FEDERAL RESERVE BANK of ATLANTA

# The McKenna Rule and U.K. World War I Finance

James M. Nason and Shaun P. Vahey

Working Paper 2007-3
February 2007

WORKING PAPER SERIES

FEDERAL RESERVE BANK *of* ATLANTA | WORKING PAPER SERIES

# The McKenna Rule and U.K. World War I Finance

James M. Nason and Shaun P. Vahey

Working Paper 2007-3
February 2007

**Abstract:** The United Kingdom employed the McKenna rule to conduct fiscal policy during World War I (WWI) and the interwar period. Named for Reginald McKenna, Chancellor of the Exchequer (1915–16), the McKenna rule committed the United Kingdom to a path of debt retirement, which we show was forward-looking and smoothed in response to shocks to the real economy and tax rates. The McKenna rule was in the tradition of the "English method" of war finance because the United Kingdom taxed capital to finance WWI. Higher rates of capital taxation also paid for debt retirement during and subsequent to WWI. The United Kingdom was motivated to implement the McKenna rule because of a desire to achieve a balance between fairness and equity. However, the McKenna rule adversely affected the real economy, according to a permanent income model. WWI and interwar U.K. data support the prediction that real activity is lower in response to higher past debt retirement rates.

JEL classification: E6, N4

Key words: war finance, McKenna rule, debt retirement, capital income tax rate, permanent income

---

The authors thank Ellis Tallman for many useful comments. Annie Tilden and Kateryna Rakowsky provided excellent research assistance. The views expressed here are the authors' and not necessarily those of the Federal Reserve Bank of Atlanta, the Federal Reserve System, the Reserve Bank of New Zealand, Norges Bank, or their respective staffs. Any remaining errors are the authors' responsibility.

Please address questions regarding content to James M. Nason, Federal Reserve Bank of Atlanta, Research Department, 1000 Peachtree Street, N.E., Atlanta, GA 30309, jim.nason@atl.frb.org, or Shaun P. Vahey, Norges Bank, Research Department, Bankplassen 2, N – 0107, Oslo, Norway, shaun.vahey@norges-bank.no.

Federal Reserve Bank of Atlanta working papers, including revised versions, are available on the Atlanta Fed's Web site at www.frbatlanta.org. Click "Publications" and then "Working Papers." Use the WebScriber Service (at www.frbatlanta.org) to receive e-mail notifications about new papers.

# The McKenna Rule and U.K. World War I Finance

Participants in a war finance session of the 1917 American Economic Association meetings deliberated options for fiscal strategy during World War I (WWI). O.M.W. Sprague (1917) and his discussants commended the "English method" of finance, characterized by contemporary taxation of factor incomes to finance wartime government spending. The English method of war finance differs from the tax smoothing model which proposes debt finance of emergency (*i.e.*, war) expenditures; see S. Rao Aiyagari, Albert Marcet, Thomas J. Sargent, and Juha Seppälä (2002).

This paper argues that U.K. WWI fiscal policy followed the English method identified by Sprague (1917) and his discussants and revived by the U.S. to finance the Korean War (see Lee E. Ohanian (1997)). During WWI, U.K. fiscal policy adopted the "McKenna rule" named for Reginald McKenna, Chancellor of the Exchequer (1915 – 16). McKenna presented his fiscal rule to Parliament in June 1915. The McKenna rule guided U.K. fiscal policy for the rest of WWI and the interwar period. We draw on narrative evidence to show that motivation for the McKenna rule came from a desire to treat labor and capital fairly and equitably, not pass WWI costs onto future generations, and commit to a debt retirement path and higher taxes. However, a permanent income model suggests the McKenna rule adversely affected the U.K. because a higher debt retirement rate produces a lower consumption-output ratio. A 1916 – 37 sample supports this prediction.

## I. A Narrative of U.K. Fiscal Policy during and after WWI

Contrary to the initial expectations of U.K. policymakers, the persistent and costly nature of WWI was apparent when McKenna became Chancellor of the Exchequer in May 1915.[1] Rather than rely on debt finance, McKenna's September 1915 budget committed the U.K. to a debt retirement path and higher taxes as demanded by Parliament and The City of London. A commitment to

a debt retirement path came from a belief that owners of government bonds should not profit from WWI and that future generations should not have to pay for WWI, as argued by Pigou (1916). Nonetheless, there was skepticism about McKenna's proposed fiscal rule. McKenna had several opportunities to convince Parliament and The City of London that he was committed to his fiscal arithmetic. The first, in the summer of 1915, stressed the need for higher taxes to meet anticipated temporary increases in government expenditures: "... we shall have to find further money, and it is perfectly open to anybody to calculate what. They only have to reckon the time when ... the mere interest on [loans] will have exhausted all our surplus revenue, then ... [w]e must raise fresh taxes" McKenna (Hansard (Commons), June 21, 1915, col 1000).

The McKenna rule restrained U.K. fiscal policy during and after WWI by tying "interest" to all financial flows on government debt. In this case, interest was the sum of coupon payments, rolled over maturing debt, and provision for future debt retirement. The last of these, a "sinking fund", greatly added to the budget; Wormell (2000, p. 202, pp. 662 – 698). For example, McKenna projected interest of five percent in the April 1916 budget when consuls paid below four percent.

McKenna also used the April 1916 budget to clarify further his fiscal policy. In that budget, he explained that "surplus revenue" referred to "ordinary" peacetime primary budget surpluses. Thus, McKenna committed post-armistice fiscal policy to peacetime budget surpluses, while excluding temporary "extraordinary" revenue and expenditure.

Besides committing to a debt retirement path, the McKenna rule required revenue to satisfy the government budget constraint. Under the McKenna rule, the Chancellor chose a debt path, which implied a debt retirement rate, $\kappa_t$. Next, the Chancellor selected among possible revenue sources to meet government expenditures needs, but McKenna did not commit future policy to a specific tax. However, Daunton (2002) argues that the tax burden fell heaviest on capital because

U.K. policymakers wanted to provide a "just mix" of current taxation and debt. This just mix aimed to strike a balance between fairness and equity to limit rents (*i.e.*, war profits) earned by capital.

McKenna revealed his preference to place the heaviest tax burden on owners of capital in the September 1915 and April 1916 budgets. The September 1915 budget saw higher statutory income tax rates combined with lower exemption limits, and the introduction of the extraordinary Excess Profit Duty (EPD); Peden (2000, pp. 90 – 91). The EPD was intended to offset temporary wartime expenditures. It was set at 50 percent in the September 1915 budget, 60 percent in the April 1916 budget, and raised to 80 percent by 1918 prior to being phased out in 1921.[2]

Capital took the brunt of the tax burden, especially after WWI, according to figure 1. It plots mean $\tau_{K,t}$ (excluding the EPD) and labor income tax rates, $\tau_{N,t}$, from 1916 to 1937. Subsequent to 1920, $\tau_{K,t}$ is 9.5 percentage points larger than $\tau_{N,t}$, on average. This indicates U.K. fiscal policymakers preferred to adjust $\tau_{K,t}$ to satisfy the government budget constraint, given $\kappa_t$.

McKenna's tenure as Chancellor ended with the Liberal government collapse in December 1916. Thus, it fell to others to maintain the McKenna rule. McKenna's immediate replacement, Bonar Law (Chancellor 1916 – 19) and his successor Austen Chamberlain (Chancellor 1919 – 21), explicitly cited the McKenna rule as the basis of fiscal policy; Wormell (2000, pp. 348 – 349, p. 393). Law and Chamberlain promised to continue to finance the sinking fund. Chamberlain also oversaw the expected phase out of the EPD with the end of WWI. Since the peacetime McKenna rule required other revenue sources, there was a shift from profit to capital income taxes to meet the revenue shortfall. This shift was accelerated by tax reform in 1920. Subsequent Chancellors, Robert Horne (1921 – 22), Stanley Baldwin (1922 – 23), Philip Snowden (1924, 1929 – 31), Winston Churchill (1924 – 29), and Neville Chamberlain (1923 – 24, 1931 – 37), used their discretion to fine-tune debt retirement while operating within the confines of the McKenna rule.

## II. The McKenna Rule Accounting Exercise

This section uses the McKenna rule restrictions to study the implications for the path of debt retirement. Begin with the government budget constraint

$$(1) \quad D_{t+1} + \tau_{C,t}C_t + \tau_{N,t}w_tN_t + \tau_{K,t}(Y_t - w_tN_t) + \tau_{P,t}P_{*,t} \geq G_t + (1 + r_{D,t})D_t + Tr_t,$$

where $D_{t+1}$ is the (real) stock of debt, $\tau_{C,t}$ is the tax rate on consumption $C_t$, $\tau_{N,t}$ is levied on the wage bill $(w_tN_t)$, $\tau_{K,t}$ is levied on net profits $(Y_t - w_tN_t)$, $\tau_{P,t}$ is the EPD rate on profits net of average profits $P_{*,t}$, $G_t$ is total government expenditure, $r_{D,t}$ is the (real) return on $D_t$, and $Tr_t$ denote transfers.[3] Note that $G_t = G_{O,t} + G_{W,t}$, where $G_{O,t}$ and $G_{W,t}$ denote ordinary peacetime and temporary wartime government expenditures, respectively.

Explicit in McKenna's statement to Parliament in June 1915 was that financial flows on debt, which included the provision for future debt retirement (*i.e.*, the sinking fund), must be paid out of the ordinary peacetime surplus. Under the McKenna rule, ordinary peacetime revenue was $T_{O,t} \equiv \tau_{C,t}C_t + \tau_{N,t}w_tN_t + \tau_{K,t}(Y_t - w_tN_t) - Tr_t$, which made $T_{O,t} - G_{O,t}$ the ordinary peacetime primary surplus. Thus, McKenna's June 1915 statement is given by the inequality

$$(2) \qquad \kappa_tD_t + r_{D,t}D_t \leq T_{O,t} - G_{O,t}, \quad 0 \leq \kappa_t \leq 1,$$

where $\kappa_tD_t$ represents resources earmarked for debt repayment.

The inequality $(2)$ and the government budget constraint $(1)$ restrict the debt path of the McKenna rule. This follows from imposing equality on $(2)$ and combining it with $(1)$ to obtain

$$(3) \qquad D_{t+1} = (1 - \kappa_t)D_t + G_{W,t} - \tau_{P,t}P_{*,t},$$

which is the McKenna rule law-of-motion of government debt. Note that new debt was issued only to finance extraordinary spending net of wartime EPDs, but $\kappa_t$ dictated the debt retirement rate.

The McKenna rule parameter $\kappa_t$ determines the persistence of the government debt process, given movements in net extraordinary wartime expenditures. As $\kappa_t \rightarrow 0$, the government debt process $(3)$ approximates a random walk driven by fluctuations in net wartime spending. In this case, debt dynamics are in accord with predictions of the tax-smoothing model. If $\kappa_t > 0$, tax smoothing no longer approximates the fiscal outcomes that arise under the McKenna rule.

## III. The McKenna Rule and Permanent Income

The McKenna rule had implications for the U.K. economy besides driving the path of debt retirement and the allocation of the tax burden. This section shows that $\kappa_t$, which controlled the debt retirement path, was forward-looking. This indicates that the McKenna rule acted to smooth the debt retirement path, rather than smooth, say, $\tau_{K,t}$. Another implication of the McKenna rule is that it had an adverse effect on the U.K. economy. An example is presented in this section that uses a permanent income model to depict one such effect.

We establish the forward-looking nature of the McKenna rule with a first-order Taylor expansion around its steady state of the budget constraint $(1)$ and the McKenna rule law of motion of debt $(3)$. Equate the resulting linear difference equations to obtain

$$
\begin{aligned}
(4) \qquad \widetilde{\kappa}_t \;=\; & \frac{1-\kappa^*}{\kappa^*}\,\widetilde{x}_t \;+\; \frac{\gamma_y^*\, g_W^*}{\kappa^*}\left(\frac{D}{Y}\right)^{*-1}\widetilde{g}_{W,t} \;+\; \frac{\kappa_r^*}{1-r_y^*\mathbf{E}_t\mathbf{L}^{-1}}\left[\gamma_y^*\,\widetilde{\gamma}_{y,t} \;+\; \frac{1-\kappa^*}{r_y^*}\,\widetilde{x}_t\right], \\
\widetilde{x}_t \;\equiv\; & \left(\frac{D}{Y}\right)^{*-1}\left[\tau_C^*\left(\frac{C}{Y}\right)^*\left(\widetilde{\frac{C}{Y}}\right)_t \;+\; (\tau_N^*-\tau_K^*)\,w_{yN}^*\,\widetilde{w}_{yN,t} \;-\; \frac{r_y^{*-1}\,r_D^*}{1+r_D^*}\widetilde{r}_{D,t} \;-\; g^*\widetilde{g}_t\right] \\
- \;\; & \left(\frac{Tr}{D}\right)^*\left(\widetilde{\frac{Tr}{Y}}\right)_t \;+\; \left(\frac{D}{Y}\right)^{*-1}\left[\left(\frac{C}{Y}\right)^*\tau_C^*\widetilde{\tau}_{C,t} \;+\; w_{yN}^*\tau_N^*\widetilde{\tau}_{N,t} \;+\; (1-w_{yN}^*)\tau_C^*\widetilde{\tau}_{C,t}\right],
\end{aligned}
$$

where, for example, $\widetilde{\kappa}_t = (\kappa_t - \kappa^*)/\kappa^*$ (*i.e.*, the deviation of $\kappa_t$ from its steady state $\kappa^*$), $\widetilde{\gamma}_{y,t}$ is the deviation of output growth, $Y_t/Y_{t-1}$, from its steady state $\gamma_y^*$, $w_{yN,t} = w_t N_t/Y_t$, $\widetilde{w}_{yN,t} =$

$(w_{yN,t} - w^*_{yN})/w^*_{yN}$, $\kappa^*_r = (\kappa^* + r^*_D)/[\kappa^*(1 + r^*_D)]$, $r^*_y = \gamma^*_y/(1 + r^*_D)$, $\mathbf{E}_t$ is the expectations operator given date $t$ information, $\mathbf{L}$ is the lag operator ($x_{t-1} = \mathbf{L}x_t$), and the EPD is ignored.

The present value relation $(4)$ shows that $\kappa_t$ was forward-looking in output growth, the consumption-output ratio (*i.e.*, permanent income), unit labor costs, returns on government debt, government spending (which includes extraordinary government expenditures), and consumption, labor income, and capital income tax rates. Note $\kappa_t$ rises (falls) if permanent income, labor's share of income, or tax rates (the return on government debt or ordinary government expenditures) is expected to be higher in the future. Thus, debt retirement was accelerated in response, say, to higher real economic activity or an anticipated increase in future taxes.

McKenna rule debt retirement smoothing had implications for the U.K. economy. Consider a household with additive log utility that is separable in consumption and leisure. We construct a permanent income decision rule by linearizing the household budget constraint and Euler equation for government debt. This decision rule and the linearized law of motion of debt $(3)$ produces

$$
\begin{aligned}
(5) \quad \left(1 - \kappa^*_y \mathbf{L}\right) \left(\widetilde{\frac{C}{Y}}\right)_t \;=\; & C^*_D \left[ -\frac{\kappa^*}{\gamma^*_y} \widetilde{\kappa}_{t-1} \;-\; \kappa^*_y \, \widetilde{\gamma}_{y,t-1} \;+\; g^*_W \left(\frac{D}{Y}\right)^{*\,-1} \widetilde{g}_{W,t-1} \right] \\
& +\; \frac{1 - \kappa^*_y \mathbf{L}}{1 - r^*_y \mathbf{E}_t \mathbf{L}^{-1}} \left[ C^*_{\mathcal{H},y} \left(\widetilde{\frac{\mathcal{H}_y}{Y}}\right)_t \;-\; C^*_{\mathcal{T}} \left(\widetilde{\frac{\mathcal{T}}{Y}}\right)_t \right] \;+\; \left[ \frac{C^*_{\gamma,y}(\mathbf{L})\, \widetilde{\gamma}_{y,t} \;-\; C^*_r(\mathbf{L})\, \widetilde{r}_{D,t}}{(1 - \beta^*_r \mathbf{E}_t \mathbf{L}^{-1})(1 - r^*_y \mathbf{E}_t \mathbf{L}^{-1})} \right],
\end{aligned}
$$

where $\kappa^*_y = (1 - \kappa^*)/\gamma^*_y$, $\mathcal{H}_y$ is total household income, $\mathcal{T}$ is the household tax bill, $C^*_{\gamma,y}(\mathbf{L})$ and $C^*_r(\mathbf{L})$ are finite-order polynomials, $\beta^*_r = \beta/r^*_y$, and $\beta \in (0,\, 1)$ is the household discount factor.

The permanent income decision rule $(5)$ is standard, except for the quasi-difference operator, $1 - \kappa^*_y \mathbf{L}$, and $\kappa_{t-1}$. For example, an increase in net permanent income (of taxes) raises $(C/Y)_t$. On the other hand, an increase in $\kappa_{t-1}$ lowers $(C/Y)_t$ because $\beta^*_r > r^*_y$ and $C^*_D = [\beta^*_r - r^*_y]/[\beta^*_r \, r^*_y]$. Thus, households cut current consumption (relative to income) to save more to have resources to pay the anticipated increase in future taxes implied by accelerated debt retirement.

The U.K. data supports this prediction of the permanent income decision rule $(5)$. The evidence is found in figure 2, which presents a scatter plot of $(1 - \kappa_y^* \mathbf{L})(C/Y)_t$ and $\kappa_{t-1}$ for the 1916 – 1937 sample. The former series relies on calibrating $\kappa_y^*$, which equals $(1 - \kappa^*)/\gamma_y^*$, to 0.9477, where sample means yield $\kappa^* = 0.0468$ and $\gamma_y^* = 1.0058$. We combine the budget constraint $(1)$ and McKenna rule law of motion $(3)$ to obtain a time series for $\kappa_t$.[4]

Figure 2 shows that $(1-\kappa_y^* \mathbf{L})(C/Y)_t$ (vertical axis) and $\kappa_{t-1}$ (horizontal axis) are inversely related for a 1916 – 37 sample. The correlation is $-0.64$, which is nearly 1.65 times larger than the correlation of $(1 - \kappa_y^* \mathbf{L})(C/Y)_t$ with its own lag. The lower right corner of figure 2 contains WWI observations that indicate $(C/Y)_t$ fell while the McKenna rule produced high debt retirement rates. This was followed by a post-armistice recovery in $(C/Y)_t$, but lower debt retirement rates immediately after WWI (observations in the upper left corner of figure 2). In the early 1920s, the U.K. increased the pace of debt retirement and observations in the center left of figure 2 also reveal that $(1 - \kappa_y^* \mathbf{L})(C/Y)_t$ dropped. Thus, figure 2 points to an inverse relationship between U.K. economic activity and the debt retirement rates produced by the McKenna rule.

## IV. Conclusion

During WWI and the interwar period, the U.K. employed the McKenna rule to conduct fiscal policy. The McKenna rule committed the U.K. to a debt retirement path, which was forward-looking, and implied it was smoothed. In the English method tradition of war finance, the U.K. taxed capital to retire debt and to achieve a balance between fairness and equity. The prediction that real activity is lower in response to higher past debt retirement rates is supported by WWI and interwar U.K. data. James M. Nason and Shaun P. Vahey (2007) provide evidence that the McKenna rule also contributed to the U.K. depression of the 1920s.

## REFERENCES

**Aiyagari, S. Rao, Albert Marcet, Thomas J. Sargent, and Juha Seppälä.** 2002. "Optimal Taxation without State-Contingent Debt." *Journal of Political Economy*, 110(6): 1220 – 1254.

**Daunton, Martin J.** 2002. *Just Taxes: The Politics of Taxation in Britain, 1914-1979*. Cambridge: Cambridge University Press.

**Feinstein, Charles H.** 1972. *National Income, Expenditure and Output of the United Kingdom, 1855-1965*. Cambridge: Cambridge University Press.

**Hall, George J., and Thomas J. Sargent.** 1997. "Accounting for the Federal Governments Cost of Funds." *Federal Reserve Bank of Chicago Economic Perspectives*, 21$(Q4)$: 18 – 28.

**Hirst, F.W., and J.E. Allen.** 1926. *British War Budgets*. London: Carnegie Endowment for International Peace.

**Janssen, Norbert, Charles Nolan, and Ryland Thomas.** 2002. "Money, Debt and Prices in the United Kingdom, 1705 – 1996." *Economica*, 69(275): 461 – 479.

**Miller, E.T., H.L. Lutz, Edmond E. Lincoln, T.K. Urdahl, and O.M.W. Sprague.** 1917. "Loans and Taxes in War Finance: Discussion." *American Economic Review* (Papers and Proceedings), 7(1): 214 – 223.

**Mitchell, Brian R.** 1988. *British Historical Statistics*. Cambridge: Cambridge University Press.

**Nason, James M., and Shaun P. Vahey.** 2007. " 'Over the Top': U.K. World War I Finance and Its Aftermath." manuscript, Research Department, Federal Reserve Bank of Atlanta.

**Ohanian, Lee E.** 1997. "The Macroeconomic Effect of War Finance in the United States: World War II and the Korean War." *American Economic Review*, 1997, 87(1): 23 – 40.

**Peden, George C.** 2000. *The Treasury and British Public Policy, 1906 – 1959*. Oxford: Oxford University Press.

**Pigou, A.C.** 1916. *The Economy and Finance of the War: On the Real Costs of the War and the Way in which They Should Be Met*. London: J.M. Dent and Sons.

**Sprague, O.M.W.** 1917. "Loans and Taxes in War Finance." *American Economic Review* (Papers and Proceedings), 7(1): 199 – 213.

**Wormell, Jeremy.** 2000. *The Management of the National Debt of the United Kingdom, 1900 – 1932*. London: Routledge.

## FOOTNOTES

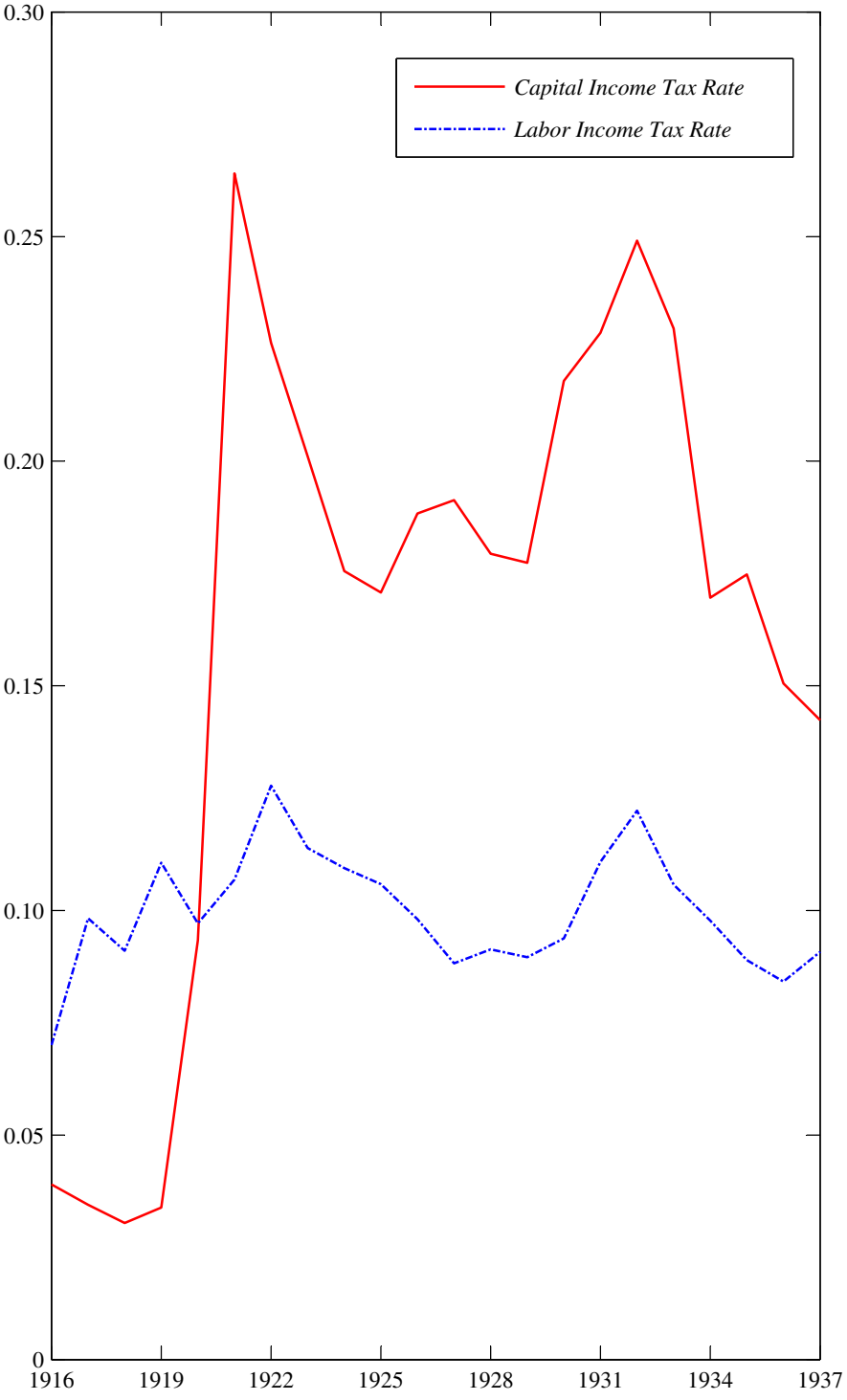
1. McKenna estimated that the war cost the U.K. government $\pounds\,3$ million per day in the June 1915 budget, yet government revenues were less than $\pounds\,0.8$ million; see Hirst and Allen (1926, p. 57).

2. Firm profits greater than $\pounds 100$ of the 1912 – 14 average were liable for the EPD.

3. During WWI and the interwar period, transfers were a negligible part of U.K. budgets.

4. Charles F. Feinstein (1972) and Brian R. Mitchell (1988) are data sources. Norbert Janssen kindly supplied the U.K. government debt data (see Norbert Janssen, Charles Nolan, and Ryland Thomas (2002)), but we note concerns Hall and Sargent (1997) and Daunton (2002, pp. 128 – 132) raise about measurement of interest costs in the national income accounts.

**Figure 1. Mean Capital and Labor Income Tax Rates, 1916-37**



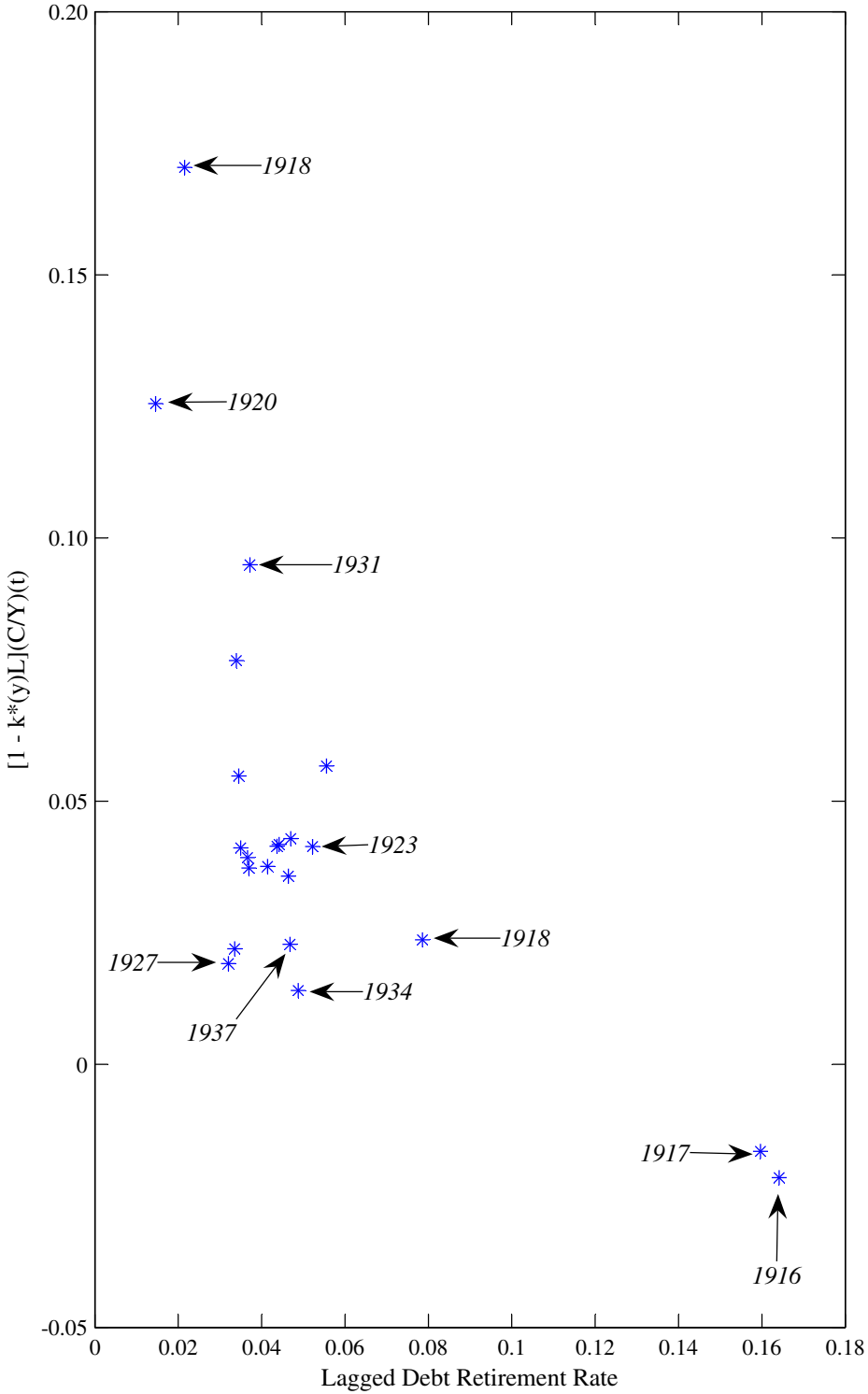


**Figure 2. Permanent Income and the McKenna Rule, 1916-37**