Dollarization and Seignorage: How Much Is at Stake?*

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July 9, 1999

When a country decides to replace its domestic currency with the U.S. dollar, it automatically ceases to collect the stream of seignorage revenue, which is instead redirected toward the U.S. central bank. A central issue in the debate about dollarization is the distribution of seignorage income between the governments of the United States and the economies that are considering the adoption of the dollar as the sole legal tender. One of the main road blocks for dollarization has been the reluctance of the United States to agree to any kind of formal sharing rule.

A prerequisite for designing meaningful seignorage sharing rules is to assess the amount of resources that are at stake. A common misconception is that the amount of seignorage income involved is simply equal to the interest income on the amount of foreign reserves required to exchange the entire domestic money supply for dollars. The way this misconception emerges is the following. Consider an economy in which at time 0 the monetary base is equal to M_0 and the nominal exchange rate, defined as the price of 1 U.S. dollar in terms of domestic currency, is E_0. Suppose for simplicity that all foreign reserves are held in the form of U.S. Treasury bills and that the interest rate on Treasury bills is constant over time and equal to i. Let $B_0 \equiv M_0/E_0$ denote the dollar value of the monetary base. Such an economy could implement dollarization by selling B_0 of its foreign reserves to the U.S. government in exchange for dollar bills and use these dollars to buy the entire domestic money supply. Because by the process of dollarization the government loses B_0 dollars of foreign reserves, one might be tempted to conclude that the amount of seignorage income lost by a government that dollarizes is in any period $t \geq 0$ given by iB_0.

This conclusion is misleading for the simple reason that it implicitly assumes that the domestic monetary base remains constant over time. Clearly, this is unlikely to be the case, for both inflation and domestic real growth will induce a long-run upward trend in the domestic demand for monetary assets. In the remainder of this note, we show that ignoring these two sources of money growth can lead to enormous underestimations of the amount of seignorage revenue lost by the governments of countries that dollarize.

Let π_t denote the inflation rate and g_t the domestic real growth rate in period t. For simplicity, we assume that π_t and g_t are constant over time and equal, respectively, to π and g. Assume that the income elasticity of the demand for real balances in the domestic economy is unity, so that real balances are growing at the rate g. The evolution of dollar holdings by domestic residents, denoted by D_t, is thus given by $D_t = (1+g)(1+\pi)D_{t-1}$ or $D_t = [(1+g)(1+\pi)]^t D_0$. Under dollarization the way in which the increase in the domestic country's money holdings, $D_t - D_{t-1}$, is brought about is through transfers of real resources from the domestic economy to the U.S. government in

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exchange for U.S. dollars. The U.S. government in turn can earn interest on these real resources. Suppose that the U.S. government does not share seignorage income with the domestic economy. In this case, the stream of income earned by the U.S. government in each period $t \geq 0$ is given by iD_t. The present discounted value of seignorage income, $PDVS$, is thus given by:

$$\begin{aligned} PDVS &= \sum_{t=0}^{\infty} \left(\frac{1}{1+i}\right)^t iD_t \\ &= \sum_{t=0}^{\infty} \left(\frac{1}{1+i}\right)^t i\ [(1+g)(1+\pi)]^t D_0 \end{aligned}$$

Letting $(1+g)(1+\pi) = (1+\mu)$ and recalling that $D_0 = B_0$, the present discounted value of seignorage income can be written as

$$PDVS = \frac{1+i}{i-\mu}\, i\, B_0.$$

Under the alternative, incorrect, measure of seignorage income that ignores growth in the demand for monetary balances, the present discounted value of seignorage income, which we denote by $PDVS^I$, is given by

$$\begin{aligned} PDVS^I &= \sum_{t=0}^{\infty} \left(\frac{1}{1+i}\right)^t iB_0 \\ &= (1+i)B_0. \end{aligned}$$

Let $\rho \equiv PDVS/PDVS^I$ be the ratio of the correct measure of the present discounted value of seignorage revenue to the incorrect measure. Then ρ is given by

$$\rho = \frac{i}{i-\mu}.$$

The nominal interest rate can be written as $1+i = (1+\pi)(1+r)$, where r denotes the real interest rate. Then the denominator on the right hand side of the above expression can be written as $(1+\pi)(r-g)$. To the extent that $r > g$, a standard steady-state condition in any dynamic optimizing growth model, we have that $i - \mu > 0$. Thus, ρ exceeds unity whenever μ is positive. In particular, the incorrect measure underestimates the amount of seignorage income when the inflation rate and the growth rate in the domestic country are positive, which is clearly the case of greatest interest.

Table 1 displays the value taken by ρ as a function of i and $i - \mu$. It shows that the difference between the two measures of seignorage can be fairly large, ranging from -50 percent to 1000 percent. For example, in the plausible case of a U.S. nominal interest rate of 5 percent, a real growth rate of 3 percent, and a real interest rate of 4 percent, so that $i = .05$ and $i - \mu \approx .01$, the correct measure of seignorage is *five times* as large as the incorrect one. The incorrect measure overestimates the correct one only in the unrealistic case in which the inflation rate is less than minus the real growth rate ($\pi < -g$).

Table 1: Ratio of correct measure of seignorage to incorrect measure

$$\left(\rho \equiv \frac{PDVS}{PDVS^I} = \frac{i}{i-\mu}\right)$$

	$i-\mu$			
i	0.01	0.02	0.03	0.04
0.02	2.0	1.0	0.7	0.5
0.04	4.0	2.0	1.3	1.0
0.06	6.0	3.0	2.0	1.5
0.08	8.0	4.0	2.7	2.0
0.10	10.0	5.0	3.3	2.5

Note: i denotes the nominal interest rate in the U.S. and $\mu = (1+g)(1+\pi) - 1$, where π and g denote, respectively, the inflation rate and the growth rate in the country adopting dollarization. All rates are in annual terms.