THE MCKENNA RULE
AND U.K. WORLD WAR I FINANCE

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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 heavy contemporary taxation of factor incomes to finance war-time government expenditures. The tradition emphasized by Robert J. Barro (1987) is very different. He claimed that the U.K.'s debt path from the early 1700s to WWI largely avoided distortions to factor inputs. Tax smoothing implies debt finance of emergency (*i.e.*, war) expenditures, as shown by S. Rao Aiyagari, Albert Marcet, Thomas J. Sargent, and Juha Seppälä (2002).

This paper presents evidence that U.K. fiscal policy during WWI and interwar resembled the English Method described by Sprague (1917) and his discussants, and revived by the U.S. to finance the Korean War (Lee E. Ohanian (1997)). The response of U.K. fiscal policy to WWI was the "McKenna rule", named after Reginald McKenna, Chancellor of the Exchequer. The McKenna rule was presented to the U.K. Parliament in June 1915 and guided policy for the remainder of WWI and through the interwar period. Under the McKenna rule, the U.K. committed itself to a path of debt retirement and higher taxes.

We draw on narrative evidence to explain that the McKenna rule was an attempt to balance fairness and equity considerations, rather than to engage in tax smoothing. In support of our narrative, a permanent income example shows that real activity was negatively affected by the McKenna rule. This prediction finds support in a 1916 – 1937 U.K. sample.

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

Contrary to the initial expectations of U.K. policymakers, the persistent and extremely costly nature of WWI trench warfare was apparent by the time McKenna became Chancellor of the Exchequer in May 1915. McKenna estimated that the war cost the U.K. government £3 million per day in June 1915, yet government revenues were less than £0.8 million; see Hirst and Allen (1926, p. 57).

Rather than rely only on debt to finance WWI, 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. 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 taxes to rise 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 next opportunity McKenna took to explain his fiscal policy was the April 1916 budget. In that budget, he explained that "surplus revenue" referred to the "ordinary" peacetime primary budget surplus. Excluding temporary "extraordinary" revenue and expenditure, McKenna committed post-armistice fiscal policy to balance peacetime budgets. However, future Chancellors had discretion over debt management because they could fine-tune the debt path while still operating under the McKenna rule.

The McKenna rule committed the U.K. to a debt retirement path during and after WWI by defining "interest" as all financial flows on government debt. In this case, interest equalled the sum of coupon payments on debt, rolled over maturing loans, and provision for future debt retirement. The last of these, a "sinking fund", contributed greatly to the budget; Wormell (2000, p. 202, pp. 662 – 698). For example, McKenna projected "interest" at five percent in the April 1916 budget at a time consuls paid less than four percent.

Besides committing to a debt retirement path, the McKenna rule required revenue to satisfy the government budget constraint. Under the McKenna rule, the budget process first had the Chancellor choosing a debt path, which implied a rate, κ_t, of debt retirement. Although this was typically followed by the Chancellor selecting among the possible revenue sources to meet government expenditures needs, McKenna did not commit future policy to a specific tax instrument. However, Daunton (2002) argues that this tax burden fell heaviest on capital because U.K. policymakers wanted to provide a "just mix" between current taxation and debt. U.K. policymakers aimed to strike a balance between fairness and equity as they employed fiscal policy to limit the rents appropriated by owners of capital (*i.e.*, wartime "profiteering"), under the McKenna rule. Thus, U.K. fiscal policymakers preferred to adjust the capital income tax rate, $\tau_{K,t}$, to satisfy the government budget constraint, given a sequence of κ_t, as shown by labor and income tax rates in figure 1.

McKenna revealed his preference to place the heaviest tax burden on the 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

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EPD was intended to offset temporary wartime government expenditures and was slated to be abolished after WWI. Initially set at 50 percent in the September 1915 budget and to 60 percent in the April 1916 budget, the EPD was raised to 80 percent by 1918 and phased out in 1921.[1]

McKenna's tenure as Chancellor was relatively short (the Liberal government to which McKenna belonged collapsed in December 1916), and the responsibility for carrying on the implementation of the McKenna rule fell to others. Successive Chancellors had discretion over the debt path. McKenna's immediate replacement, Bonar Law (Chancellor until January 1919) and his successor Austen Chamberlain (Chancellor 1919 – 21), explicitly cited the McKenna rule as their basis for fiscal policy; Wormell (2000, pp. 348 – 349, p. 393). Law and Chamberlain promised to maintain McKenna's payments into the sinking fund. Chamberlain also oversaw the anticipated phasing out of the extraordinary EPD with the end of WWI. Since the peacetime variant of the McKenna rule required other revenue sources, there was a shift in taxation from profits (*i.e.*, firms) to capital income (*i.e.*, individuals) to meet the revenue shortfall. This shift was accelerated by the substantial 1920 tax reform. Subsequent Chancellors, Robert Horne (1921 – 22), Stanley Baldwin (1922 – 23), Philip Snowden (1924 and 1929 – 31), Winston Churchill (1924 – 29), and Neville Chamberlain (1923 – 24 and 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

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path of debt retirement. Begin with the government budget constraint

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

where D_{t+1} is the (real) stock of debt, $\tau_{C,t}$ is the tax rate on consumption expenditures C_t, $\tau_{N,t}$ is the labor income tax rate levied on the real wage bill $(w_t N_t)$, the capital income tax is levied on profits net of the real wage bill $(Y_t - w_t N_t)$, $\tau_{P,t}$ is the EPD tax rate on profits net of average (or steady state) profits, $P_{*,t}$, G_t is total government expenditure, $r_{D,t}$ is the (real) return on D_t, and Tr_t denote transfers.[2] 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 $T_{O,t} \equiv \tau_{C,t} C_t + \tau_{N,t} w_t N_t + \tau_{K,t}(Y_t - w_t N_t) - Tr_t$, which made $T_{O,t} - G_{O,t}$ the ordinary peacetime primary surplus. Thus, the inequality McKenna had in mind is

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

where $\kappa_t D_t$ represents resources earmarked for debt repayment.

The inequality (2) and the government budget constraint (1) restrict the path of debt under the McKenna rule. The restrictions follow from imposing equality on (2) and

combining it with the government budget constraint 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. The backward-looking law of motion (3) restricted new debt issues to pay only for extraordinary government spending net of wartime EPDs. Thus, κ_t was a policy variable set to achieve an expected future path of debt retirement traced out by the law-of-motion of debt (3).

The choice of the McKenna rule parameter κ_t determines the persistence of the government debt process, given movements in net extraordinary wartime government spending. As $\kappa_t \to 0$, 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 the predictions of the tax-smoothing model. If $\kappa_t > 0$, tax smoothing no longer approximates the fiscal outcomes that arise under the McKenna rule.

The McKenna rule commitment to a debt path had to be supported by sufficient revenue to satisfy the budget constraint (1). Given κ_t, the Chancellor still had to allocate the tax burden among the factors of production. For example, if a Chancellor decided capital income was to bear the brunt of the tax burden, the McKenna rule law of motion for debt (3) and the budget constraint (1) restrict the capital income tax rate according to

$$(4) \qquad \tau_{K,t} \;=\; \frac{(\kappa_t + r_{D,t})D_t \;+\; Tr_t \;+\; G_{O,t} \;-\; \tau_{C,t}C_t \;-\; \tau_{N,t}w_tN_t}{Y_t \;-\; w_tN_t}.$$

In this case, $\tau_{K,t}$ adjusts to cover the ordinary peacetime deficit plus interest payments (as a ratio of net profits, $Y_t - w_tN_t$), given a sequence of κ_t 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 κ_t, which controlled the debt retirement path, was a forward-looking under the McKenna rule. This indicates that the McKenna rule acted to smooth the debt retirement path, rather than, 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 linear approximations of the budget constraint (1) and the McKenna rule law of motion of debt (3). Equate the resulting linear difference equations to obtain

$$(5) \quad \widetilde{\kappa}_t = \frac{1-\kappa^*}{\kappa^*}\widetilde{x}_t + \frac{\gamma_y^* g_W^*}{\kappa^*}\left(\frac{D}{Y}\right)^{*-1}\widetilde{g}_{W,t} + \frac{\kappa_r^*}{1-r_y^*\mathbf{E}_t\mathbf{L}^{-1}}\left[\gamma_y^*\widetilde{\gamma}_{y,t} + \frac{1-\kappa^*}{r_y^*}\widetilde{x}_t\right],$$

$$\widetilde{x}_t \equiv \left(\frac{D}{Y}\right)^{*-1}\left[\tau_C^*\left(\frac{C}{Y}\right)^*\left(\widetilde{\frac{C}{Y}}\right)_t + (\tau_N^* - \tau_K^*)w_{yN}^*\widetilde{w}_{yN,t} - \frac{r_y^{*-1}r_D^*}{1+r_D^*}\widetilde{r}_{D,t} - g^*\widetilde{g}_t\right]$$

$$- \left(\frac{Tr}{D}\right)^*\left(\widetilde{\frac{Tr}{Y}}\right)_t + \left(\frac{D}{Y}\right)^{*-1}\left[\left(\frac{C}{Y}\right)^*\tau_C^*\widetilde{\tau}_{C,t} + w_{yN}^*\tau_N^*\widetilde{\tau}_{N,t} + (1-w_{yN}^*)\tau_C^*\widetilde{\tau}_{C,t}\right],$$

where, for example, $\widetilde{\kappa}_t = (\kappa_t - \kappa^*)/\kappa^*$ (*i.e.*, the percentage deviation of κ_t from its steady state κ^*), $\widetilde{\gamma}_{y,t}$ denotes the percentage deviation of output growth (*i.e.*, Y_t/Y_{t-1}) from its steady state γ_y^*, $\widetilde{w}_{yN,t+j}$ represents the percentage deviation of labor's share of income, w_tN_t/Y_t, from its steady state w_{yN}^*, $\kappa_r^* = (\kappa^* + r_D^*)/[\kappa^*(1+r_D^*)]$, $r_y^* = \gamma_y^*/(1+r_D^*)$, and the EPD is ignored.

The present value relation (5) shows that κ_t was forward-looking in the 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 κ_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. However, an expected increase in extraordinary government expenditures had an ambiguous effect on κ_t.

McKenna rule debt retirement smoothing had implications for the U.K. private sector. Consider a household with additive log utility and separable in consumption and leisure. We construct a permanent income decision rule by linearizing the household budget constraint and Euler equation for government debt. When this decision rule is combined with the McKenna rule law of motion of debt (3), we find

$$(6) \quad \left(1 - \kappa_y^* \mathbf{L}\right) \widetilde{\left(\frac{C}{Y}\right)}_t = C_D^* \left[-\frac{\kappa^*}{\gamma_y^*} \widetilde{\kappa}_{t-1} - \kappa_y^* \widetilde{\gamma}_{y,t-1} + g_W^* \left(\frac{D}{Y}\right)^{*-1} \widetilde{g}_{W,t-1} \right]$$

$$- \left(1 - \kappa_y^* \mathbf{L}\right) \left[C_{\gamma,y}^* \widetilde{\gamma}_{y,t} - C_r^* \widetilde{r}_{D,t} \right] + \frac{1 - \kappa_y^* \mathbf{L}}{1 - r_y^* \mathbf{E}_t \mathbf{L}^{-1}} \left[C_{\mathcal{H},y}^* \widetilde{\left(\frac{\mathcal{H}_y}{Y}\right)}_t - C_{\mathcal{T}}^* \widetilde{\left(\frac{\mathcal{T}}{Y}\right)}_t \right]$$

$$+ \left[\frac{1 - \kappa_y^* \mathbf{L}}{1 - \beta_r^* \mathbf{E}_t \mathbf{L}^{-1}} - \frac{C_{\gamma,y}^* \left(1 - \kappa_y^* \mathbf{L}\right)}{1 - r_y^* \mathbf{E}_t \mathbf{L}^{-1}} \right] \widetilde{\gamma}_{y,t} - \left[\frac{1 - \kappa_y^* \mathbf{L}}{1 - \beta_r^* \mathbf{E}_t \mathbf{L}^{-1}} - \frac{C_r^* \left(1 - \kappa_y^* \mathbf{L}\right)}{1 - r_y^* \mathbf{E}_t \mathbf{L}^{-1}} \right] \widetilde{r}_{D,t},$$

where $\kappa_y^* = (1 - \kappa^*)/\gamma_y^*$, $\mathcal{H}_y$ denotes total household income, $\mathcal{T}$ represents the household tax bill, $\beta_r^* = \beta/r_y^*$, and β is the household discount factor.

The permanent income decision rule (6) is standard, except for the presence of the quasi-difference operator $1 - \kappa_y^* L$ and lagged debt retirement rate, κ_{t-1}. For example, permanent household income net of permanent taxes raises the consumption-output ratio. On the other hand, an increase in κ_{t-1} lowers the consumption-output ratio because $C_D^* = [\beta_r^* - r_y^*]/[\beta_r^* r_y^*]$ is positive *i.e.,* $(\beta_r^* > r_y^*)$. Households cut current consumption (relative to income) to save more to provide the 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 (6). The evidence is found in figure 2, which presents a scatter plot of $(1 - \kappa_y^* L)(C/Y)_t$ and κ_{t-1} for the 1916 – 1937 sample. We invert the $\tau_{K,t}$ equation (6) to obtain a time series for κ_t.[3] Given sample means yield $\kappa^* = 0.0468$ and $\gamma_y^* = 1.007$, κ_y^*, which equals $(1 - \kappa^*)/\gamma_y^*$, is calibrated to 0.9465.

Figure 2 shows that $(1 - \kappa_y^* L)(C/Y)_t$ (vertical axis) and κ_{t-1} (horizontal axis) move inversely with a correlation of -0.64, which is nearly 1.65 times larger than the correlation of $(1 - \kappa_y^* L)(C/Y)_t$ with its own lag. This negative correlation is found in the lower right corner of figure 2, which contain WWI observations indicating the consumption-output ratio fell at the same time the McKenna rule produced high debt retirement rates. This was followed by a post-armistice recovery in the consumption-output ratio, but less commitment to debt retirement immediately following WWI, given observations in the upper left corner of figure 2. In the early 1920s, the U.K. increased the pace of debt retirement, but observations in the center left of figure 2 reveal that $(1 - \kappa_y^* L)(C/Y)_t$ dropped. Thus, figure 2 points to the adverse effects the McKenna rule had on the U.K. economy.

IV. Conclusion

The McKenna rule was a fiscal regime the U.K. instituted during WWI and operated under during the interwar period. The U.K. committed to a path of debt retirement while allocating taxes to achieve a balance between fairness and equity during the McKenna rule regime. These consideration lead the U.K. to rely heavily on Capital income taxation under the McKenna rule. The McKenna rule also implied a forward-looking debt retirement rate, which acts to smooth the debt retirement path, and predicts that real activity is lower in response to a higher past debt retirement rate. This prediction is supported by WWI and interwar U.K. data. Nason and Vahey (2007) provide more evidence that the McKenna rule 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.

Barro, Robert J. 1987. "Government Spending, Interest Rates, Prices and Budget Deficits in the United Kingdom, 1701-1918", *Journal of Monetary Economics*, 20(2): 221 – 247.

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

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

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

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

Mitchell, Brian R. 1988. BRITISH HISTORICAL STATISTICS, Cambridge University Press, Cambridge, U.K..

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.

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 University Press, Oxford, U.K..

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.

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*, Routledge, London, U.K..

FOOTNOTES

1. Profits £100 or more in excess of a firm's (average) 1912-14 tax liability were liable for the EPD.

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

3. The data sources are Charles F. Feinstein (1972) and Brian R. Mitchell (1988). Norbert Janssen kindly supplied the debt data; also see Norbert Janssen, Charles Nolan, and Ryland Thomas (2002). Hall and Sargent (1997) and Daunton (2002, pp. 128 – 132) raise concerns about measurement of interest costs in the national income accounts of the period we study.

Figure 1. Average Capital and Labor Income Tax Rates, 1916–37

Figure 2. Permanent Income's Response to the McKenna Rule, 1916-37