defined as follows:

$$y_t = \left[PV_t/GDP_{t-1} \quad \log G_t \quad \log(GDP_t - G_t) \quad R_t \quad \text{average marginal tax rate} \right]'$$

Here, G_t denotes Federal, State and Local Government purchases of goods and services, GDP_t denotes real gross domestic product in quarter t , R_t denotes the three month Treasury bill rate and the last variable is an estimate of the average marginal tax rate constructed by Barro and Redlick (2011). The variable, PV_t , is Ramey’s measure of the present discounted value of government spending. Following Ramey, the VAR includes a constant, four lags of y_t and a quadratic time trend. I compute the innovation to PV_t/GDP_{t-1} (the ‘news shock’) applying the approach in Ramey’s ‘News EVAR’ specification.³ The posterior distribution of the multiplier using several sample periods is reported in Figure 1.⁴ The top panel in Figure 1 displays the posterior distribution when the whole sample of data is used. The mode is below unity, and the distribution is moderately spread out. The middle distribution excludes the World War II period and note how the posterior distribution fans out substantially more. Finally, the distribution in the bottom panel drops both the World War II and

³The average value of the private spending to government spending ratio, $(GDP_t - G_t)/G_t$, in the data set is 3.76. Then, $\bar{Y}_t = 3.76 \times \hat{y}_{3,t} + \hat{y}_{2,t}$ and $\bar{G}_t = \hat{y}_{2,t}$, $y_t = [y_{1,t} \quad y_{2,t} \quad y_{3,t} \quad y_{4,t} \quad y_{5,t}]$ and a hat over a variable indicates its impulse response to the news shock.

⁴The posterior distribution was computed using the MCMC algorithm. The results in Figure 1 make use of a flat prior on the VAR parameters. The computations were also performed with a ‘Minnesota prior’ and the results were virtually the same. Let θ denote the vector of VAR parameters. Corresponding to each MCMC draw of θ , impulse responses in (\bar{Y}_t, \bar{G}_t) to a news shock were computed and these were used to compute the multiplier defined in the text (the infinite sum was truncated at horizon 500). A large number of θ ’s was drawn using the MCMC algorithm and the multiplier was computed in each case. Figure 1 displays the resulting histogram of the multiplier.

Korean episodes. Note that now the data are essentially completely uninformative about the multiplier. I conclude that the only information about the multiplier comes from the Korea and World War II episodes.⁵

My next time series evidence uses the methodology and annual data covering 1930-2008 used by Hall in his paper in this volume.⁶ The data are the annual change in military spending and the annual change in real GDP, each divided by lagged GDP. Let the military spending variable be denoted m_t and let GDP growth be denoted by y_t . The scatter plot of m_t and y_t is displayed in Figure 2. As a benchmark, I also display the curve, $y_t = a + m_t$, where a is the sample mean of y_t minus the sample mean of m_t . The data in Figure 2 are differentiated according to whether they belong to the World War II period, the period of the Korean War or other periods.

Note first that there is very little variation in military spending outside of the two war periods (see the observations indicated by a '+'). With so little variation, we do not expect to be able to get a precise measure of the multiplier, dy_t/dm_t , from these observations. Still, the least squares line computed using these data imply a very small multiplier, 0.45 (see Table 1). The observations indicated by circles correspond to the Korean War. There is notably more variation in m_t in the Korean war period. Those observations generally lie along a line that is flatter than the 45 degree line, so that those data suggest the multiplier is below unity. According to Table 1, the least squares estimate of the multiplier is 0.90. Finally, the greatest degree of variation in m_t is exhibited by the World War II data. Those observations lie along a line noticeably flatter than the benchmark curve. This is why, according to Table 1, the least squares estimate of the multiplier for that period is so small, 0.51.

The evidence in Figure 1 is consistent with the implications of the Ramey VAR analysis. Most of the information about the multiplier in the time series comes from World War II and the Korean war. Moreover, they do not provide much support for the notion that the multiplier is much larger than unity.

$y_t \sim GDP \text{ growth}, m_t \sim (\text{military spending}_t - \text{military spending}_{t-1})/GDP_{t-1}$		
Sample period	a	b
non-war period	0.03	0.45
World War II	0.06	0.51
Korea	0.02	0.90
Whole sample, 1930-2008	0.03	0.55

But, is the evidence on the government spending multiplier from the two wars relevant to the current situation? Part of the answer can be seen in Figure 3. The top panel displays the Barro and Redlick (2011) tax data. Note that in each of World War II and the Korean War, there was a sharp rise in taxes. So, those

⁵A version of Figure 1 as computed using Ramey's 'Blanchard-Perotti SVAR' approach, with similar results.

⁶These were kindly provided by Hall in an excel file with the name, "Fig weights, Tables VARs and regs".

episodes do not share characteristic (i) in the current situation, that the rise in government spending is not likely to be accompanied by a rise in taxes right away. The top panel displays Hall's data on the log of real defense spending. Note that the expansion in military spending in the Korean war turned out to be essentially permanent. To the extent that people has a sense of this in real time - perhaps they interpreted Korea as the first battle in a long (mostly) cold war - they would have viewed the rise in military spending as being persistent. In this respect, the Korean war episode does not satisfy our characteristic (ii), that it be temporary.⁷ Finally, rationing in World War II greatly biases estimates of the multiplier based on that period. Arithmetic requires that for the multiplier to be big, private spending must increase. But, under rationing this possibility is ruled out by law. For these reasons, the US time series data beginning with World War II appear to have little information about the government spending multiplier that is relevant for the current situation.

Interestingly, Gordon and Krenn (2011) argue that the two years right before the entry of the US into World War II do provide information about the government spending multiplier that is relevant to present circumstances. Military spending began to rise sharply "...starting in June 1940, fully 18 months before Pearl Harbor" (abstract, Gordon and Krenn (2011)). They note that the interest rate was roughly constant during that period, so that is it consistent (iii) above. Also, there was no rationing at that time and there was considerable slack in the economy, as there has been in the US economy in recent years. Gordon and Krenn (2011) argue that the quarterly data on this period warrant the conclusion that the multiplier is as high as 2.5. This is an important observation. Still, given the short sample on which it is based, it is important to find additional corroborating evidence.

3 Observations on the Paper

The preceding observations make clear why the topic of this paper is important. In addition, my brief summary of the time series evidence suggests that additional sources of information about the multiplier are needed. Exploiting one such source of information is the stated objective of this paper.

The authors study the household consumption and labor supply response to a government spending shock. Identification proceeds as in Nakamura and Steinsson (2011). When government spending increases, its distribution across states of the United States is not completely predictable. States that receive an unexpectedly high share of government spending experience a positive spending

⁷It is not clear what the direction of bias might be. The impact of the persistence of government spending shocks on the spending multiplier is not robust across dynamic economic models. According to a real business cycle model, the more persistent is the rise in government spending the greater is the government spending multiplier. This reflects the negative wealth effect of government spending on labor supply. The New Keynesian model de-emphasizes labor supply. As a result, the more persistent is a government spending shock in that model, the smaller is the multiplier. This reflects the negative wealth effect on consumption. See Christiano, Eichenbaum and Rebelo (2011) for further discussion.

shock and states that receive an unexpectedly low share of government spending receive a negative spending shock. Because of the richness of the authors' data set, they can identify how different types of households in a state respond to a state government spending shock and how their responses might vary over the business cycle. This type of information is of great interest for understanding how people respond to shocks.

As the authors themselves emphasize, it is not so clear whether the analysis sheds light specifically on the government spending multiplier as discussed in the first section above. For example, the positive spending shock received by a state under the authors' identification generates virtually no need for additional future taxes. The reason is that if one dollar of additional government spending finds its way into a particular state, the extra taxes to finance that extra dollar are paid by all states. As a result, one of the objectives of the research appears not to be possible. It is not possible to use the authors' analysis to determine whether the transmission mechanism for government spending implied by the IS-LM model corresponds better with the data than the mechanism implied by intertemporal models like the real business cycle model. A key difference between these models is that households in the former ignore future taxes, while households in the latter fully internalize them.

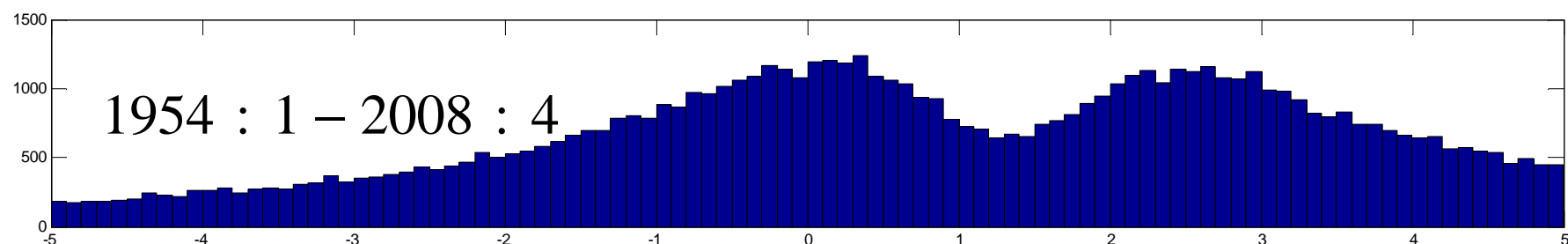
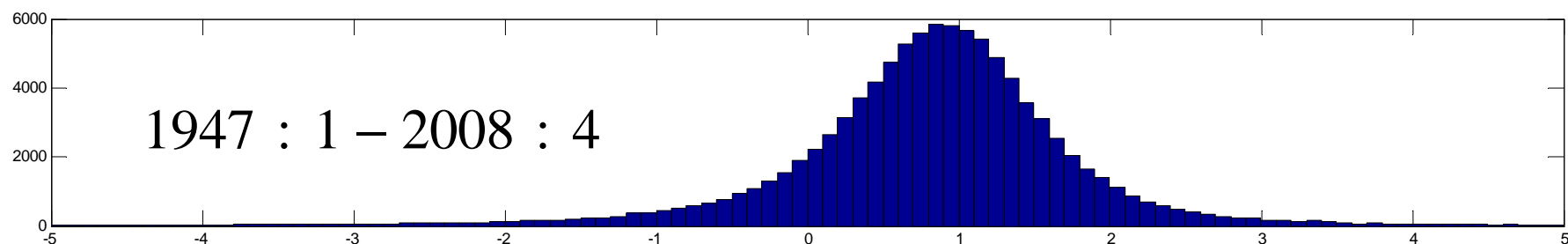
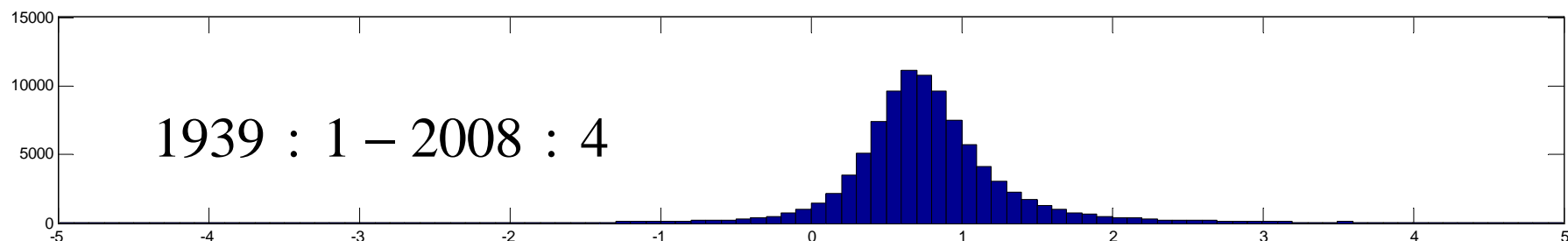
Perhaps a better way to think of the analysis in the paper is to think of the states of the United States as separate, small open economies.⁸ In effect, a rise in government spending in a particular state is equivalent to a rise in that state's exports. When a country experiences a rise in export demand, there is no sense in which the citizens expect to pay higher taxes in the future to finance those exports. Thinking of the analysis as shedding light on the effects of an export shock may also clarify some results which at first seem puzzling. For example, the authors find that low income households respond to a rise in government spending shocks by working longer hours and consuming less. High income households respond by consuming more. Pursuing the small open economy idea, imagine that each state is a small open economy with a traded good and a non-traded good sector. Suppose that a state experiences a rise in government spending in the form of increased government purchases from the state's higher income people. Suppose also that this increases the rent those people earn on their human and physical capital. Because the increased government spending raises their wealth, the higher income people respond by purchasing more consumption goods, including non-tradable consumption goods. This raises the price of non-tradable consumption goods and in effect acts as a tax on the low income people. This negative wealth effect suffered by poor people causes them to work harder and consume less.

⁸This is an interpretation of this type of analysis stressed in Nakamura and Steinsson (2011).

References

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Figure 1: Posterior Distribution of Government Spending Multiplier Implied by Ramey VAR



Excludes Korea and WWII

Figure 2: Hall's Evidence on the Multiplier

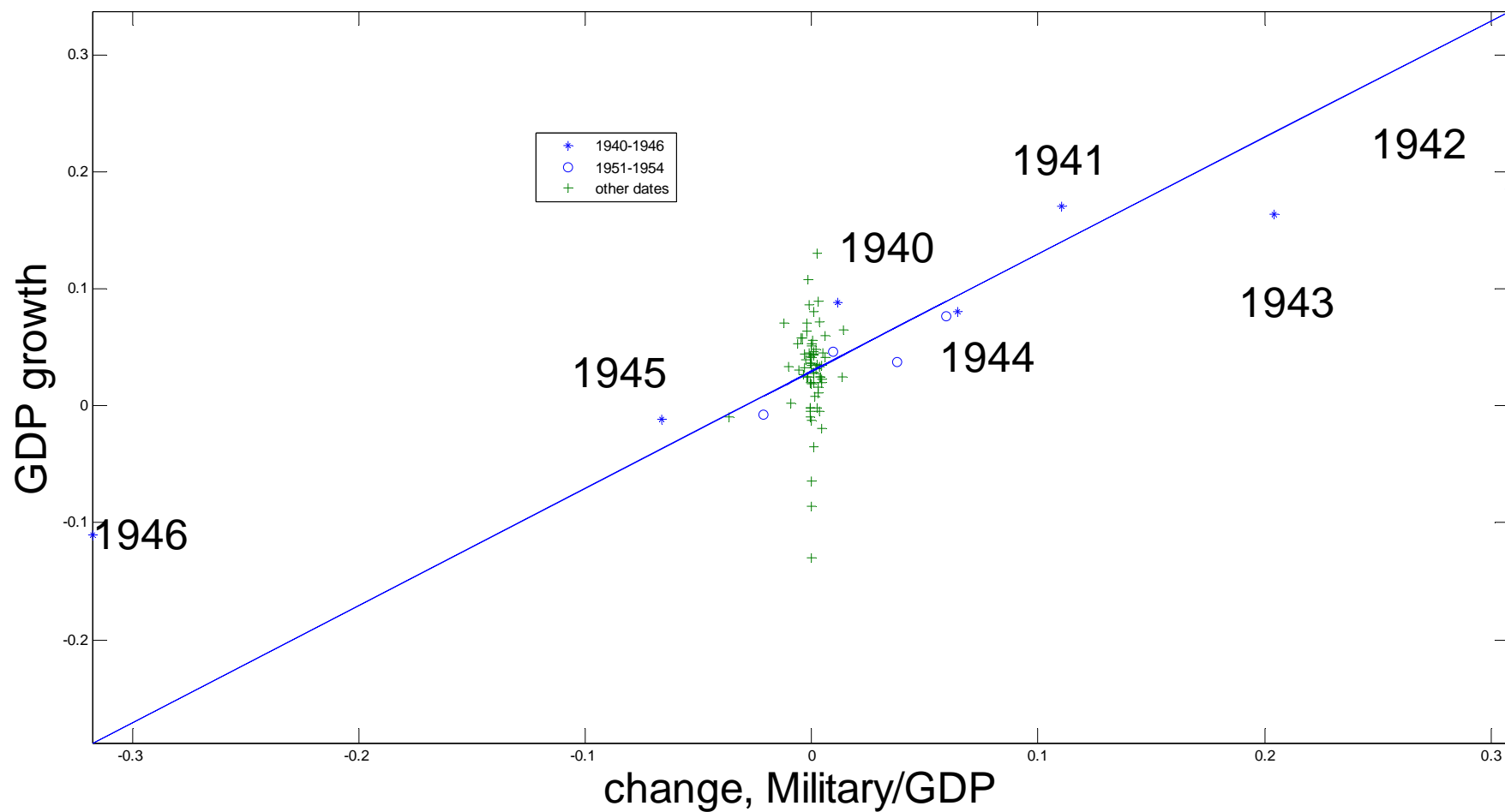
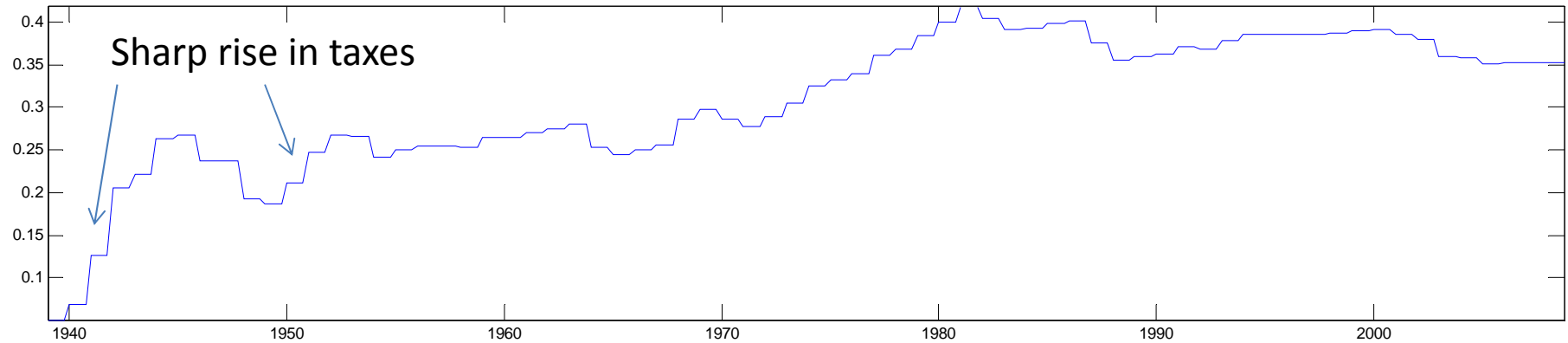
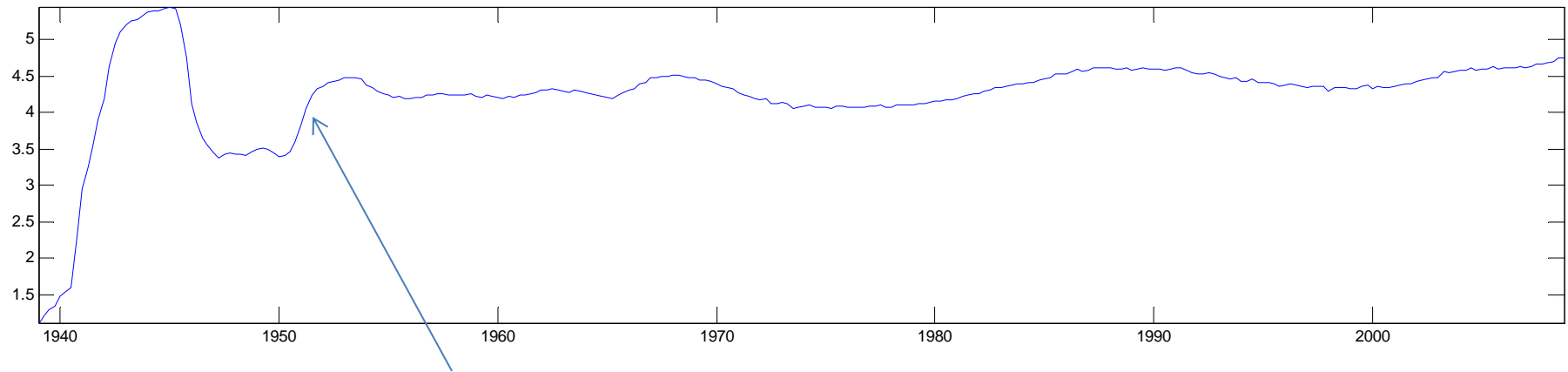


Figure 3: Government Spending and Tax Data

Barro-Redlick tax rate



log, real defense spending



Jump in military spending may have been interpreted as 'permanent', the first battle in the cold war.