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**From Transition to European Monetary
Integration: Revenues from Seigniorage
in Poland**

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Responsibility for the information and views set out in the paper lies entirely with the author.

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Abstract

The analysis presented in the paper focuses on seigniorage revenues in the period of transition to market economy and fiscal consequences of European monetary integration. A comprehensive framework for a measurement of seigniorage revenues in transition period is presented and estimates of its sources and uses in the period 1990–2000 are computed and analyzed. The analysis reveals that in Poland at the end of the last decade revenues from the money creation have not been extensively used as a tool for financing government expenditures. Furthermore, it is shown that, in contrary to the transition period, an accession to European Monetary Union will be accompanied by significant fiscal gains resulting from redistribution of seigniorage wealth between member countries.

I. Introduction

The end of the cold war and the rapid political and economic transformation of the majority of former socialist countries have created a basis for the gradual formation of modern democratic societies. In some, most advanced in market reforms, countries (the Czech Republic, Estonia, Hungary, Poland and Slovenia), the basic stage of economic transformation (macroeconomic stabilization, restructuring, change in ownership structure, etc.) was completed by the middle of nineties, and the post-transformation stage has been accompanied by a significant rate of economic growth. This success in the transformation of Eastern European societies has created an entirely new situation for the European Union (EU), where we currently observe two, to some extent contradictory, tendencies: to deep the community of European countries and to expand the EU. The enlargement of the EU is represented by the conclusions of the EU summit in Copenhagen (1993), which confirmed the policy of gradual enlargement of the EU by the associate countries (if they apply for it). Finland, Sweden and Austria joined EU already in 1995, however, the target solution is considered to be the admittance of the number of Central and Eastern European (CEE) countries. At the end of 1997 five transition countries – the Czech Republic, Estonia, Hungary, Poland and Slovenia – were invited to start negotiations on their accession to the EU. In 1999 five other countries – Bulgaria, Latvia, Lithuania, Romania and Slovakia joined the first group¹.

Although expected integration with the EU should not automatically imply monetary integration, admission to European Monetary Union (EMU) seems to be a target of all new members. As mentioned by Feist (2001), it is clear from the Copenhagen criteria² that adherence to the aim of EMU is one of the duties involved in the membership process. Thus, we can expect that in few years Poland will enter not only European Community (EC) but also European financial structures including EMU, and European

¹ Until the date 12 countries started negotiations with EU, namely: Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, the Slovak Republic, and Slovenia. Turkey, which since Helsinki European Council in 1999 has been also an official candidate, has still to meet the conditions to be fulfilled before negotiations will be started.

² The set of criteria laid down at the Copenhagen European Council in June 1993 requires: (i) the stability of institutions guaranteeing democracy, the rule of law, human rights, and the respect for and protection of minorities; (ii) the existence of functioning market economy as well as the capacity to cope with competitive pressure and market forces within the EU; (iii) the ability to take on the obligations of membership, including adherence to the aims of political unification, as well as economic and monetary union (European Union, 1999).

Central Bank (ECB)³. It is clear, however, that monetary integration is supposed to generate macroeconomic stability and long term growth, on the one hand side, and some costs, on the other. Among various elements of the cost (which are not always easy to quantify) the loss of monetary policy and the flow of seigniorage revenues⁴ from national central bank seem to be in special importance.

In this context we have to mention that although fundamental market reforms have already laid the basis for some macroeconomic stabilization in Poland, the country still meets the problem of significant fiscal imbalances (see Figure 1). In particular, in the period 1997–2000 the budget deficit in absolute terms has been increasing from year to year (the budget deficit expressed as a percentage of GDP has shown similar pattern in years 1999–2000).

Figure 1. Budget deficit in the period 1990–2001



Source: Ministry of Finance (for 2001 estimation).

³ Note that criteria set by Maastricht Treaty were formally binding only on the first group of EMU candidates and will not be automatically applied to the new EMU members (see Kosterna, 1998; European Central Bank, 2000).

⁴ The theoretical concept of seigniorage is discussed in detail in Section 2, but its core is based on a simple idea. A central bank makes profits because it is entitled to provide the private sector with legal tender. While the assets obtained in exchange for it are interest-bearing, the central bank does not pay interest on its currency issued. This discrepancy results in a flow of central bank profits which helps the government to finance its budget year after year.

Although in the last period deficit of the state budget does not exceed three percent of GDP it is a subject of hot debates and permanent problems⁵. There is a common view that, when other fiscal revenues are insufficient for covering the financial needs of the government, seigniorage can be considered as a kind of income of the last resort. Thus, if the nation decides whether or not to join EU (and, consequently, EMU), hence to give up its monetary authority, it also foregoes the flow of seigniorage revenues. Given this, brief considerations may lead to the conclusion that the loss of independent monetary policy (resulting from accession to EMU) accompanied by the loss or a significant decline of seigniorage revenues could make budget consolidation more difficult. Taking into account contemporary fiscal problems, a deep understanding (i) the real scale of current budget support from the central bank and (ii) the principles of sharing seigniorage revenues in EMU, is important in the context of economic and monetary integration.

In the present paper, following Neumann (1996), we define seigniorage in the broadest possible sense as the sum of all revenues resulting from the monopoly power to issue money. Unlike existing empirical studies we take into account the important fact that seigniorage depends also on legal, institutional and operational details that are relevant for the creation of base money in each particular country (see Klein and Neumann, 1990; and Neumann, 1996). This approach not only allows proper estimation of the seigniorage revenues in subsequent years, but also shows how the size of seigniorage revenues should be computed for the purpose of inter-country comparisons (see Neuman, 1996; and Cukrowski 2001).

The paper is organized as follows. In the next section we discuss issues related to economic understanding of the term *seigniorage*, present corresponding definitions, and describe the sources of total gross seigniorage. In the third section we consider possible uses of seigniorage revenues. In the fourth section, we describe the data sources, present and discuss empirical results concerning seigniorage during transition period in Poland. In the fifth section we present current regulations concerning seigniorage distribution in EMU and estimates of seigniorage gains in the case of EMU enlargement. The last section concludes.

2. Sources of Seigniorage Revenues

The concept of seigniorage can be defined in a few different ways (see e.g., Drazen, 1985), and as with most conceptual issues, there is no clear indication which definition of

⁵ It is expected that in 2002 the budget deficit will reach the level of more than 5 per cent of GDP.

seigniorage is the best. In the classical theoretical literature (see e.g., Drazen, 1985) three basic definitions of seigniorage are used. The first defines seigniorage as *inflation tax* (πh , where π is an inflation rate and h denotes real high-powered money). The second defines seigniorage as *opportunity cost of holding money* (ih , where i is a nominal interest rate) – the private sector's loss of foregone interest revenue from holding non-interest bearing cash balances instead earning assets. The third – and the most general – defines seigniorage as *total revenues associated with money creation* ($\mu h + (r-n)a$, where μ is the nominal growth rate of high-powered money, $r-n$ is the difference between the real rate of interest and population growth rate, a is the real stock of interest earning government assets, $a < h$). It has been shown (see Drazen, 1985) that the first two definitions are special cases of the last one. In the analysis which follows we adopt the concept of gross seigniorage proposed by Klein and Neumann (1990) and Neumann (1996), which encompasses most of other commonly used notions (see Neumann, 1996, and Hochreiter and Rovelli, 2001). In particular, we define *total gross seigniorage* as the real gross resource flow to the government sector associated with base money creation (Neumann, 1996). Formally, in a certain year t total gross seigniorage s_t is specified as

$$s_t = s_t^M + s_t^I + s_t^A \quad (1)$$

where

s_t^M is monetary seigniorage defined as a change in base money stock ΔM_t deflated by the general price level p_t :

$$s_t^M = \frac{\Delta M_t}{p_t} \quad (2)$$

s_t^I denotes seigniorage revenue from the stock of interest-earning foreign and domestic private assets

$$s_t^I = \frac{i_t^P A_t^P + i_t^F A_t^F}{p_t} = \frac{IR_t - IE_t}{p_t} \quad (3)$$

A_t^P and A_t^F denote a private sector debt and foreign debt, i_t^P and i_t^F stand for corresponding nominal interest rates;

IR_t and IE_t correspond to interest revenues and interest expenditures, respectively;

s_t^A states for seigniorage revenue from central bank's operations

$$s_t^A = \frac{RE_t - IR_t}{p_t} \quad (4)$$

where RE_t denotes the total revenue of the central bank.

Monetary seigniorage s_t^M measures the actual wealth transfer which the private sector has to make in order to receive base money in the amount of ΔM_t from the central bank. The second term in expression (1) describes the flow of interest revenue on the stock of non-government debt that the central bank bought in the past in exchange for non-interest bearing base money (the debt service on the central bank's stock of government debt is not included here because it is merely an internal transaction between the government and the central bank). The third term in expression (1) describes seigniorage revenue from central bank's operations.

3. Distribution of Seigniorage Revenues

Most empirical literature presents a proxy for actual seigniorage flow to the government based on two implicit assumptions: (i) the government receives the seigniorage revenues regardless of the legal and institutional regulations governing the relationship between the government and central bank, (ii) the amount of seigniorage revenue transferred to the government does not depend on the specific ways and means in which the creation of seigniorage is induced by the central bank. This is a simplification which does not take into account the cost of money production and the existence of the central bank in general⁶.

A more precise analysis presented by Neumann (1996) shows that total seigniorage is used for: (i) covering the cost of money production and central bank operations s_t^C , (ii) net investment in non-government debt by the central bank s_t^{NI} , (iii) replacement investment to make up for the exchange rate induced loss of assets (in terms of domestic currency) s_t^{RI} , (iv) budget finance s_t^G , and (v) the increase in the central bank capital (or is transferred to the third parties) s_t^O . Thus,

$$s_t = s_t^C + s_t^{NI} + s_t^{RI} + s_t^G + s_t^O \quad , \quad (5)$$

where

$$s_t^C = \frac{C_t^{Coin} + C_t^{CB}}{P_t} \quad , \quad (6)$$

⁶ The cost of the central bank could be significant. E.g., Klein and Neumann (1990) show that in the period 1974–1987, about 16.9% of German monetary seigniorage was used to cover the Bundesbank's operating costs.

C_t^{Coin} denotes the cost of coinage, and C_t^{CB} stands for the central bank's cost of printing notes and maintaining operations;

$$s_t^{NI} = \frac{\Delta A_t^P + \Delta A_t^F}{P_t}, \quad (7)$$

A_t^P and A_t^F denote private sector debt and foreign debt, respectively;

$$s_t^{RI} = \frac{L_t}{P_t} = - \frac{(e_t - e_{t-1})A_t^F}{e_{t-1}P_t}, \quad (8)$$

L_t denotes a book loss (defined as a positive number), and e_t is an exchange rate;

$$s_t^G = \frac{\Delta A_t^G + (R_t^G - i_t^G A_t^G)}{P_t}, \quad (9)$$

A_t^G denotes government debt to the central bank and R_t^G appropriated profit;

$$s_t^O = \frac{R_t^O}{P_t}, \quad (10)$$

R_t^O denotes amount of central bank profit transferred to the third parties or used for capital accumulation.

Part of the seigniorage transferred to the budget s_t^G (specified by expression (7)) is called *fiscal seigniorage* (see Neumann, 1996). In general, there should be two additional terms in the numerator of the expression (7): R_t^{Coin} – revenue from coinage (in the case where the government has rights to issue coins as in Germany, for example); and T_t^B – taxes on central bank's property and income (when the central bank has to pay taxes on property and income as, for instance, in Japan). In the case of Poland the government receives fiscal seigniorage through: (1) net borrowing from the central bank $(\Delta A_t^G)^7$, and (2) appropriation of the central bank's profit, net of interest payments on the central bank's stock of government debt $(R_t^G - i_t^G A_t^G)$. Thus, fiscal seigniorage is fully determined by expression (9).

4. Seigniorage Revenues in Transition Period

The empirical analysis of sources and uses of seigniorage revenues presented in this section is based on data from the central bank balance sheets and its statements of

⁷ Although direct borrowing from the National Bank of Poland is not allowed, the central bank can buy government bonds on the secondary market.

income and expenditures and profit distribution (the main data sources are the *Annual Reports of National Bank of Poland*). The sample period is 1990–2000.

In Table 1, the sources and uses of seigniorage for the overall sample period 1990–2000 are presented in Polish zlotys (PLN) (all flows are expressed in 1990 prices).

The year by year developments of the total gross seigniorage is presented in Figure 2. Development of its sources is shown in Figure 3. The distribution of the total gross seigniorage in subsequent years is presented in Figure 4. The total gross seigniorage and fiscal seigniorage as a fraction of GDP in 1990–2000 are presented in Figure 5.

Figure 2. Total gross seigniorage in the period 1990–2000 as a share of GDP

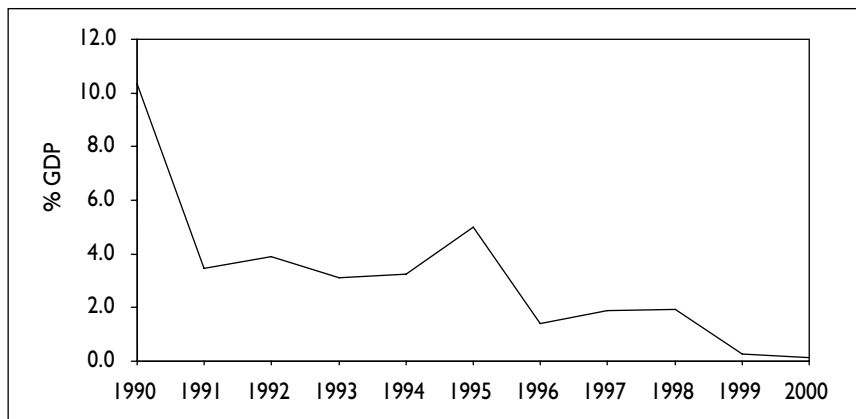


Figure 3. Sources of total gross seigniorage in the period 1990–2000 as a share of GDP

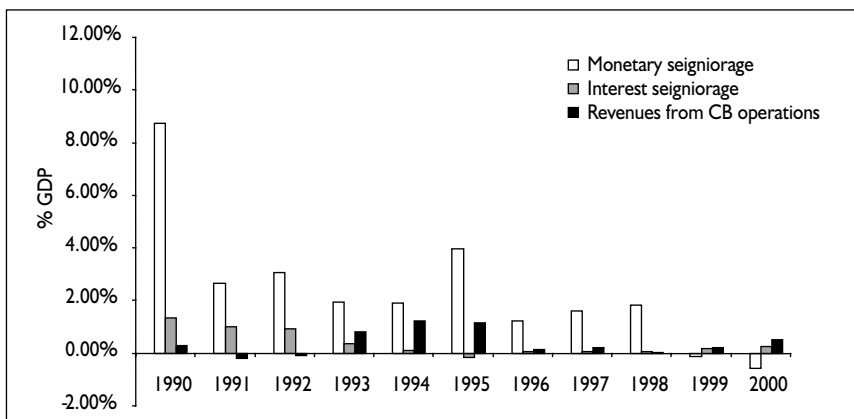
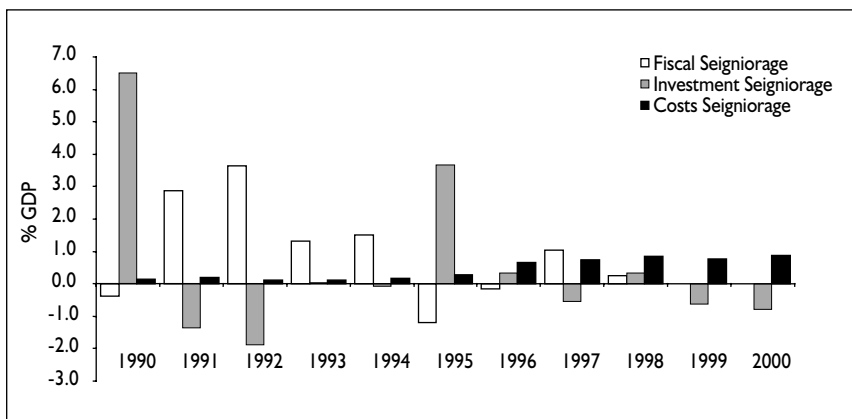


Table 1. Sources and uses of seigniorage revenues in Poland in 1990–2000 (1990 prices)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
billion PLN												
Total	S_t	6.66	3.25	3.84	1.51	1.10	4.11	1.00	1.79	1.46	0.90	1.36
Sources PLN billion												
Monetary	S_t^M	5.30	1.37	1.51	0.94	0.97	2.27	0.74	1.07	1.37	-0.10	-0.46
Interest	S_t^I	0.80	0.51	0.45	0.17	0.06	-0.08	0.03	0.04	0.06	0.12	0.18
Revenues from CB operations	S_t^A	0.17	-0.09	-0.04	0.40	0.63	0.65	0.08	0.13	0.03	0.16	0.39
Uses PLN billion												
Fiscal	S_t^G	-0.39	2.88	3.64	1.31	1.50	-1.19	-0.16	1.05	0.25	0.02	0.002
Costs of CB	S_t^C	0.14	0.19	0.12	0.13	0.17	0.29	0.65	0.74	0.86	0.77	0.88
Net investment and replacement investment	$S_t^{NI} + S_t^{RI}$	6.50	-1.37	-1.88	0.03	-0.07	3.68	0.32	-0.55	0.34	-0.61	-0.78
An increase in CB capital	S_t^O	0.02	0.09	0.04	0.05	0.06	0.07	0.03	0.01	0.01	0.01	0.01
Sources Per cent of total sources												
Monetary	S_t^M	79.5%	42.3%	39.3%	62.2%	88.4%	55.3%	73.7%	59.6%	93.7%	-11.1%	-34.1%
Interest	S_t^I	12.1%	15.6%	11.7%	11.5%	5.2%	-2.0%	3.0%	2.0%	4.3%	13.6%	13.6%
Revenues from CB operations	S_t^A	2.6%	-2.9%	-1.0%	26.2%	57.0%	15.9%	7.7%	7.5%	2.0%	18.3%	28.9%
Uses Per cent of total uses												
Fiscal	S_t^G	-5.8%	88.7%	94.8%	86.8%	136.6%	-28.8%	-15.5%	58.2%	17.0%	1.8%	0.1%
Costs of CB	S_t^C	2.1%	5.7%	3.2%	8.5%	15.2%	6.9%	65.0%	41.4%	59.1%	86.2%	65.0%
Net investment and replacement investment	$S_t^{NI} + S_t^{RI}$	97.5%	-42.2%	-48.9%	1.7%	-6.3%	89.4%	32.1%	-30.8%	23.5%	-68.0%	-57.5%
An increase in CB capital	S_t^O	0.4%	2.8%	0.9%	3.0%	3.3%	1.7%	2.8%	0.4%	0.4%	0.9%	0.7%

Figure 4. Uses of total gross seignorage in the period 1990–2000 as a share of GDP

Note that in 1994 the National Bank of Poland started the denomination process. New banknotes were introduced, and, consequently, the costs of printing banknotes and operating costs increased in subsequent years (Figure 4). Moreover, since 1994 the National Bank of Poland has been involved in open market operations which were ultimately quite costly. In 1995 the total revenues of the central bank raised significantly (Figure 2), however, the fiscal seignorage decreased (Figure 4). Decline of fiscal revenues from seignorage in 1995 is associated with the increase in net foreign exchange reserves (see Figure 4) resulting from an improvement of an inflow of foreign direct and portfolio investment, new credits and large purchases of foreign currencies, large-size cross-border trade, higher level of economic activity, and the policy of National Bank of Poland⁸. In the next two years fiscal seignorage increased again reaching in 1997 the level of the budget deficit (Figure 5). In the subsequent years the flow of fiscal revenues from seignorage decreased significantly. Note that while decrease in fiscal seignorage in years 1995–96 resulted, to some extent, from contemporary economic situation, the pattern observed after 1997 (reduction of fiscal seignorage) resulted from institutional changes that significantly increased political, economic and overall (political+economic) independence of National Bank of Poland⁹ (see Figure 6). Evolution of basic elements of political and economic independence of National Bank of Poland is presented in Table A4

⁸ The increase of foreign exchange reserves caused a pressure for appreciation of the PLN. On 16 February 1995 NBP lowered the rate of devaluation to a monthly 1,2%, and in May 1995 implemented a floating exchange rate mechanism PLN was allowed to float with fluctuations with +/- 7% band of the central bank rate.

⁹ See Maliszewski (2000) for details.

and Table A5, respectively¹⁰. The Act on the National Bank of Poland from 1997 (i.e., a current version of Polish central bank act) is characterized in Table A6.

Summing up, our estimations (see Table 1, and Figures 2–4) show that in contrast to the common belief that in most transitional economies revenues from money creation

Figure 5. Fiscal seigniorage and budget deficit in the period 1990–2000

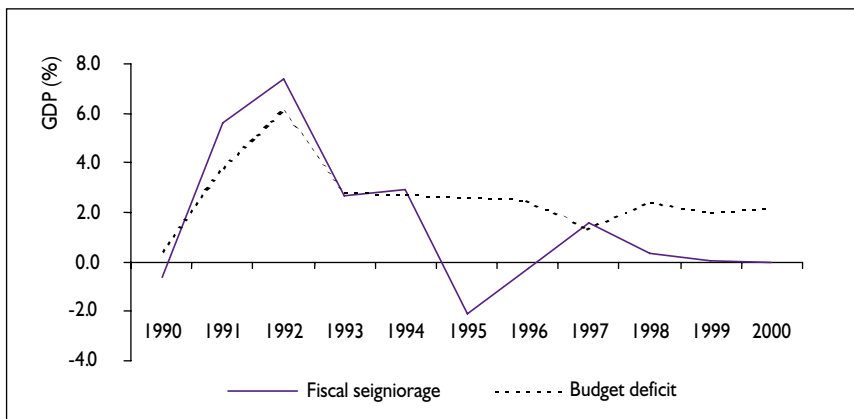
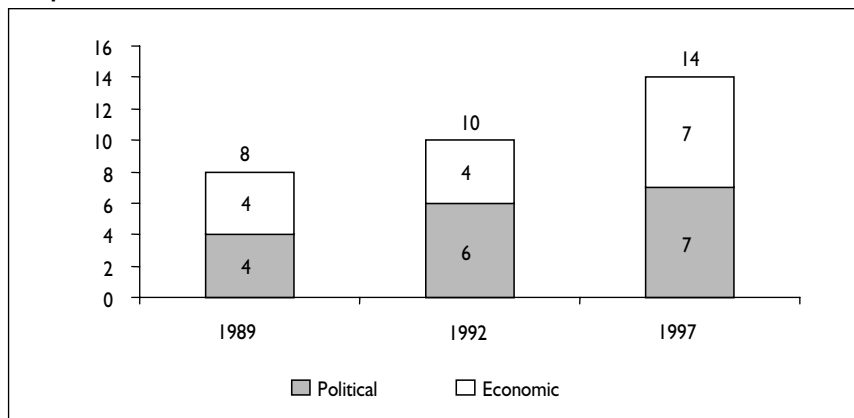


Figure 6. Development of political, economic, and overall (political+economic) independence indicators of National Bank of Poland

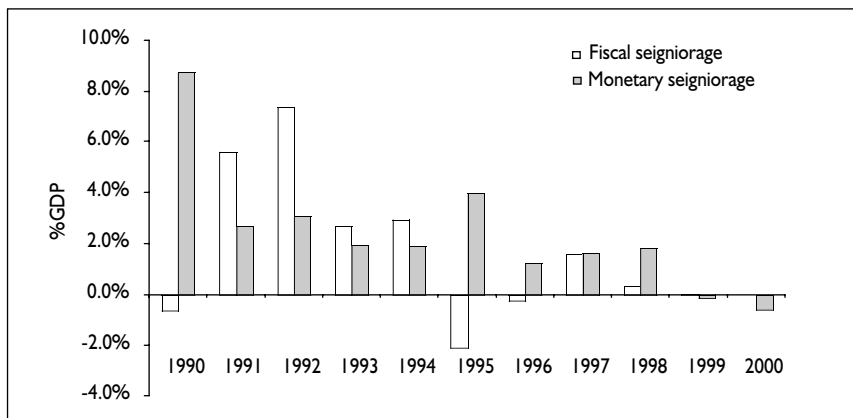


Source: Maliszewski (2000).

¹⁰ The Act on the National Bank of Poland was firstly enacted in January 1989, and then modified in 1992. Its current form reflects revisions enacted in 1997.

play a significant budgetary role (see, e.g., Budina, 1997), in the second part of nineties (except the year 1997) in Poland seigniorage revenues have not been extensively used as a tool for financing government expenditures (see Figure 5). Note that although in 1995 the value of monetary seigniorage increased, the value of the fiscal seigniorage deteriorated (due to significant increase of foreign assets). Such a pattern is not contradictory because monetary seigniorage corresponds to fiscal seigniorage only if other seigniorage components are close to zero. It follows from the analysis presented above, that in Poland interest earnings on non-government debt (interest revenues) and revenues from the central bank's operations are important components of total central bank revenues, and therefore, the conventional concept of monetary seigniorage does not always adequately measure the total flow of seigniorage. In particular, the results show that an estimation of the total central bank earnings by monetary seigniorage usually understates the total flow of seigniorage revenues. At the same time, the results indicate that monetary seigniorage should not be used as a proxy for the total flow to the government sector (see Figure 7) since it reflects fiscal seigniorage only if investment seigniorage is close to zero, something that is usually not the case in transition economies.

Figure 7. Monetary and fiscal seigniorage in the period 1990–2000 as a share of GDP



Furthermore, it is important to stress that the results above imply a weakening of the link between inflation and seigniorage. In particular, much like Klein and Neumann (1990), we would like to emphasize that the increase in a monetary base (and a country's inflation rate) does not automatically imply higher fiscal seigniorage revenues. Nor does the inverse necessarily hold, i.e., a decrease in a monetary base (associated with a decrease

in the rate of inflation) does not automatically imply smaller seigniorage revenues for budget deficit financing. An increase in the scope of budget deficit financing can be achieved by increasing the central bank's efficiency instead of by raising the rate of inflation.

5. Expected Gains from Seigniorage Revenues in European Monetary Union

Introduction of Euro in the beginning of 1999 has affected not only monetary policy of the member states of EMU, but has also some fiscal consequences, related to changes in the flow of seigniorage revenues. First of all, once national currencies and seigniorage disappeared at national level, this source of budget revenues is not available anymore. Second, ECB increasing stock of euro, collects seigniorage revenues that need to be distributed to the member states of EMU. An important point is that current regulations imply some redistribution of the total seigniorage within EMU. As the result, it is expected that some of the member states of EMU will face non trivial gains but at the same time some other will realize significant loses.

Although negotiations about the distribution of ECB revenues from seigniorage are being carried out behind closed door, the general principles of their allocation among the Euro area member states have been already determined. In particular, under Article 32 of the Protocol No. 18 of the Statute of the European System of Central Banks and of the European Central Bank of the Maastricht Treaty the sum of the participating national central banks' monetary income shall be allocated to them in proportion to their paid up shares in the capital of ECB¹¹.

Recall from Section 2, that there are three basic components of total seigniorage revenues: monetary seigniorage, interest seigniorage and revenues from financial operations of the central bank. Taking into account that the national central banks in the member states of EMU still exist, but are organized in different ways and perform different functions, the cost of operating them and eventual revenues from financial operations are not subject to common use. Monetary seigniorage and interest seigniorage, however, are socialized to a common pull and then redistributed among the member states of EMU. Since it is unclear where the assets backing the monetary base will be held (especially after

¹¹ The principles of seigniorage redistribution were studied in detail by Sinn and Feist (1997, 2000) and Gross (1998).

EMU enlargement), it is very difficult to predict future flows of monetary seigniorage. Moreover, given that all central banks will be able to produce the same quality of money, it might well be the case that part of the monetary base of one country is replaced by increases in the monetary base of the other, and that interest bearing assets are transferred accordingly. Definitely, given the sharing rule agreed on in the Maastricht treaty, it would have a big effect on the net flows of transfer payments between the central banks, but now it can hardly be estimated. However, in addition to socialization of future increases in seigniorage wealth, there exists a real problem of socialization of the initial (historically accumulated) seigniorage wealth (or, in other words, the problem of socialization of the future interest income generated by this wealth), which has huge redistribution effects (see Sinn and Feist 1997, 2000, and Feist 2001). This is because the contribution of a particular country to the common pull of interest revenues generated based on the amount of historically accumulated seigniorage wealth does not correspond exactly to this country's share in the ECB, in accordance to which seigniorage revenues are distributed.

Note that since the present value of the flow of interest profits is equal to the market value of assets held by the central bank as a counterposition to its currency, the waiving of the future profit flow due to EMU can be treated from economic point of view as foregoing the assets backing the currency circulation. Redistribution effect (in terms of foregoing assets backing the currency circulation) for current member states of EMU has been discussed in detail by Sinn and Feist (1997, 2000). Gain and losses of the countries-candidates to EU have been studied by Feist (2001).

As estimated by Feist (2001) the overall effect of full EMU enlargement (including new members: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, Slovenia, and old the EU but not EMU members: Sweden, Denmark and United Kingdom) would be an increase in seigniorage wealth from 406.8 billion euros to 429.3 billion euros (5.5 percent growth)¹². Poland, as the largest accessing country will contribute with 8.6 billion euros (2 percent of total currency share). However, the capital share [resulting from the arithmetic average of population (8.1 percent) and GDP (2.0 percent) shares], which determines the share in ECB and the receipts from seigniorage revenues will amount to about 5 percent. The gain of the country understood as the difference between what it contributes and what it receives, may be calculated as capital share (5 percent) minus currency share (2 percent) multiplied by the amount of seigniorage wealth in the common pool (429.3 billion euros). The simple computations show impressive gains of Poland from redistribution of seigniorage wealth amounting to 12.9 billion euros.

¹² The estimations presented refer to the situation for the end of 1998, nevertheless, they give a hint about the scope of possible gains/loses of seigniorage wealth redistribution within EMU.

In interpreting these results, it is important to note again that the figure above is not annual value, but that it describes the once-and-for-all gain from the redistribution of historic seigniorage wealth which is associated with the participation in EMU. This figure is, however, the best suited to describe gains or losses from the redistribution of seigniorage wealth, for a country facing the decision to join once and for all, or not to join at all.

Given that starting from 1998 the amount of fiscal seigniorage was rather negligible and continuously decreasing to the amount close to zero in 2000 (see Table I), and that the wealth transfer to Poland resulting from redistribution of ECB seigniorage would be significant, the overall gain seems to be quite transparent.

6. Conclusions

This study has presented the analysis of total scale and the flows of seigniorage revenues to the budget during a period of transition to market economy and confronted them with the expected gains from redistribution of seigniorage wealth in the case of integration with EMU.

In the paper we used the new view on the formation of the central banks revenues and transfers from the central banks to the budget which seems to be especially useful for transition countries. In particular, in contrary to other empirical studies, we have not relied on the simple concept of monetary seigniorage which measures the flow of the additional monetary base the government can issue, but instead we have used (1) a new concept of total gross seigniorage which measures the total flow to the government sector and (2) fiscal seigniorage which measures the portion of seigniorage received for budget financing.

In contrast to the common belief that in most transition economies revenues from money creation play a significant budgetary role, we found that starting from 1998 the flow of budget revenues from central bank seigniorage was rather negligible and decreasing. This finding has been confronted with the estimation of the expected gains from redistribution of seigniorage wealth in the case of EMU enlargement. Taking into account that expected transfer of seigniorage wealth to Poland resulting from the redistribution of ECB seigniorage revenues, would be significant, fiscal authorities would definitely not lose from Polish participation in EMU (if the current rules of redistribution prevail). We have to mention, however, that one country may benefit from redistribution of seigniorage wealth only if the other county loses. Therefore, in addition to big

beneficiaries of the redistribution process in enlarged EMU (as Poland or Romania¹³) there will be also big losers (the overall loss of Germany is estimated to about 49.2 billion euros, Spain – 19.6 billion euros, Italy – 10.2 billion euros). Obviously, authorities of these countries may tend to reconsider the rules underlying current redistribution mechanism. In any case, however, since the current flow of seigniorage revenues to the budget is not significant, one should not expect that giving up the monetary authority and the accession to EMU will lead to significant budgetary loses associated with the flow of seigniorage revenues from the central bank to the budget.

¹³ See Feist (2001).

Appendix

I. Data Sources and Details of Seigniorage Estimation

The main sources of data used for the calculations of the total gross seigniorage and its components are: (i) *The Balance Sheet of the National Bank of Poland* and (ii) *The Profit and Loss Statement of the National Bank of Poland*. The simplified forms of *The Balance Sheet of the National Bank of Poland* for the period 1990–2000 is presented in Table A1, and the example of *The Profit and Loss Statement of the National Bank of Poland* for 1997 is presented in Table A2. A short description follows of how Table A3, containing all the data used for the computation of the total gross seigniorage and its components, is constructed.

Table A1. Aggregated Balance Sheet of National Bank of Poland as of December 31, 1990–2000 (PLN billion)

	Assets	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
A.1	Due from abroad	3.82	5.07	7.74	13.49	21.36	41.03	56.01	79.44	103.40	120.35	120.70
A.2	Due from financial institutions	7.61	7.51	4.85	6.34	7.02	7.79	10.85	9.27	7.64	7.08	6.87
A.3	Loans to general government	0.59	2.48	4.30	1.87	1.74	1.79	1.81	2.80	1.74	0.00	0.00
A.4	Due from non financial sector	0.01	0.02	0.02	0.03	0.02	0.02	0.06	0.07	0.06	0.07	0.07
A.5	Securities	0.00	1.89	7.87	13.89	18.22	10.22	11.34	14.43	16.43	19.11	16.99
A.6	Other assets	1.59	2.70	4.54	2.96	4.43	5.08	4.13	3.75	2.13	3.61	1.81
	Total assets	13.62	19.67	29.32	38.57	52.80	65.91	84.21	109.76	131.40	150.23	146.45
	<i>Liabilities</i>											
L.1	Foreign liabilities	0.00	1.37	1.99	5.68	9.94	4.33	4.21	7.15	7.79	14.49	8.51
L.2	Notes&coins in circulation	4.81	6.83	9.52	12.18	14.78	22.41	27.24	31.08	33.99	43.38	38.56
L.3	Due to financial institutions	3.04	3.30	4.11	4.46	5.83	9.56	9.14	12.53	19.65	9.43	10.21
L.4	Deposit of general government	1.37	1.11	1.28	2.27	2.77	3.44	6.13	4.29	4.01	7.04	9.77
L.5	Zloty deposit of non-financial sector	0.00	0.05	0.07	0.01	0.00	0.00	0.00	3.60	0.01	0.00	0.00
L.6	Foreign currency deposit of non-financial	0.69	0.71	1.10	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
L.7	Other liabilities	3.71	6.30	11.25	13.95	19.47	26.17	37.47	51.12	65.94	49.50	44.01
	Total liabilities	13.62	19.67	29.32	38.57	52.80	65.91	84.21	109.76	131.40	150.23	146.45

Table A2. Profit and Loss Statement of the National Bank of Poland as for 31.12 (million PLN)

Revenue		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
R.1	Interest Revenue	1.39	1.24	1.42	1.03	0.97	1.13	1.31	1.11	1.22	1.29	2.26
R.2	Revenue from Financial Operations	0.00	0.00	0.13	1.41	2.85	4.35	3.39	4.34	4.97	5.70	7.83
R.3	Revenue from fees	0.05	0.09	0.03	0.03	0.02	0.03	0.00	0.00	0.01	0.01	0.02
R.4	Other revenues ¹	0.27	0.02	0.03	0.17	0.22	0.23	0.85	1.45	1.45	1.60	3.01
R.5	Total revenue	1.71	1.35	1.61	2.64	4.05	5.74	5.54	6.91	7.66	8.60	13.12
Expenditure												
E.1	Interest Expenditures	0.59	0.43	0.38	0.47	0.74	1.54	1.13	0.87	0.77	0.31	0.65
E.2	Open market operations	0.00	0.00	0.00	0.03	0.05	0.87	2.49	3.70	5.40	3.33	6.37
E.3	Provisions	0.00	0.09	0.02	0.03	0.03	0.03	0.05	0.03	0.03	0.02	0.02
E.4	Other ²	0.09	0.03	0.22	0.04	0.05	0.09	0.83	0.65	0.25	1.88	0.21
E.5	Administration cost	0.04	0.13	0.03	0.19	0.22	0.24	0.30	0.39	0.46	0.56	0.63
E.6	Cost of printing bank notes and making coins	0.01	0.01	0.01	0.06	0.17	0.10	0.11	0.11	0.08	0.20	0.22
E.7	Total costs	0.73	0.69	0.66	0.82	1.26	2.88	4.90	5.76	6.99	6.30	8.10
R.6	Profit for the Accounting Period	0.98	0.66	0.95	1.82	2.82	2.86	0.64	1.15	0.67	2.30	5.01
	Profit transfer to the budget	0.83	0.58	0.80	1.59	2.48	2.69	0.60	1.11	0.60	2.21	4.87

¹ In the period 1997–2000 "Other revenue" (R4) exceeded 1.0 billion PLN. In 1997 the biggest part of R4 consisted in exchange rate gains (1146.4 million PLN). Similarly, in 1998 it included mainly exchange rate gains (709.9 million PLN) and actualization of the value of assets (666.8 million PLN). In 1999 it included mainly resources from unplanned income on the release of part of the currency revaluation reserve (670.2 million PLN), FX gains on revaluation (535.9 million PLN) and release of valuation allowances against bank assets (294.2 million PLN). In 2000 part R4 included mainly: release of currency revaluation reserve (1.5 billion PLN) which was recorded on the sale of foreign currency to the Ministry of Finance to service the official foreign debt and FX gains on the revaluation (0.93 billion PLN).

² In 1999 "Other" (expenditure) (E5) achieved 1.0 billion PLN. It was mainly the result of decrease of book value of treasury bills with constant interest rate (value of 1.7 billion PLN) received as the result of the conversion the state debt on 30.09.1999.

Tables A1 and A2 were used to obtain data needed for the computation of the total gross seigniorage and its main components (see Table A3).

Table A3. Data used for the computation of the total gross seigniorage and its main components

Year	P	C^{CB}	$C^{Co\&Bn}$	G	R	$R^G - i^G A^G$	IR-IE	A^f	A^G	A^p	M
1	2	3	4	5	6	7	8	9	10	11	12
1989	18.53	0.06	0.01	0.09	0.26	0.24	0.19	0.58	0.43	2.68	2.57
1990	100.00	0.13	0.01	0.32	0.98	0.83	0.80	3.13	-0.78	7.61	7.85
1991	160.40	0.29	0.01	0.11	0.66	0.58	0.81	2.99	3.26	7.48	10.12
1992	231.46	0.28	0.01	0.19	0.95	0.80	1.04	4.65	10.88	4.80	13.63
1993	318.49	0.34	0.06	1.61	1.82	1.59	0.56	7.79	13.48	6.35	16.65
1994	412.44	0.52	0.17	3.08	2.82	2.48	0.24	11.41	17.19	5.08	20.61
1995	501.52	1.33	0.10	4.61	2.86	2.69	-0.42	36.69	8.55	2.04	31.97
1996	594.31	3.77	0.11	4.23	0.64	0.60	0.18	51.80	7.03	-1.62	36.39
1997	672.76	4.89	0.11	5.79	1.15	1.11	0.24	72.29	12.95	-8.64	43.60
1998	730.61	6.22	0.08	6.44	0.67	0.60	0.45	95.61	14.16	-20.88	53.65
1999	802.21	6.19	0.20	7.31	2.30	2.21	0.98	105.86	12.07	-17.54	52.80
2000	870.40	7.67	0.22	10.85	5.01	4.87	1.61	112.19	7.22	-26.80	48.77

where:

P – general price level index (1990 = base year), reported annually by Polish Central Statistical Office,

C^{CB} – costs of maintaining operations (in PLN billion),

$C^{Co\&Bn}$ – costs of printing banknotes (in PLN billion),

G – revenue from central bank's operations (in PLN billion),

R – total central bank profit (in PLN billion),

$(R^G - i^G A^G)$ – net profit distributed to the government (in PLN billion),

(IR - IE) – net interest revenues reported in (in PLN billion),

A^f – foreign debt to NBP (in PLN billion),

A^G – government debt to NBP (in PLN billion),

A^p – private sector debt to NBP (in PLN billion),

M – monetary base (in PLN billion).

Sources:

C^{CB} (costs of maintaining operations) computed base on the data presented in the Profit and Loss Statement of the National Bank of Poland (see Table A2, items E.2+E.3+E.4+E.5).

$C^{Co\&BN}$ (cost of printing banknotes and making coins) is presented in the Profit and Loss Statement of the National Bank of Poland (see Table A2, item E.6).

G (revenue from central bank's operations) presented in the Profit and Loss Statement of the National Bank of Poland (see Table A2, items R.2+R.3+R.4).

R (net profit of the central bank) is reported in the Profit and Loss Statement of the National Bank of Poland (see Table A2, item R.6).

$(R^G - i^GA^G)$ (net profit distributed from central bank to the government) reported in by the National Bank of Poland.

A^P (domestic private debt held by the National Bank of Poland) is determined as the sum of *due from financial institutions* (Table A1, item A.2) and *due from non financial sector* (Table A1, item A.4) minus *zloty deposit of non-financial sector* (Table A1, item L.5).

A^G (government debt held by the National Bank of Poland) is determined as the sum of *loans to general government* (Table A1, item A.3) and *securities* (Table A1, item A.5) minus *deposit of general government* (Table A1, item L.4).

A^F (foreign debt held by the National Bank of Poland) is determined as *due from abroad* (Table A1, item A.1) minus *foreign liabilities* (Table A1, item L.1) and *foreign currency deposit of non-financial sector* (Table A1, item L.6).

IR-IE (net interest revenues of the National Bank of Poland) determined as a difference between *interest revenues* (Table A2, item R.1) and *interest expenditures* (Table A2, item E.1).

M (the monetary base) reported by National Bank of Poland.

II. Evolution of Central Bank Law in Poland

Table A4. Elements of political independence (√ – yes, — – no)

	1989	1992	1997
Governor not appointed by the government	√	√	√
Governor appointed for more than five years	—	√	√
Provisions for government's dismissal non-political only	—	√	√
None of the board appointed by the government	√	√	√
Board appointed for more than five years	—	—	√
No mandatory government representative in the board	√	√	—
Government approval of monetary policy is not required	—	—	√
Statutory responsibility to pursue monetary stability	√	√	√
Presence of legal provision supporting bank in conflicts with the government	—	—	—
Total index	4	6	7

Source: Maliszewski (2000).

Table A5. Elements of economic independence (✓ – yes, — – no)

	1989	1992	1997
Direct credit facility is not automatic	✓	✓	✓
Direct credit facility is at the market interest rate	—	—	✓
Direct credit facility is temporary	—	—	✓
Direct credit facility is of limited amount	✓	✓	✓
Central bank does not participate in the primary market	—	—	✓
All direct credit is securitized	✓	✓	✓
Discount rate is set by the central bank	✓	✓	✓
Supervision of commercial banks is not entrusted to the central bank	—	—	—
Total index	4	4	7

Source: Maliszewski (2000).

Table A6. Selected important details of current regulation on central bank in Poland

Central bank governor	
Governor appointed by	Parliament (proposal of the President)
Term	8 years
Reappointment	Two terms
Provision for dismissal	Non-political
Central bank board	
Board appointed by	President: 3 members, Parliament: 6 members
Members	9
Term	6 years
Reappointment	No
Government representative	Yes (advisory)
Monetary policy	
Relation with the government	Co-operation
Relation with the parliament	Bank submits monetary policy guidelines and annual reports
Monetary stability objective	Yes
Provisions in case of disagreement with the government	No
Constraints on central bank credit to the government	
Direct loans	Prohibited
Securities on the primary market	Prohibited
Securities on secondary market	Unconstrained

Source: Maliszewski (2000).

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