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OPINION

Seigniorage Revenues in Pakistan

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Developing economies share two common features in their fiscal positions: (a) a large gap between their resources and expenditures, and (b) limited capacity of domestic financial markets to absorb the government debt to finance the gap. Moreover, most of them also face constraints in getting external financing due to inadequate international credit ratings. As a consequence, they often rely heavily on financing the deficit by printing new money – also called seigniorage.[1] But this fuels inflation in the economy. Inflation is just like a tax (Mankiw, 1987) as it generates revenues for the government – though distorts private sector behavior.

Seigniorage revenues are defined as the amount of real resources obtained by the government by injecting new base money (Cukierman, 1992). The expected amount of revenue from printing of money depends upon demand for the base money, real growth, and elasticity of demand for real balances with respect to inflation and income. Seigniorage is also defined as opportunity cost of holding money. However, for measuring the amount of seigniorage, its former definition (i.e., new money creation) is used because the opportunity cost approach needs choice of a "true" interest rate which is hard to identify.

While it is convenient to use monetary measure of seigniorage, it has issues. Auernheimer (1974) reports that monetary seigniorage can only be used under the assumption of golden rule – that is over the economic cycle, the government borrows only to invest and not to fund current spending. If this assumption is violated, monetary seigniorage underestimates the total cost imposed on the private sector and thus overstates the revenue maximizing rate of inflation.

In case of Pakistan, Arby (2006) estimates the seigniorage revenues for Pakistan with the conventional definition of monetary seigniorage. However, as argued above, this approach is not justified as even revenue deficit is often financed through borrowing by the government in Pakistan. The alternate approach is

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[1] For institutional or technological reasons, developing countries are unable to build sophisticated tax systems with low efficiency losses and thus have to rely on seigniorage to finance government spending (Cukierman et al., 1989).

measuring seigniorage through its sources and uses. The monetary seigniorage, as used by Arby (2006), may be valid only under the assumptions: (a) the real rate of growth, the real interest rate and the rate of inflation are constant and equal worldwide; (b) the exchange rate is constant and thus the valuation adjustment component in the balance sheet is zero; (c) the velocity circulation of base money is constant; (d) the central bank receives competitive interest rates on all its assets, and; (e) the composition of central bank balance sheets is constant.

The closer assessment of these assumptions reveals that, in general, monetary seigniorage does not provide a realistic measure of the government's revenues from creation of money.[2] If the real rate of interest exceeds the rate of growth and if credit to the private sector as well as net foreign assets is non-negligible sources of base money growth, the sum of fiscal seigniorage and the central bank's operating costs will exceed monetary seigniorage. However, there are two sufficient conditions which render monetary seigniorage as correct measure of the revenue created. These are: (a) the credit to the government is the only source of base money creation, and; (b) the real interest rate coincides with the real rate of growth, i.e., in a state of golden rule growth (Gros, 1989).

As the above mentioned assumptions are highly unlikely to be met, there is a need of reworking the seigniorage revenues for Pakistan by accommodating all the above mentioned scenarios. We use a methodology proposed by Klein and Neumann (1990) to estimate seigniorage in Pakistan. The next section of this paper provides a framework of seigniorage computation and section 3 offers results for Pakistan. The last section gives concluding remarks.

2. Framework for measurement

We have used SBP balance sheets for FY00 to FY11 which are available as per International Accounting Standards in 2001.[3] The concept of seigniorage revenue is primarily related to the asset side of the monetary base, which includes the NDA (Net Domestic Assets) and NFA (Net Foreign Assets) components. NDA further consists of credit to government sector (NDA government), credit to private sector (NDA non-government) and OIN (other items net) component. We have found that the traditional concept of monetary seigniorage does not capture the variations in non-government part of NDA and the variations in NFA component of monetary base's asset side. For example, if credit to government sector is high in a year but at the same time there are some developments which make the OIN to

[2] For detail see Klein and Neumann (1990).
[3] Balance sheets prior to FY00 were not available in the form we needed to compute the seigniorage.

move in the opposite direction; the overall change in monetary base will not be equal to the change in credit to government. This may underestimate seigniorage revenues if computed in traditional way.

Sources of seigniorage

Total seigniorage can be defined as the real gross resources flow to the government sector associated with base money creation.[4] This flow results from two sources: (a) monetary seigniorage, which measures current resource flow from expanding the base money stock by buying interest earning assets. These assets generate a flow of interest revenue in period $t + 1$ (next year); and (b) the flow of interest revenue on the stock of non government debt that the central bank bought in past in exchange of non-interest bearing base money.

Total seigniorage (S) can be defined as

$$S = S^m + (i^P A^P + i^F A^F)/P \qquad (1)$$

There are two kinds of assets, private sector debt (A^P) and foreign debt (A^F, defined in domestic currency). Level of exchange rate will have a significant effect on the level of seigniorage; the same was overlooked while using monetary seigniorage on the assumption of fixed exchange rate. Respective nominal interest rates on private sector and foreign debt are denoted by i with superscripts P and F. The debt service on the central bank's stock of government debt is not included because it is not a revenue to the government sector but just an inside transaction between central government and the central bank.

Monetary seigniorage (S^m) has been computed by converting the change in monetary base into real balances using consumer price index. Second source of seigniorage, earnings on private sector debt and foreign debt ($i^P A^P + i^F A^F$) has been computed as the sum of interest earned on share of profit in profit and loss sharing arrangements, interest earned on loans and advances to banks and financial institutions, interest earned on foreign currency deposits, interest earned on foreign currency securities, exchange rate gain/loss on foreign currency placements, deposits, securities and other accounts, exchange rate gain/loss on currency swap arrangements, exchange rate gain/loss on forward covers under Exchange Risk Coverage Scheme, exchange rate gain/loss on payable to IMF and exchange rate gain/loss on Special Drawing Rights of IMF.

[4] See Neumann (1996).

Uses of seigniorage

Most of the theoretical literature equates the seigniorage to the government with monopoly profit used by the government for budget finance. This is the simplification that abstracts from the cost of money production and central banks operations. In general, total seigniorage is used for covering the cost of money production and central bank operations, S^C, for investment in non-government debt by the central bank, S^{NI}, and for budget finance, S^G:

$$S = S^C + S^{NI} + S^G \quad (2)$$

With

$$S^C = (C^{Coin} + C^{CB})/P$$
$$S^{NI} = (\dot{A}^P + \dot{A}^F)/P$$
$$S^G = [\dot{A}^G + R^{Coin} + (R^G - i^G A^G)]/P$$

Where C^{Coin} denotes cost of coinage; C^{CB} is cost of printing notes and maintaining operations; $\dot{A}^P$ is change in Net Domestic Assets (Non Government); $\dot{A}^F$ is change in Net Foreign Assets of SBP; $A^G$is government debt; R^{Coin} is revenue from coinage; and R^G is appropriated profit.

As expressed above, the government's fiscal seigniorage (s^G) has three channels: net borrowing from the central bank (change in Net Domestic Assets (government), coinage, and the appropriation of central bank's profit net of interest payment on the central bank's stock of government debt.

The revenue from coinage equals the difference between the change in the circulation of coins, including holdings by the central bank and the cost of coinage. As in Pakistan, central bank earns zero profit on coins so the revenues from coinage has been assumed zero. Central bank used to purchase the coins at their face value so there is no concept of revenues by this mean.

3. Level of seigniorage

Sources of seigniorage

Total seigniorage from different sources has remained in the range of (-20) billion rupees to 374 billion rupees since FY00, with an average of 164 billion rupees per annum. The monetary seigniorage has been in the range of Rs 23 billion to Rs 270 billion since FY00, with an average of Rs 141 billion per annum whereas the change in monetary base ranges between Rs 27 billion to Rs 287 billion with an

average of Rs 129 billion per annum. The interest seigniorage has remained in the range of (-76) billion rupees to 105 billion rupees with an average of 23 billion rupees per annum. Total seigniorage from sources side remained in the range of -0.5 percent to 3.9 percent of nominal GDP with an average of 2.1 percent per annum. The years like 2008 where government relied heavily on the central bank for financing the deficit reports a high level of seigniorage (highest in the sample period).[5] The results validate the hypothesis already drawn in the literature, that monetary seigniorage underestimates/overestimates the overall level of seigniorage revenues (Table 1). It provides the year wise detail of monetary seigniorage, interest seigniorage and total seigniorage from the flow side for the sample period where S^m, S^i and S^t Stands for monetary seigniorage, interest seigniorage and total seigniorage from the flow side respectively.

Table 1. Seigniorage Revenues from Flow Side (Sources)

	Δ in High Power Money	**Price Level (CPI)**	**S^m**	**S^i**	**S^t**	**Nominal GDP (MP)**	**S^t as % of GDP**
2000	100	60	166	-18	148	3826	3.9
2001	35	63	56	-76	-20	4210	-0.5
2002	51	65	79	19	98	4453	2.2
2003	85	67	126	-3	124	4876	2.5
2004	103	70	147	12	159	5641	2.8
2005	115	77	150	42	192	6500	2.9
2006	92	83	111	44	156	7623	2.0
2007	209	89	234	53	287	8673	3.3
2008	270	100	270	105	374	10243	3.7
2009	27	117	23	47	71	12724	0.6
2010	172	129	133	26	160	14837	1.1
2011	287	146	196	21	216	18063	1.2

Note: All figures except CPI are in billion Rupees. CPI is an index with base 2007-08.
Source: Economic Survey, Monetary Survey and Annual Balance Sheets of SBP.

Monetary seigniorage and inflation remained positively correlated during the sample period. There are essentially three alternative explanations of the relationship between inflation rate and the level of seigniorage revenues. Laffer curve has been used in the literature to discuss these three explanations. The first is that the economy is on the "efficient" part of the Laffer curve and hence the increase in inflation is associated with larger seigniorage.[6] The second explanation argues that the economy might be stuck at an equilibrium that lies on the "wrong" side of the Laffer curve; fiscal deficits in this case are not the sole explanation for

[5] Stock of T-Bill holdings by SBP increased to Rs536.98 billion in FY08 compared to Rs90 billion in FY00.
[6] For further details see Sargent and Wallace (1973), Rational Expectations and the Dynamics of Hyperinflation.

inflation.[7] From a fiscal perspective, the government can increase the revenue from seigniorage by reducing the rate of inflation. The common feature of these two views is that they consider high inflation as a stable long-run equilibrium. The third explanation sees high inflation as an unstable phenomenon, whose main cause is the attempt to raise seigniorage in excess of the maximum warranted by the demand for money. According to this approach, once the economy reaches this point inflation accelerates, eventually reaching hyperinflation levels. Which of these explanations is the most relevant to explain the actual behavior of a particular economy depends on whether the inflation elasticity of the demand for money is smaller or greater than unity, and on whether the long-run fiscal deficit is greater or smaller than the maximum long-run revenue from money creation.

Uses of seigniorage

Total seigniorage calculated by summing up the uses, remained in the range of (-70) billion rupees to 358 billion rupees since FY00, with an average of 168 billion rupees per annum. The most consistent use of seigniorage in the sample period turns out to be seigniorage used to cover the cost of coinage and printing (S_c) which remained in the range of Rs 11 billion to Rs 17 billion since FY00, with an average of Rs 15 billion per annum. Seigniorage used for net investment by central bank in its portfolio of non-government debt (S^{ni}) remained in the vicinity of (-353) billion rupees to 444 billion rupees since FY00, with an average of 76 billion rupees per annum. This use of seigniorage remained highly volatile in the sample period. The use of seigniorage extensively studied as proxy of total seigniorage in the theoretical literature and very little empirically, is "Fiscal Seigniorage". Fiscal seigniorage for Pakistan since 2000 remained in the range of (-298) billion rupees to 696 billion rupees, with an average of 76 billion rupees per annum. In 2008, fiscal seigniorage was Rs 696 billion. This is the same year when central government of Pakistan borrowed extensively from SBP.[8] Trend of fiscal seigniorage also validates the hypothesis of inappropriate measurement of seigniorage by monetary seigniorage concept. Total seigniorage from uses side remained in the range of -6.1 percent to 6.8 percent of nominal GDP in the sample period.

Table 2 provides the year wise detail of seigniorage used for covering the cost of coinage and printing of notes (S^c), seigniorage used for net investment by SBP in its portfolio of non-government debt (S^{ni}), seigniorage used for financing the deficit of the central government (Sg) and total seigniorage (St) from the uses side for the sample period.

[7] For details see Fischer and Bruno (1990).

[8] Rs.677 billion in FY08 as compared to annual average of Rs.72 billion since FY04.

Table 2. Seigniorage Revenues Uses Side

	Price Level (CPI)	S^c	S^{ni}	S^g	S^t	Nominal GDP (MP)	S^t as % of GDP
2000	60	11	-60	195	146	3826	5.1
2001	63	16	50	-136	-70	4210	-3.2
2002	65	17	207	-170	54	4453	-3.8
2003	67	15	444	-298	161	4876	-6.1
2004	70	15	79	94	189	5641	1.7
2005	77	15	-3	219	230	6500	3.4
2006	83	15	84	177	275	7623	2.3
2007	89	17	309	-31	296	8673	-0.4
2008	100	15	-353	696	358	10243	6.8
2009	117	15	-68	107	54	12724	0.8
2010	129	16	147	71	234	14837	0.5
2011	146	15	78	-6	87	18063	0.0

Note: All figures except CPI are in billion Rupees. CPI is an index with base 2007-08.
Source: Economic Survey, Monetary Survey and Annual Balance Sheets of SBP.

It is found that fiscal seigniorage and seigniorage used for net investment by SBP in its non-government debt are inversely related. This inverse relationship signals a crowding out effect in Pakistan. In all those periods, when central government borrowed heavily from SBP, there were very little financial resources left to be offered to non-government sector.

4. Conclusion

Generally, developing countries rely heavily on central banks to finance their budget deficits. Deficit financing by printing new money creates inflation in the economy and generates seigniorage revenues for the government. Proper computation of seigniorage revenues is very important, as it determines the reliance of fiscal side on the central bank and also determines the autonomy of the central banks. Arby (2006) has analyzed this phenomenon exclusively in the context of Pakistan. However, definition of seigniorage used by Arby (2006) has been criticized due to the its implied assumptions that are hard to be materialized in the real world.

We have used the methodology proposed by Klein and Neumann (1990) to compute the seigniorage revenues for Pakistan. This methodology is superior to other concepts as it provides a consistency in theoretical definition and empirical measurement. The link was missing earlier as researchers tend to explain the fiscal aspect in definition but compute monetary aspect while doing empirical work. This concept provides more disaggregated computations of seigniorage revenues. If we compute seigniorage revenues from its uses and flows side, as proposed by Klein and Neumann (1990), we get a more precise and accurate picture of

seigniorage revenues. The results indicate that the seigniorage revenues have been extensively used to finance the government's mismatch of revenues and expenditures. The relationship between fiscal seigniorage and seigniorage used for net investment by SBP in its non-government debt portfolio points out the possibilities of crowding out in Pakistan's economy. On the flow side although monetary seigniorage remained the main flow of revenues, but interest seigniorage was also not negligible.

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