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The Secular Decrease in UK Safe Asset Market Power†

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Safe assets are an important part of the global financial system, and they provide holders with a safe and liquid store of value. These assets are characterized by a large and rapidly growing demand and a relatively small number of suppliers, most notably the governments of advanced economies with sound institutions and fiscal discipline. This structure can give rise to market power for safe asset suppliers (Farhi and Maggiori 2018). Currently, the world leader in safe asset provision is the United States government, which is able to issue large levels of debt at lower interest rates than assets of similar characteristics.

The United States has been the dominant player in safe asset markets since the middle of the twentieth century. Prior to that, the United Kingdom was the dominant provider of safe assets, and the British Pound served as the global reserve currency (Eichengreen 2011). In fact, the first example of safe government debt occurred in England (see Gorton 2017 and the references within). After the Glorious Revolution of 1688, the increased role of the Parliament in fiscal affairs curbed irresponsible behavior by the Crown, leading to safer debt and an increased capacity to raise funds (North and Weingast 1989). In a related paper, Chen et al. (2022) show that this dominant position allowed the United Kingdom to earn significant convenience yields (up to 100 basis points) on its government debt and run public debt levels beyond their fiscal capacity until the First World War.

In a previous paper, Choi, Kirpalani, and Perez (2022), the authors showed that the United States has sizable market power in safe assets and quantified the benefits to the United States. In this paper, we document the decline in market power for the United Kingdom and quantify its losses. We begin by documenting an increase in the elasticity of demand—an important determinant of the degree of market power—for UK public debt in the latter half of the twentieth century. We then use the model to quantify the decline in seigniorage revenues and find that it is significant.

I. Estimating the Demand for UK Public Debt

In this section, we estimate the elasticity of demand for UK public debt and document its evolution over time. To do so, we estimate the following regression:

$$y_t = \alpha + \beta \ln b_t + \delta X_t + \varepsilon_t, \tag{1}$$

where y_t is the convenience yield on UK sovereign bonds, $\ln b_t$ is the log of the ratio of UK public debt to GDP, and X_t is a vector of controls that includes a measure of stock market volatility and the slope of the yield curve. This specification follows existing literature (e.g., Krishnamurthy and Vissing-Jorgensen 2012) and estimates a constant semielasticity of prices to quantities, β.

The data are at a quarterly frequency, and the time sample is from 1933 to 2017. The convenience yield is measured as the spread between the yield on UK prime commercial paper and the yield on three-month UK sovereign bonds, both denominated in pounds sterling. Public debt corresponds to total public debt held domestically and externally. The volatility measure is computed as the standard deviation of the weekly returns of the MSCI United Kingdom Index, computed over a yearly rolling window. Because this index is available only starting in 1972, for the earlier part of the sample, we use a projection based on the yearly-rolling-window standard deviation of monthly returns of the UK share price index. The slope of the yield curve is

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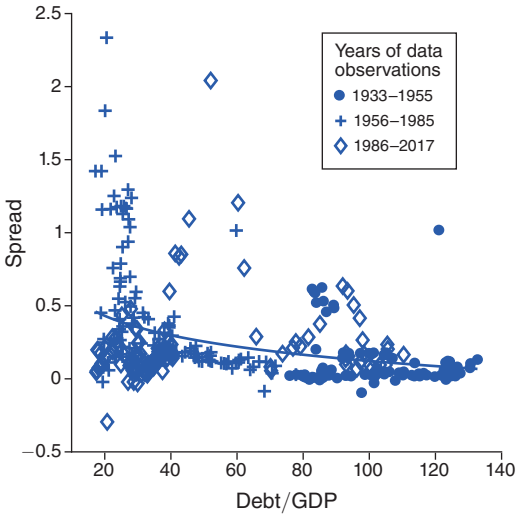

FIGURE 1. SPREAD AND DEBT FOR UNITED KINGDOM

Notes: Spread is the difference between the yield on UK prime commercial paper and the yield on three-month UK sovereign bond. Debt/GDP is the ratio of UK outstanding public debt to UK GDP.

TABLE 1—DEMAND ESTIMATES

Variables	OLS (1)	IV (3)
log(Debt/GDP)	−0.17	−0.18
	(0.03)	(0.05)
Volatility	3.7	3.64
	(1.88)	(2.09)
Slope	0.03	0.04
	(0.01)	(0.01)
Constant	0.77	0.81
	(0.15)	(0.22)
Observations	338	321
R^2	0.19	0.18
Elasticity	1.57	1.47

Notes: The dependent variable is the spread between the yield on UK prime commercial paper and on a three-month UK sovereign bond. The main independent variable is ratio of UK outstanding public debt to GDP. Controls include the slope of the UK yield curve, measured as the spread between the yield on a ten-year and a three-month UK sovereign bond, and a measure of volatility based on the standard deviation of the MSCI United Kingdom Index and the UK share price index. The estimation method is OLS for column 1 and IV for column 2. Standard errors are in parentheses.

measured as the spread between the yield on a ten-year and a three-month UK sovereign bond.

Figure 1 shows a scatterplot of the spread and debt data. The downward-sloping line of best fit suggests a negative relationship between debt quantities and spreads. The 1940s and 1950s were characterized by a large stock of public debt fueled by the need to finance the Second World War and relatively low spreads. On the other hand, the 1970s and 1980s were decades of large spreads and a low stock of public debt.

The econometric analysis confirms this negative relationship. We pursue two complementary estimation methods: OLS and instrumental variables (IV). In the latter, we instrument the supply of public debt with the log of the dependency ratio. The motivation for using this instrument is that changes in the demographic structure of the population affects social security/pension spending and thus the amount of public debt in a way that is unrelated to the demand for public debt. Table 1 shows the estimation results. The first column documents the results when we estimate (1) using OLS. We estimate a negative and statistically significant semielasticity of $\hat{\beta} = -0.17$, which corresponds to a demand elasticity of 1.57.[1] The elasticity estimates are similar in magnitude to those estimated for the United States in prior literature. Furthermore, we estimate that high convenience yields are also associated with periods of large volatility and slope of the yield curve for a given stock of public debt. The second column shows the estimation results using IV. The point estimate of the semi-elasticity is negative, statistically significant, and similar in magnitude to the one obtained using OLS.

We then assess whether and how this elasticity has changed over time. For this, we estimate (1) using a rolling sample in which we fix the start date at 1933 and use rolling end dates that vary from 1980 until 2017. Figure 2 shows the evolution of the estimated elasticity of demand using OLS, which is increasing over time. The estimated elasticity is 0.77 when estimated in the 1933–1980 sample, and gradually increases as we add quarters to the sample to reach 1.57

[1] We obtain the demand elasticity of quantities to prices by taking the absolute value of the ratio of the average convenience yield in the sample to $\hat{\beta}$.

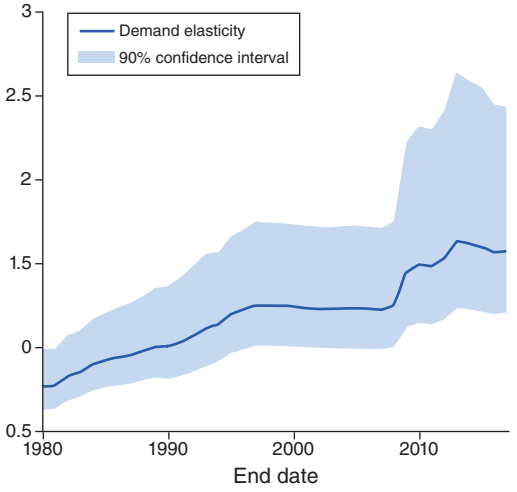

FIGURE 2. UK ELASTICITY OVER ROLLING END DATES

Note: Estimated demand elasticity for UK public debt fixing the sample start date at 1933 and varying the sample end dates from 1980 to 2017.

when estimated over the full sample of 1933–2017. We obtain similar results if we pursue the same exercise using IV and if we fix the sample end date and use rolling start dates that vary from 1933 until 1970 (see online Appendix Figures 1 and 2, respectively).

Next, we contrast this trend in demand elasticity estimates for the United Kingdom with that of the United States. To do so, we estimate (1) using quarterly data for the United States from 1933 to 2017. We compute the convenience yield as the weighted average of short- and long-term convenience yields, with the weights given by the average share of short- and long-term US public debt. The short-term convenience yield is the difference in the yields of short-maturity AAA corporate bonds and US Treasury Bills, and the long-term convenience yield is the difference in the yields of long-maturity AAA corporate bonds and US Treasury bonds. Public debt is privately held gross federal debt. Finally, the vector of controls X_t includes a US volatility measure, and the slope of the US yield curve. From 1990 to 2017, the volatility measure is the volatility index (VIX); prior to 1990, we create a historical series of VIX predicted by regressing VIX on the annualized standard deviation of the weekly log stock returns on the S&P 500 index from 1990 to 2017.

Figure 3 shows the estimated elasticity of demand for US public debt as we vary the end date of the estimation sample. In contrast to the United Kingdom, the demand elasticity exhibits a downward trend over time. The estimated elasticity is 2.53 when estimated in the 1933–1980 sample and 1.67 in the full 1933–2017 sample.

The results indicate that the shift in the reserve currency leader from the United Kingdom to the United States that gradually occurred during the twentieth century also coincided with the demand for US public debt becoming more inelastic and the demand for UK public debt becoming more elastic. These opposing trends in demand elasticity also constitute supportive evidence of the change in the dominant safe asset provider from the United Kingdom to the United States during this time period.

II. Quantifying the Decline in UK Market Power

In this section, we use the model in Choi, Kirpalani, and Perez (2022) to quantify the losses to the United Kingdom associated with this increase in the demand elasticity. The model is a two-country (the United Kingdom and the rest of the world (RoW)) dynamic model with two assets: debt and capital. There are two important features of that model. First, if RoW purchases b_t units of debt in period $t-1$, it generates $f_t(b_t)$ units of the consumption good for RoW in period t. In that paper, we show that these additional resources can arise if debt purchases ease collateral constraints for entrepreneurs in RoW. We assume $f(\cdot)$ to be a constant elasticity function with parameter η (elasticity $1/(1-\eta)$). Second, the country issuing debt (the United Kingdom in this case) behaves as a monopolist. One result in this model is that under some sufficient conditions, the debt issuance problem for the country with monopoly power can be rewritten as a period-by-period static maximization of the seigniorage revenues that arise due to the nonpecuniary benefit of debt. To understand the implications for the United Kingdom of declining demand elasticity, we focus on these seigniorage revenues, which are defined as

$$\Pi_t(\eta) = \mathcal{S}_t\big(\eta, b_t(\eta)\big)\, b_t(\eta) - \chi_t\big(b_t(\eta)\big),$$

where $b_t(\eta)$ is the equilibrium debt level associated with η, $\mathcal{S}_t\big(\eta, b_t(\eta)\big)$ is the spread between

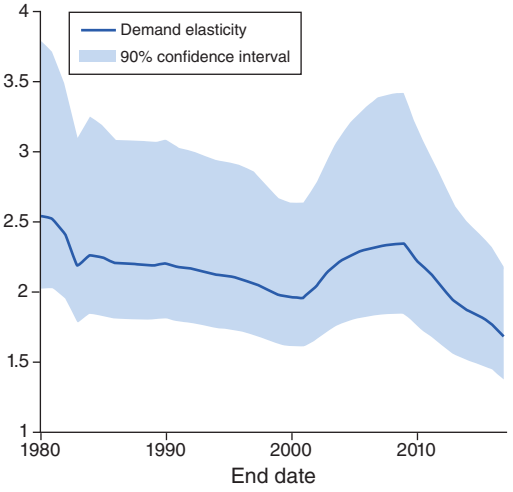

FIGURE 3. US ELASTICITY OVER ROLLING END DATES

Note: Estimated demand elasticity for US public debt, fixing the sample start date at 1933 and varying the sample end dates from 1980 to 2017.

the return on capital and that on debt, and $\chi_t(b_t)$ denotes the cost of issuing debt for the United Kingdom, which we assume to be increasing and weakly convex in b. Because we are interested in analyzing how these objects change in response to changes in the elasticity of demand, we explicitly write the variables as a function of η. From the first-order condition of RoW, we have that $S_t\big(\eta, b_t(\eta)\big) = f_t'\big(\eta, b_t(\eta)\big)$, where we note that the function f also depends directly on the parameter η. Seigniorage revenues can be interpreted as the monopoly profits associated with the ability to issue these safe assets. As the demand elasticity changes, these monopoly profits will also change. Using the two equations above, one can use an envelope argument to show that the change in seigniorage revenues is

$$\frac{d\Pi_t(\eta)}{d\eta} = \nu b_t^{\eta-1} \ln b_t.$$

The above equation implies that the effects of a change in η on seigniorage revenues is ambiguous. On the one hand, an increase in η (higher elasticity) implies a decrease in markups, which lowers siegniorage revenues. On the other hand, an increase in η increases the equilibrium level of debt, which, for a given spread, increases siegniorage revenues. If the latter debt effect is small enough, seigniorage revenues decrease as demand becomes more elastic. In particular, these revenues are decreasing in η as long as $b < 1$.

Given the theoretical ambiguity, we quantify the model to better understand the effects on seigniorage revenues. We further assume that $f(b) = \nu b^{\eta}/\eta, \chi(b) = \omega b^{1+\lambda}/(1+\lambda)$ and set $\lambda = 1$ in accordance with the literature (Barro 1979; Jiang et al. 2022). We compare the steady-state change in seigniorage revenues across two elasticity values; one estimated on the full sample and the other estimated on the post-1960s sample. The former, as shown in Table 1, is 1.57, and using a similar procedure, we estimate the latter to be 2.47. The objective of this exercise is to isolate the effect of this increased elasticity on welfare. The elasticity parameter η is estimated from the regressions in the previous section. To calibrate ω and ν, we use the following two first-order conditions from the model

$$\mathcal{S}\left[1 + \frac{f''(b)b}{f'(b)}\right] + \chi'(b) = 0,$$
$$\mathcal{S} = f'(b),$$

and the data on spreads and debt levels for our full sample. The first equation is the first-order condition of the monopolist debt issuer, while the second is the first-order condition for the RoW. The targeted moments are an average debt-to-GDP ratio of $b = 0.58$ and an average spread of $\mathcal{S} = 0.26\%$. The resulting parameter values are $\omega = 0.0016$ and $\nu = 0.0018$.

The higher elasticity lowers seigniorage revenues by 0.02 percent in consumption equivalent terms. If we take into account the transition, the difference in seigniorage revenues amounts to 0.035 percent in consumption equivalent terms. This suggests that all else equal, the loss in safe asset market power resulted in nonnegligible losses for the United Kingdom.

As a final point, our focus on seigniorage revenues as opposed to overall welfare is motivated by the fact that most of the welfare gains associated with the higher elasticity are due to the difference in seigniorage revenues. In particular, the overall welfare reduction (including the transition) is 0.04 percent in terms of consumption, as compared with 0.035 percent, which arises due to the change in seigniorage revenues.

III. Conclusion

The case of the United Kingdom suggests that US dominance in safe asset markets is unlikely to last forever. Indeed, there are efforts to produce competitor safe assets by both sovereigns and private financial institutions. An interesting recent example is the case of China. As argued in Clayton et al. (2022), China's policy of selectively opening up their bond markets to international investors is consistent with a strategy to build its reputation and establish itself as a safe issuer of assets. It is still too early to tell whether there will be a significant change in the level of competition in safe asset markets, but it is important to understand its potential effects.

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