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The Georgian Hyperinflation and Stabilization

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Abstract

This paper anlayzes the Georgian hyperinflation of 1993-94, which featured endogenous fiscal expenditures and the money supply, depreciation, and currency substitution. Hyperinflation was stopped by removing generalized consumer subsidies and tightening of monetary policy, and not by a sudden rush of credibility or imposition of an exchange rate anchor. A de facto exchange rate anchor served ex post as a vehicle for building credibility, which ensured a dramatic reversal of currency substitution when the currency reform was implemented. The paper also discusses the relatively rapid output recovery in Georgia.

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Contents Page

THE GEORGIAN HYPERINFLATION AND STABILIZATION

I. INTRODUCTION

Hyperinflation burst out in several BRO economies following the breakup of the ruble zone.[2, 3] The inflation in Georgia, after the introduction of its currency—the coupon—in April 1993, was one of the worst. The extent of currency substitution, the detrimental impact on public finances and the banking system, and the resulting relations among prices, exchange rate, and wages all represent an extreme in the annals of hyperinflation. A comprehensive stabilization and structural reform program was developed and implemented with the assistance of the International Monetary Fund and the World Bank beginning in mid-1994. Hyperinflation came to an end abruptly with the nominal exchange rate appreciating from over coupon 5 million to the U.S. dollar in unofficial trading to about coupon 1.3 million to the dollar in the fourth quarter of 1994, and in coupon terms, prices were actually declining during the period. Exchange rate and price stability was maintained subsequently despite the absence of the recovery of fiscal revenues notable in other disinflation cases. The new national currency—the lari—was successfully introduced one year after the halt in hyperinflation, bringing about a dramatic reversal in currency substitution. The lari actually appreciated vis-à-vis the U.S. dollar in the aftermath of the currency reform. GDP, after severe contraction in 1991–94, started growing in 1995, and increased by over 10 percent in real terms in 1996–97.

This stabilization episode provides an opportunity to examine a number of policy issues that are of interest to students of hyperinflation and transition economies: in particular (1) the process that leads to hyperinflation in a transition economy; (2) stabilization policies; and (3) the resumption of economic growth after stabilization. Studies of hyperinflation in the 1920s and 1980s have identified several key elements of the high inflation process, including endogenous money supply, the erosion of tax revenues by inflation, wage indexation, financial innovations and, in some cases, causal movements in exchange rates (Sargent and Wallace 1973, Dornbusch and Fischer 1986, Dornbusch, Sturzenegger, and Wolf, 1990, Tullio, 1995). A transition economy in the early 1990s may differ substantially from these earlier cases, and the differences may have important bearing on the inflation process.

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[2]BRO countries include the Baltics, Russia, and other former Soviet Union countries.

[3]By Cagan's (1956) classic definition, hyperinflation begins in the month in which inflation exceeds 50 percent and ends in the month in which inflation last exceeds 50 percent and is followed by 12 months of less than 50 percent inflation. While quarterly retail price inflation exceeded 150 percent during 1992–1994 in many BRO states including Azerbaijan, Belarus, Kyrgyz, Kazakhstan, Tajikistan, Turkmenistan, and Uzbekistan, only Georgia, Ukraine, and Armenia recorded inflation of such magnitude for at least 2 consecutive quarters. The Georgian hyperinflation started in September 1993 and ended in September 1994.

The traditional approach to stabilization places central emphasis on controlling the money supply (Cagan, 1956). In an influential paper, Sargent (1982) argued that credible "regime change"—through fiscal reforms and the creation of an independent central bank—is a necessary and sufficient condition for stopping inflation. While receiving some support (Bomberger and Makinen, 1983), this view has not gone unchallenged. Sachs (1987) found that in the case of Bolivia, exchange rate stabilization played a preeminent role. Price stability could precede the credibility of fundamental regime change. Dornbusch (1987) reached a similar conclusion by reexamining the German inflation in the 1920s. The recent literature on money-based vs. exchange-rate-based stabilization also favors the use of an exchange rate anchor to break the link between past and present with regard to price and wage formation (see Dornbusch, 1982, Fischer 1988, Calvo and Vegh 1994). Indeed, empirical studies have found that monetary targeting with an exchange rate float has been a policy option in low/moderate inflation, but hardly ever been the case with successful stabilization of hyperinflation (Bruno, 1993, p.270). The Georgia experience appears to run counter to the prescription of fixing the exchange rate and raises the questions of what ultimately stopped hyperinflation and the role of exchange rate policy in stabilization.

Statistical analyses of transition economies have found that growth resumed on average two years after stabilization occurred (e.g., Fischer, Sahay, and Vegh (1996)). It is unclear, however, what is the microeconomic basis for the two-year lag. The rapid recovery of Georgia may provide some insight into the stabilization-growth linkages and the policy measures needed to speed up economic growth in the transition economies.

This paper provides an analytical account of the Georgian hyperinflation and stabilization based on available data for 1993–1996. Key findings of the study are as follows. The hyperinflation in Georgia resulted mainly from the combination of accommodating financial policies and the government's attempt to maintain stable prices for key commodities (bread and energy). In the face of multiple shocks to the government's budget, relying on monetary financing of the fiscal deficit accelerated depreciation of the currency and domestic inflation. Fixing the prices of bread and energy in local currency (the coupon) was tantamount to indexing the implicit budgetary subsidies to the exchange rate. A vicious circle of fiscal deficit, central bank credit emission, currency devaluation and substitution, and larger fiscal deficit thus reinforced the usual inflation-expectation dynamics and the tax revenue erosion effect, quickly driving prices upward.

In contrast to other hyperinflation cases, in which domestic currency remained the principal medium of exchange despite rampant currency substitution, this vicious circle of endogenous fiscal structure and money supply quickly led to the development of a dual economy, in which the coupon ceased to be the medium of exchange and the unit of account except for government related transactions, notably the distribution of food aid. This specific structure of the economy and the absence of indexation of labor and other contracts altered the conventional linkages between exchange rate and price and wage formation. Under the circumstances, fixing the nominal exchange rate of the coupon ex ante would have little

impact on price and wage setting.[4] Stopping hyperinflation first and foremost required breaking the vicious circle through fundamental adjustment in fiscal and monetary policies.

The Georgian experience shows that exchange rate and price stability could be achieved before the establishment of credibility, which takes time and requires a track record of policy performance by the government. After the initial phase, an exchange rate anchor played an important role in maintaining price stability and formed an effective vehicle for accumulating credibility, which eventually paid off in the reversal of currency substitution when the currency reform was implemented.

Georgia's economic recovery was first recorded in agriculture, which responded to the sharp increase in bread prices—a central element of the stabilization program—in an environment of de facto privatization of agricultural land. The recovery also benefited from the upturns in service, trade, transportation, and residential construction. These early recovering activities received virtually no direct budgetary support and financing from the banking system, but took advantage of the low taxes, weakened bureaucratic interference, free prices, and a liberal trade and exchange system.

The rest of the paper is organized as follows. Sections II and III provide a description of the hyperinflation and stabilization periods. Section IV is the main part of the paper. It develops a simple model to highlight the key elements in the hyperinflation and stabilization process and presents the supporting statistical evidence for the model. Stabilization issues of nominal anchors, credibility, and economic recovery are discussed in sections V and VI. The last section summarizes the policy conclusions.

II. Shocks, Financial Policies, and Hyperinflation

A. Shocks to the economy

Georgia inherited an economic structure that was highly vulnerable to shocks to the trade and payment arrangements and the terms of trade of the former Soviet Union when it became independent in 1991. Production, energy consumption, and trade were highly integrated with other BRO countries, especially Russia. Imports of energy amounted to almost 80 percent of total available energy resources in 1990, and this proportion rose in 1991 and 1992 as domestic production contracted. Closely related to the output and energy patterns was the country's high trade to GDP ratio, which was around 40 percent before independence. Inter-republican trade, which was generally in surplus, reflecting low energy prices, accounted for the bulk of the external trade, and relied on the railway and road routes to Russia.

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[4]While wages of the budgetary institutions were set and paid in coupon, goods and services in a large part of the economy were priced and paid in Russian rubles, or U.S. dollars.

The disruptions of trade and payment arrangements in the former Soviet Union in 1991 sharply reduced the volume of external trade. At the same time, the terms of trade deteriorated as the prices of Georgia's key energy imports, gas and refined oil products, rose by four- and twenty-one-fold respectively in 1992–93 (Table 1). The external position weakened also because of the discontinuation of transfers and capital outflows from the central government of the former Soviet Union. The trade shocks were compounded by Georgia's civil strife and the breakdown of law and order in 1992–93. The conflicts in South Ossetia, Abkhazia, and with the supporters of ex-President Gamsakhudia resulted in widespread destruction, a large number of refugees, and the cut-off of Georgia's only railway link with Russia. Recorded output, after shrinking by 56 percent in 1991–92, fell further by 25 percent in 1993. Other available indicators such as natural gas and electricity consumption also suggest severe output contractions. Inflation was high but did not reach a hyper-inflationary level until after the introduction of the coupon in 1993 (Table 2).

B. Fiscal imbalances and generalized consumer subsidy

The systemic shocks and wars quickly worsened fiscal performance. Relative to GDP, tax revenue dropped from 22 percent in 1991 to 8 percent in 1992 and 2 percent in 1993, reflecting a rapidly shrinking tax base, lags in collection, and a deterioration in tax compliance (Table 3). On the expenditure side, total expenditure to GDP ratio was maintained or even increased slightly to 36 percent in 1992–93 but the composition of spending changed dramatically during the period.

Amid the civil conflicts, the Georgian authorities received a large quantity of grants/humanitarian assistance in wheat and flour.[5] The bulk of the food aid was passed on to the population through the sale of bread which was made from the imported grants of wheat and flour. Although price controls had been lifted on most goods and services since 1992, the government continued to administer the prices for bread sold in the state-owned retail outlets, as well as natural gas, electricity, and public transportation. The resulting losses of revenues (counterpart funds) to the government which are equivalent to the implicit subsidies on these items—the difference between the costs and the prices paid by the consumers—rose quickly as the exchange rate depreciated, from virtually nil in 1991–92 to over 70 percent of total expenditure and net lending of the government (or 25 percent of GDP) in 1993.[6]

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[5]According to the World Food Program, food aid shipped to Georgia (including a small amount of humanitarian assistance channeled through non-governmental organizations) amounted to the equivalent of about 342,000 and 763,290 metric tons of wheat in 1993–94 respectively. At the price of US$140 per ton, the food aid was valued near US$50 million in 1993 and over US$100 million in 1994.

[6]The generalized consumer subsidy on bread was implicit because it did not entail direct budgetary outlays; instead the government lost revenues from the sale of food aid. In Table 3,

(continued...)

The overall consolidated fiscal deficit (excluding grants) rose from the equivalent of 3 percent of GDP in 1991 to 25 percent in 1992 and 26 percent of GDP in 1993. The rapid rise of the generalized consumer subsidies including on gas, electricity, and public transportation contributed significantly to the widening of the budgetary gap, by over 20 percent of GDP in 1993, compared to the effect of tax revenue reduction of 6 percent of GDP. Nearly 80 percent of the deficit in 1993 was financed by external loans and grants, and the remainder by the central bank.

C. Monetary policy and devaluation of the coupon

When Georgia was within the ruble zone, its monetary policy was essentially controlled by the Central Bank of Russia (CBR). Toward the end of 1992, the CBR stopped supplying banknotes to the National Bank of Georgia (NBG). In response to the cash crisis, the authorities introduced the coupon in April 1993 to circulate alongside and at par with the ruble. Following the July 1993 demonetization of pre-1993 rubles in Russia, the Georgian authorities declared the coupon sole legal tender in the country in August 1993.

Monetary and credit policies after the introduction of the coupon were highly accommodating and repeatedly subject to direct intervention of the government and parliament. Between end-March 1993 and end-August 1994, currency in circulation and domestic currency broad money (M2) increased by more than 152- and 130-fold respectively (Table 4). Behind this development was the explosive growth in the NBG's domestic lending, directly or indirectly to the government.[7] A Head of State decree in November 1993 required the NBG to provide coupon 720 billion of credit (150 percent of base money at end-September 1993). In February 1994, the parliament authorized a further credit of coupon 1.8 trillion (more than the entire stock of base money at end-December 1993) to finance the budget deficit, agriculture, and official barter trade. The NBG's attempt to control its credit to the government in the second quarter of 1994 quickly led to the accumulation of large expenditure arrears. Parliament ordered another NBG lending to the government in the amount of coupon 10 trillion (150 percent of base money at end-June 1994) on June 30 for eliminating expenditure arrears and government overdrafts at the commercial banks. This credit, had there not been physical limitations on the available banknotes at the time, would have led to a quadrupling of currency in circulation.

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[6](...continued)
the value of food aid and the subsidy are recorded explicitly as budgetary revenue and expenditure respectively.

[7]NBG credit to commercial banks mostly ended in the hands of the government which was able to overdraw accounts in the banks. The former state commercial banks, major players in the banking sector, received credit from the NBG, at zero interest rate, through their correspondent accounts at the NBG.

The coupon liquidity quickly found its way to the foreign exchange markets. With the supply of foreign exchange in the Tbilisi Interbank Currency Exchange (TICEX) having dried up and foreign exchange reserves of the NBG exhausted, the exchange rate depreciated almost simultaneously with every increase in central bank credit (Table 5).[8] When the NBG tried to restrict the operation of the TICEX to cash transactions only in the second quarter of 1994, a non-cash exchange rate emerged outside the TICEX and was more depreciated than the cash exchange rate. The resulting currency substitution quickened the development of a dual economy composed of a coupon-based official economy limited essentially to government transactions, and an unofficial (although by all indications a much larger) economy in which transactions were conducted in rubles and other foreign currencies.

D. Hyperinflation and seigniorage

The rapid exchange rate devaluation affected inflation. A close inspection of Table 5 reveals that the bureau market exchange rate depreciation led the price index change during the hyperinflation period. The high inflation in turn reduced the real value of the outstanding stock of money. In the summer of 1994, the real value of currency in circulation declined to 6 percent of the real stock at end-June 1993 (Table 4).

This development had an impact on seigniorage—the amount of resources appropriated by the government through expansion of nominal base money. Chart 1 depicts the monthly change in currency in circulation measured in U.S. dollars against the inflation rate of the corresponding month.[9] Interestingly the diagram does not exhibit the Laffer curve properties which are usually assumed in many analyses of high inflation (e.g., Bruno and Fischer (1990)). The relation between the seigniorage and inflation is instead convex, L shaped, and collapses to a horizontal line after November 1993—the seigniorage in Georgia was very low and hardly changed regardless of the inflation rate. This evidence cautions against the use of the "Laffer curve" in the analysis of inflation tax; the curve could be unstable and shifting in a hyperinflation environment.

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[8]By early 1994, gross official reserves of the NBG were less than US$100,000. The central bank sold less than US$0.3 million (on average) each month in January–September 1994.

[9]This effectively measures $\dot{M}/E$, which approximates $\dot{M}/P$ when E and P move together, where M, E, and P stand for money, the exchange rate, and price level, $\dot{M}=dM/dt$. Seigniorage usually consists of two components and is a function of inflation: $\dot{M}/P=\dot{m}+\pi m(\pi)$, *where* $\pi=\dot{P}/P$, $m=M/P$. Base money was not chosen for this measure because of its diminished relevance in 1994 when the use of non-cash coupons was restricted. Measures in term of GDP, frequently used in the literature, were not employed in this paper due to the limitation of monthly GDP data.

III. STABILIZATION AND CURRENCY REFORM

A. The stabilization and structural reform program

The Georgian government started serious policy dialogues with the International Monetary Fund in March 1994. While many uncertainties, including the uncertain outlook for external financial support, precluded immediate implementation of a IMF financed program, a strategy to stop hyperinflation was nevertheless agreed in the summer and early fall of 1994:

- Bank financing of the budget deficit must be massively curtailed and the commercial banks' automatic access to overdraft on their correspondent accounts at the NBG must be ended;

- The generalized consumer subsidies on bread, electricity, and gas consumption must be removed through adjustment of the administered prices;

- To further reduce the fiscal deficit, the government must reduce expenditures, including the elimination of nearly all budgetary subsidies to state-owned enterprises. Fiscal revenue should be mobilized through increasing tax rates and improving tax administration.

- Foreign exchange restrictions should be removed and the free float of the exchange rate continued.[10]

Subsequently, a comprehensive stabilization and structural reform program with a quantified framework for 1995 was finalized in November 1994 and the IMF Executive Board supported the program by approving a loan under the Systemic Transformation Facility in mid-December 1994.

B. Implementation and initial results

To prevent the public finances from completely collapsing, the leadership took drastic steps to stabilize the economy in late summer 1994. First, it sought to control the

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[10]At the time, there was a debate on the choice of exchange rate regime. Advocates of a currency board arrangement argued that such a system could provide a firm exchange rate anchor to the financial system and instill credibility to the program because there would be no room for government recourse to central bank financing. The counter-argument emphasized that the conditions for a currency board were not in place. There were many uncertainties regarding the authorities' ability to implement a tight fiscal program, the timing and availability of external financing, the likely capital inflows and real exchange rate appreciation following stabilization. Exchange rate flexibility would be needed to allow bank financing of the government operations and the government ought not to be deprived of seignorage-related revenues. In the event, the latter view prevailed.

government's access to bank credit. On August 1, it prohibited bank borrowing by all local governments. On August 31, it ordered the transfer of all budgetary accounts of the republican government to the NBG. The authorities then tightened monetary policy by increasing the average reserve requirement to 20 percent on September 1 and, one month later, introduced a severe penalty for non-compliance.

Second, the generalized consumer subsidies were reduced through administered price adjustments. Gas and electricity tariffs were increased by near 1000-fold and 600-fold respectively on September 7, 1994. The government took the most dramatic measure on September 17 when it ordered the increase of the bread price from coupon 700 to coupon 200,000 per kilogram, a 285-fold jump in the price of an item that people actual paid for in coupons on a daily basis (in contrast to gas and electricity bills which were often not paid). On the same day, Tbilisi metro prices were also increased. The price adjustments were accompanied by a public sector wage increase and a small cash payment outside the wage structure to the lowest-paid employees of the budgetary institutions, pensioners, refugees, and other needy groups of the population.[11]

At about the same time, the NBG purchased the government's foreign exchange holdings and lifted the restrictions on converting coupon deposits into cash. All commercial banks' automatic access to overdrafts from the NBG was terminated. The correspondent accounts of banks with overdrawn positions were blocked.

These measures, especially the adjustment of the administrative prices of bread, sharply reduced the real value of coupons in circulation notwithstanding the arrival of new banknote shipments, and the corresponding increase in currency in circulation in September (Table 4). On September 19 the NBG reopened the foreign exchange auction at the TICEX after suspension a month earlier. The exchange rate at the auction, coupon 2.4 million to the U.S. dollar initially, soon started appreciating to coupon 2.3 million at the end of September. The rate in the foreign exchange bureaus experienced an even sharper appreciation, from over coupon 5 million to 3.4 million per U.S. dollar in a few days in late September. Hyperinflation stopped abruptly and the consumer price index declined in subsequent months.

As in other cases, the monetary aggregates surged once hyperinflation ended, mostly reflecting the monetization of the budgetary expenditure arrears and a small initial jump in the demand for coupon. In the following two months (October–November 1994), the NBG implemented an extremely tight monetary policy—it did not provide any coupon credit to the government, nor to the commercial banks. Meanwhile, the NBG was no longer the sole supplier of foreign currency in the TICEX; indeed, it purchased foreign exchange and prevented an even sharper appreciation of the coupon.

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[11]The minimum monthly wage was increased from coupon 50,000 to coupon 1 million (equivalent to less than US$0.5 at the prevailing exchange rate) in September 1994.

The tax policy package, including the increases of VAT, custom duty, and gasoline excise rates were adopted by Parliament in November, 1994. These tax measures, together with other measures to strengthen the public finances and restructure the economy, formed the basis of the IMF supported program.

C. Currency reform

Following the initial move toward price stability, the NBG continued to pursue a tight monetary policy in 1995. In addition to the strict control on credit to commercial banks and the rest of the economy, the central bank consistently sterilized its credit to the government through foreign exchange sales at the TICEX.[12] The auction rate at the TICEX, without any public announcement, was de facto fixed at coupon 1.3 million per U.S. dollar, the rate reached at the end of 1994. These financial and exchange rate policies contributed to the relative stability in the coupon consumer price index and allowed the government to implement a range of needed structural reforms.[13] They also allowed the government to prepare through the enactment of the new NBG law and other measures for the introduction of the new national currency—the lari.

Despite the sharp fall in inflation, the demand for coupon remained very low. In early 1995, real broad money remained about 8–9 percent of the level at end-December 1992, reflecting not only the lack of confidence in the coupon which did not have any security features, but also the inconvenience of having to carry large quantities for transactions (the highest denomination was coupon 1 million). The parallel economy persisted, with the ruble as the principal medium of exchange and unit of account, and the U.S. dollar and other hard currencies as the stores of value. A fundamental change through the introduction of a new currency therefore was needed, in order to return the financial system to reliance predominantly on the local currency once confidence in the authorities' financial policies increased.

The lari was introduced on September 25, 1995, and replaced the coupon as the sole legal tender effective from October 2, 1995. The conversion from coupon to lari was

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[12]In fact, the NBG did not provide credit to the commercial banks and the rest of the economy until after June 1996. The central bank had to provide financing to the government because tax revenues recovered very slowly in Georgia, increasing from 2 percent of GDP in 1993 to about 5 percent in 1996. By comparison, net tax revenues rose in Israel from an average of 22 percent of GDP in 1980–84 before stabilization to 37 percent of GDP in 1985–87. In Bolivia's 1985 stabilization, real tax revenue increased threefold within a year and fourfold between 1984 and 1989 (see Dornbusch et al., 1990).

[13]Including the downsizing of public employment by 30 percent in 1995, elimination of the state order system, further trade and price liberalization, and privatization.

conducted on a no-questions-asked basis at a uniform rate of coupon 1 million per lari.[14] Within a week, coupon 20 trillion (97 percent of the coupon in circulation) were exchanged for lari. The population also converted the equivalent of US$48 million of foreign exchange cash holdings (equivalent to 3 times the total coupon in circulation) into lari. Strong demand for the lari continued after the official conversion period. In less than a month, domestic currency in circulation quadrupled (Table 4). The lari replaced the ruble as the principal medium of exchange in most parts of the country. While accumulating international reserves, the NBG allowed a market driven appreciation of the exchange rate, which reached lari 1.23 per U.S. dollar at end-December 1995.

IV. Interpreting the Development and End of the Hyperinflation

Descriptions in the preceding sections point to a number of salient features of the Georgian hyperinflation and stabilization, including the special role of the generalized consumer subsidy on bread, the unusual relation between the exchange rate and prices, and the existence of a large foreign currency economy. In this section, we first develop a simple model incorporating these stylized facts. The model is then used to explain the stabilization experience. Statistical support for the model is also provided.

A. A simple model

The first key element of the model is the generalized consumer subsidy on the food aid to the government. Let P^{b*} and P^{b} be the world price and domestic price for bread or wheat, respectively. In coupon terms, the subsidy can be expressed as $(Ep^{b*}-P^{b})Q$, where E and Q denotes the exchange rate and the quantity of food aid received and sold by the government.

The government's budget constraint thus is

$$[(EP^{b*}-P^{b})Q+G]-T=\dot{D}, \tag{1}$$

where G and T denote non-subsidy expenditure and tax revenue respectively. To focus on the endogenous component of the government's expenditure, we abstract from the effect of inflation on revenue and assume that both T and G are constant.[15] The budget deficit is financed by the net credit from the central bank, $\dot{D}$. $\dot{D}=dD/dt$. The balance sheet of the central bank implies that changes in base money, $\dot{M}$, is equal to the increase in the net

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[14]No restrictions were placed on the amount that could be changed and commercial banks and foreign exchange bureaus were allowed to conduct foreign exchange transactions freely during the conversion period.

[15]Endogenous tax revenue could be easily accommodated in the model, which could only reinforce the results of equation (9).

domestic credit if the net foreign assets (F) of the central bank do not change, i.e., the central bank is running out of foreign exchange reserves and can not borrow from abroad.

$$\dot{M}=\dot{D}+\dot{F}=\dot{D}, \ if \ \dot{F}=0. \tag{2}$$

Another key assumption is the dual structural of the economy. Under such a structure, aggregate prices after the introduction of the coupon could be thought of having two parts, reflecting transactions in the coupon and ruble economies respectively:

$$P=(EP^*)^{\gamma}(P^b)^{1-\gamma}, \quad \gamma\in[0,1]. \tag{3}$$

where P, P^b, P^*, and γ represent the general price level, price in the coupon economy, price and the share of the ruble economy. Equation (3) implies that with P^b administratively controlled and P^* relatively stable, inflation will be driven by exchange rate devaluation. Correspondingly, the demand for coupons has two parts. The population must hold coupons in order to purchase bread from the state stores. This part of money demand is assumed to subject to a cash-in-advance constraint.

$$M^b \geq P^b * \alpha Q, \tag{4}$$

The willingness to hold the remainder of the coupon balances, or the desired ratio of holding coupons to foreign exchange depends on expected depreciation of the coupon.

$$\frac{M_t-M_t^b}{E_t}=L(\epsilon_t^e), \qquad L'<0. \tag{5}$$

where ϵ_t^e stands for expected exchange rate change at period t, and $\epsilon_t=\dot{E}/E$. Assuming adaptive expectations,

$$\dot{\epsilon}^e=\beta(\epsilon-\epsilon^e). \tag{6}$$

In most analyses of hyperinflation, money demand and expectation equations similar to (5) and (6)—given the dynamic of money growth—determine the dynamics of inflation. In Georgia, however, there was another inflation mechanism at work. To highlight this aspect of the inflation process, we abstract from the role of expectations. The spot exchange rate is now determined by the supply, M^*, and demand, Δ, in the foreign exchange market:

$$\bar{M}^*=\Delta(E, \ M-M^b), \qquad \Delta_E<0, \qquad \Delta_M>0. \tag{7}$$

where Δ_E and Δ_M represent the partial derivatives of Δ with respect its first and the second argument. Assuming that M^*, Q, and P^b are fixed, equations (4) and (7) imply:

$$\dot{M}=(\frac{-\Delta_E}{\Delta_M})\dot{E}. \tag{8}$$

From equations (1), (2), and (8), we have

$$\begin{aligned}\dot{E}&=(\frac{-\Delta_M}{\Delta_E})[(EP^*-P^b)Q+G-T]\\&=\Phi(E;\ P^*,\ P^b,\ G,\ T).\end{aligned} \tag{9}$$

Eq. (9) is a differential equation with endogenous government expenditure and money supply. Exchange rate depreciation is linked to the government's pricing policy, P^b, and the underlying fiscal balance, T-G, through the central bank's credit and foreign exchange policies, $\dot{D}$ and $\dot{F}$. The system is clearly unstable, because $\partial\Phi/\partial E=-\Delta_M/\Delta_E>0$. A shock to the underlying fiscal balance or the exchange rate would quickly send the system to an explosive path. Equations (5), (6), and (9) jointly determine the rise of hyperinflation in the model.

B. The end of hyperinflation

To stop hyperinflation in this model, the pressure on the exchange rate that is independent of the devaluation expectation must be eliminated. This would require a large upward adjustment in the price of bread. An increase in P^b would have an immediate impact on E. From the spot market equilibrium condition (7), we have

$$\frac{\partial E}{\partial P^b}=\frac{\Delta_M}{\Delta_E}\alpha Q<0, \quad for\ M=\bar{M},\ M^*=\bar{M}^*,\ Q=\bar{Q}. \tag{10}$$

A sharp bread price hike immediately increased the transaction demand for coupons. With central bank credit under tight control and no change in the supply of foreign exchange to the market, the coupon exchange rate would have to appreciate.

In addition to this static effect, this policy mix would also reduce the budget deficit, thereby alleviating the pressure on the central bank for credit emission and hence on the exchange rate. This can be seen clearly by differentiating eq. (9) with respect to P^b:

$$\frac{\partial\Phi}{\partial P^b}=\frac{\Delta_M}{\Delta_E}Q<0. \tag{11}$$

Once the exchange rate depreciation decelerated or the rate started appreciating, another powerful dynamic effect would come to play—market participants would change their expectations on currency movements taking into account the current changes as described in equation (6). They would be willing to hold larger coupon balances or for a longer period, exerting further pressure on the coupon to appreciate.

C. Statistical support for the model

The dual structure of the Georgian economy is central to our account of the hyperinflation and stabilization. In what follows, we first estimate the relation between the inflations in Russia (π^*) and Georgia (π) when Georgia was within the ruble zone. We then use the Russian price index as a proxy for the prices in the ruble economy in Georgia to estimate eq. (3). Eq. (12) below relates π to π^*. Two dummy variables are added to capture the impact of the Russian and the Georgian price liberalizations in January and March 1992 respectively. υ_t is the usual error term.

$$\pi_t=\alpha_0+\alpha_1\pi^*_t+\alpha_2 I_{1992:1}+\alpha_3 I_{1992:3}+\upsilon_t. \tag{12}$$

Estimation results, using monthly data in January 1991–March 1993, are reported in Table 6. Not surprisingly, prices in Georgia moved closely with that in Russia during the period, notwithstanding the wars and the interruptions of trade and transport links.

Equation (3) is linearized for estimation:

$$\pi_t=\alpha_1\pi^*_t+\alpha_2\epsilon_t+\alpha_3\omega_t+\alpha_4 DPB_t+\upsilon_t, \tag{13}$$

where ϵ_t, $\omega_t=\dot{W}_t/W_t$, DPB_t represent the depreciation rate of the coupon vis-à-vis the Russian ruble, and the rates of change of wages and bread prices respectively. Public sector wage and the generalized consumer subsidy on bread accounted for most of the government expenditure during the coupon period (Table 3) and thus well represented the transactions in coupons. The time series of the public sector minimum wage was used because it is the only available monthly wage data and all public sector payments for labor services including pensions were linked to the minimum wage during the period. The estimates are expected to pass the statistical tests $\alpha_1=\alpha_2$ and $\alpha_1+\alpha_3+\alpha_4=1$ if eq. (3) portrays the Georgian economy correctly.

Regression results based on monthly data for the periods of June 1993—September 1995 (the hyperinflation period) and January 1995—December 1996 (post-hyperinflation) are summarized in Table 7.[16] The estimated coefficient on Russian inflation for the hyperinflation period is close to the estimate for the period prior to the introduction of the coupon but statistically much less significant. The exchange rate was the most significant factor affecting the coupon price inflation and indeed led the prices by almost a month in the period

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[16]Strictly speaking, the hyperinflation ended in September 1994. In the regression of equation (3), we extended the period to September 1995 on the ground that the dual coupon-ruble economy structure was not fundamentally changed until October 1995. This extension also permits the use of more observations for estimation. Applying the Augmented Dickey-Fuller (ADF) test, the time series of π, ϵ, ω and *DPB* turn out to be stationary process in Georgia. Eq. (3) thus can be implemented using OLS to yield unbiased estimates of the coefficients and an error term with the relevant asymptotic properties.

1993–1995 (see eq. (3a)-(3d) in Table 7). After September 1995, the overall explanatory power of equation (13) dropped and the exchange rate lost its significance (eq. (3e)-(3h)).

On the basis of the regression results, the linear hypotheses of (1) $\alpha_1=\alpha_2$, and (2) $\alpha_1+\alpha_3+\alpha_4=1$ are tested. The F statistics reported in Table 7 indicate that at a 5 percent significance level, the null hypotheses are accepted.

The lack of backward indexation of coupon prices is confirmed by the estimation of the elasticity of inflation with respect its own lags using eq. (14).

$$\pi_t-\pi_{t-1}=\sum_{i=1}^{3}\alpha_i(\pi_{t-i}-\pi_{t-1-i})+\upsilon_t \qquad (14)$$

where υ includes the acceleration of the exchange rate. The results are presented in Table 8.

V. Nominal Anchors and Credibility in Stabilization

A. Nominal anchors

The Georgian program did not opt for an exchange rate target for the initial phase of the stabilization, in contrast to what has been suggested in the literature.[17] The choice made at the time was mostly out of necessity, reflecting the virtual depletion of foreign exchange reserves in the central bank and the lack of any basis for choosing the level of exchange rate to fix in view of the massive impact of monetizing the expenditure arrears and removing restrictions on coupon conversion. With hindsight, this was also a sensible decision, given the specific structure of the Georgian economy at the time.

Under the condition of extreme currency substitution in Georgia, ex ante fixing of the exchange rate would not have provided the usual benefits of coordinating inflationary expectations for price and wage setting. In addition, large adjustments of the controlled prices would have entailed considerable appreciation of the exchange rate although the magnitude was uncertain. A floating exchange rate therefore provided flexibility for the system to absorb the price adjustment shocks and to find the new equilibrium without central bank intervention.

Targeting monetary growth was not a viable option in Georgia, given the high uncertainty about money demand. In fact, the indicative target on base money under the IMF supported program was repeatedly exceeded as the demand for money recovered. However, after the initial shocks were absorbed and the auction exchange rate appreciated to a relatively stable level, the NBG intervened at the TICEX, de facto fixing the coupon exchange rate vis-

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[17]See Dornbusch (1982), Bruno and Fischer (1990), and Calvo and Vegh (1994) on the issue of exchange rate and monetary targets.

à-vis the U.S. dollar under the program. This policy not only helped anchor the implementation of the 1995 budget and the monetary program, but also contributed to the gradual increase in the population's confidence in the authorities' ability to conduct economic policies.

B. The issues of credibility

There are two relevant issues. First, what role did credibility play in Georgia's stabilization? There is no evidence that the credibility of a regime change played a central role in the sudden end of the hyperinflation. None of the signals of a regime shift observed by Sargent (1982) occurred in Georgia when the stabilization was launched. The parliament did not adopt the tax package until after the coupon prices started declining. There was no institutional change to ensure central bank independence. In fact, the NBG law was approved by parliament only after mid-year 1995. Dornbusch (1987) has suggested that external support, such as an IMF/World Bank supported adjustment program, can help establish credibility. The IMF supported program formally started in December 1994, nearly three months after the hyperinflation was halted. However, the lack of credibility no doubt contributed to the strong hysteresis in currency substitution.

The second issue is how credibility was in fact acquired in Georgia. The spread between the TICEX and the bureau market exchange rates reflects the difference in expected devaluation between the two markets. While there were no restrictions between the markets, the bureaus were directly accessible by the population and small businesses and the impact of the authorities' financial policies was first felt in the TICEX market. The exchange gap therefore captures the population's confidence (or the lack of confidence) in the authorities' financial policies. As depicted in Chart 2, the exchange spread declined in late September–October but remained at 10–15 percent of the TICEX rate in the fourth quarter of 1994. The bureau rate continued to appreciate thereafter, representing a steady accumulation of credibility, and gradually converged to the TICEX rate in September 1995.

The difference between the average interest rates of the commercial banks in coupon and foreign currency denominated lending, which reflects mainly the expected rate of depreciation of the coupon, also contains information on the evolution of the authorities' policy credibility. The interest rate gap fell in late September–October 1994 but remained very high at some 9 percent per month toward the end of the year when the actual coupon inflation was negative. It declined gradually in 1995, reflecting persistent but declining inflationary expectations (Chart 3).[18]

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[18]The interest rate gap has been derived from calculating simple average interest rates in coupon and foreign currency for a diverse group of banks, based on data collected by the NBG. It should be regarded as only a rough indicator of trends.

VI. Economic Recovery—When, Where, and How

Experiences in other high inflation cases indicate that disinflation policies could result in a high real interest rate and an appreciated real exchange rate, imposing an output cost on the economy (see, for instance, Fischer (1988), and Vegh (1992)). In Georgia, the narrow scope of coupon pricing and the extremely low real coupon wages should have largely mitigated such an adverse impact. Available data show that disinflation policies may have actually stimulated economic activities.

The economic recovery was first recorded in agriculture. In response to the 400-fold increase in bread prices in September–December 1994, Georgian farmers increased sharply their sowing acreage in the spring of 1995 (Table 9).[19] The land areas under cultivation for grain and maize increased by 15–20 percent and those for sunflower, potato, and vegetables were more than doubled. This trend continued in 1996 and the share of land sowed for cereals and sunflowers in total land under cultivation increased significantly. As a result, agriculture production increased by 18 percent in 1995 despite a mild drought and the lack of financing and inputs (fertilizer, seeds, and fuel), contributing to the turn-around in GDP in 1995.

The rebound in agriculture was followed by the service sector, including retail trade, small restaurants, guest houses, and mini-bus services. Cargo transport also increased markedly, notwithstanding a significant reduction in the inflows of humanitarian assistance. Construction activity, after a period of dormancy since independence, was also resuming, concentrated in residential housing.

These early recovering activities shared two features. First, they were all relatively labor-intensive, small scale, and appeared to have been incentive rather than credit constrained, at least in the initial phase of the recovery. Financing and the supply of energy (gas and electricity), thought to be among the key conditions for reactivating the economy, played little role in the process. As the hyperinflation ended, nominal interest rates on domestic currency loans remained very high, averaging over 100 percent per annum in early 1995 and still about 60 percent in June 1996. The ex post very high real interest rate of course reflected in part the inefficiency and perilous financial position of the commercial banking system which would take time and resources to change. With little bank financing and no direct budgetary support, anecdotal evidence suggests that farmers and most small businesses relied either on their own or intra- and inter-family resource pooling. The price incentive effect was all the more remarkable considering the severe energy shocks in 1995.[20]

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[19]The bread price was further increased by another 40 percent to coupon 280,000 in December 1994.

[20]Natural gas imports, fell from 5 billion cubic meters (bcm) in 1992, to 3 bcm in 1994, and to 0.9 bcm in 1995. The government ended intergovernmental agreement on natural gas imports

(continued...)

Second, the quick supply response of these sectors required a certain permissible environment. Specifically, official statistics indicate that nearly 80 percent of agricultural output in 1995 was from private production. In reality, private ownership of agricultural land was not legalized until March 1996 when the Land Law was adopted. Even then, a land market was not developed pending enabling legislation on land titling and registration, and on the use of agricultural land as collateral. Administrative control and restrictions on farming, however, were weakened and farmers were able to decide what and how much to grow, and what to do with their products. Similarly, private traders, shop owners, and builders benefited from the liberalized price, trade, and exchange system. The Georgian experience could be specific, but it certainly points to the necessary conditions and the structural reform priorities for the resumption of growth in a transition economy.

VII. Conclusions

A simple model was developed to interpret the Georgian experience, highlighting the differences between Georgia and earlier hyperinflation cases. While inflation and devaluation expectation played an important role, policy induced distortions were the principal driving force for the hyperinflation and extreme currency substitution. Removing the enormous implicit price subsidy on bread which had had relatively small immediate impact on the cash deficit of the budget, and therefore relatively small immediate impact on the central bank's credit emission—had a large immediate effect on the transaction demand for domestic currency. This led to an appreciation of the currency and significant downward pressure on inflation.

A number of policy lessons could be drawn from the Georgian experience. First, whether a nominal anchor should be used to stop hyperinflation, and the choice of such an anchor, should depend on the specific structure of the economy. An ex ante exchange rate anchor may not be required in the case of almost complete currency substitution and the absence of price and wage indexation. However, maintaining exchange rate stability ex post could play a central role in consolidating the disinflation gains. Given the high uncertainty in forecasting the demand for money, monetary targeting may not be a viable option in certain transition economies.

Second, policy credibility of the authorities is hard to come by but can be accumulated overtime through a track record of policy performance. The exchange rate, arguably the most visible indicator of financial policies, could serve as an effective vehicle for building such a credibility.

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[20](...continued)
and its guarantees on all energy imports from June 1995, resulting in a sharp reduction in electricity generation from natural gas.

Third, the authorities chose to implement a large dose of structural reforms up-front, including the liberalization of prices and the trade and exchange system. These reforms, coupled with the weakening of bureaucratic interference, changed the market structure and eased the environment for setting up and running small businesses and farming. In a transition economy, legalized transfers of the ownership of productive assets, including land, and large- and medium-enterprises can be a protracted process. Legal and banking sector reforms could also be time consuming. In the case of Georgia, where the nature of agriculture is more amenable to small-scale activities, the economic agents' de facto right to own the post-tax output and the ability to decide independently without much bureaucratic interference, appear to have contributed to an early supply response. Perhaps more generally, a quick recovery in output is possible if the environment for the emerging, small-scale activities is created. Bank financing and budgetary support are not necessary conditions for the initial growth of the largely private activities which are incentive rather than credit constrained. The impact of banking sector reform, as well as the reform of large state-owned enterprises, is likely to be felt at a later stage of the recovery.

Table 1. Georgia: Selected Real Sector Indicators
1991-1996

	1991	1992	1993	1994	1995	1996
Real GDP (% change)	-20.6	-44.8	-25.4	-11.4	2.4	10.5
Inflation (% change) 1/	173.1	1176.9	7487.9	6473.9	57.4	13.9
Real minimum wage index 1/ 2/	100.0	101.5	14.9	8.5	32.4	44.0
Electricity (millions of kwh)						
Domestic production	13376	11520	9748	7039	7100	...
Domestic consumption 3/	...	...	7429	7959	6200	...
Energy import prices						
Gas (US$/1,000 m3)	...	16.1	85.0	74.0	80.0	...
Refined oil products (US$/ton)	...	3.6	81.4	145.8	206.3	183.0

Sources: Georgian authorities and Fund staff estimates.

1/ End of period.
2/ 2 percent in September 1994.
3/ Consumption in 1990 was 14,240 million kwh.

Table 2. Georgia: Retail/Consumer Price Index, 1991-1996 1/

	RPI Index	Monthly Percentage change		CPI Index	Monthly Percentage change
1991			1994		
Jaunary	103.4	3.4	Jaunary	4.1	168.4
February	106.7	3.2	February	5.5	35.3
March	113.4	6.3	March	8.3	50.0
April	161.5	42.4	April	15.3	84.5
May	161.2	-0.2	May	21.8	42.7
June	162.5	0.8	June	20.7	-5.0
July	164.8	1.4	July	22.0	6.2
August	165.1	0.2	August	37.6	71.0
September	178.6	8.2	September	117.0	211.1
October	188.5	5.5	October	107.2	-8.4
November	197.3	4.7	November	108.8	1.5
December	273.0	38.4	December	100.0	-8.1
1992			1995		
Jaunary	287.8	29.1	Jaunary	113.0	13.0
February	338.1	17.5	February	113.9	0.8
March	1006.9	197.8	March	110.5	-3.0
April	1496.5	48.6	April	109.3	-1.0
May	1188.7	-20.6	May	114.9	5.1
June	1426.0	20.0	June	113.6	-1.2
July	1665.8	16.8	July	114.6	0.9
August	1766.5	6.0	August	118.4	3.3
September	2023.6	14.6	September	123.2	4.1
October	2257.8	11.6	October	152.0	23.4
November	2569.1	13.8	November	152.2	0.1
December	3485.5	35.7	December	157.4	3.4
1993			1996		
Jaunary	4417.4	26.7	Jaunary	161.3	2.5
February	6050.8	37.0	February	166.2	3.0
March	6888.1	13.8	March	171.3	3.0
April	8586.8	24.7	April	174.2	1.7
May	11317.7	31.8	May	175.2	0.5
June	14864.6	31.3	June	175.8	0.4
July	20779.0	39.8	July	173.8	-1.2
August	26656.8	28.3	August	174.1	0.2
September	40103.5	50.4	September	175.2	0.6
October	66683.4	66.3	October	175.9	0.4
November	158463.2	137.6	November	177.6	1.0
December	264595.1	67.0	December	179.2	0.9

Source: Committee for Social and Economic Information of Georgia.

1/ Retail price index from 1991 to 1993, December 1990=100; consumer price index from January 1994, December 1994=100.

Table 3. Georgia: Summary of General Government Operations
1991-1996

	1991	1992	1993	1994					1995					1996
				Q1	Q2	Q3	Q4	Annual	Q1	Q2	Q3	Q4	Annual	
				(In percent of total expenditure and net lending)										
Total revenue & grants	94.0	28.6	27.0	16.0	16.7	35.0	48.8	32.9	49.6	46.1	62.5	62.7	56.1	67.5
Revenue	94.0	28.6	6.5	4.0	5.8	12.1	36.9	17.5	36.1	35.0	40.9	48.9	40.8	60.3
o/w: Tax revenue	22.1	23.0	5.5	3.3	4.9	8.9	24.9	12.3	27.9	24.1	26.8	33.6	28.2	39.4
Grants	--	--	20.5	12.1	10.8	22.9	11.9	14.4	13.5	11.1	21.7	13.7	15.3	7.1
Current expenditure	...	...	...	98.4	98.2	91.1	76.6	89.0	60.8	72.6	71.9	68.2	69.0	92.2
o/w: Wages	...	...	...	2.6	1.0	2.1	6.7	3.3	16.3	10.9	11.8	13.4	12.8	13.4
Subsidies 1/	...	...	71.7	67.8	77.1	59.3	20.4	52.3	0.1	1.6	2.6	8.1	3.4	0.1
Captial expenditure	...	...	...	--	--	1.8	1.6	1.2	6.3	11.8	5.5	8.4	8.1	8.4
Budget deficit	-10.6	-71.4	-73.0	-84.0	-83.3	-65.0	-56.2	-68.2	-50.5	-54.0	-37.4	-37.3	-43.9	-32.5
Financing	10.6	71.4	73.0	84.0	83.3	65.0	56.2	68.2	50.5	54.0	37.4	37.3	43.9	32.5
Domestic	10.6	71.4	14.5	70.7	25.6	50.8	7.4	33.6	46.7	16.3	22.7	-3.9	18.0	26.4
Bank	-4.5	71.4	14.5	1.4	1.1	7.3	8.4	5.7	18.7	9.8	22.3	3.1	13.1	24.3
Arrears	15.2	...	...	69.3	24.6	43.5	-1.0	27.9	28.0	6.5	0.5	-7.0	4.9	2.0
External	...	--	58.5	13.2	57.7	14.2	48.8	34.5	3.8	37.7	14.7	41.2	25.9	6.2
Net credit	...	--	...	10.8	53.2	4.0	33.4	24.7	1.0	34.3	10.6	41.1	23.4	7.4
Interest arrears	...	--	...	2.4	4.5	10.2	15.4	9.8	2.9	3.4	4.1	0.2	2.6	-1.2
				(In percent of GDP)										
Total revenue & grants	30.0	10.2	9.7	12.9	7.7	10.2	6.0	7.7	6.3	6.7	8.5	7.5	7.4	9.1
o/w: Tax revenue	22.1	8.2	2.0	2.7	2.3	2.6	3.4	3.0	3.6	3.5	3.7	4.0	3.7	5.3
Expenditure & net lending	33.7	35.6	35.9	80.4	46.3	29.3	13.7	24.2	12.7	14.6	13.6	11.9	13.1	13.5
Budget deficit	-3.4	-25.4	-26.2	-67.5	-38.6	-19.0	-7.7	-16.5	-6.4	-7.9	-5.1	-4.4	-5.8	-4.4

Sources: Georgian authorities and Fund staff estimates.

1/ Excludes social safety net. In 1993-94, includes the difference between the costs and prices paid by consumers of bread, gas, electricity, and expenditure counterpart of grants.
2/ Converted at the average exchange rate.

Table 4. Georgia: Nominal and Real Money Stock, 1993-1996

	Currency in circulation M0 1/	Domestic currency broad money M2 1/ 2/	Real money index 3/ (92 Dec. M2=100) M0	M2	Memorandum items (In percent) M0/M2	Forex deposit/M3 4/
1992 December	28.4	61.2	46.4	100.0	46.4	2.1
1993 January	29.7	71.9	38.2	92.7	41.2	1.5
February	31.0	92.5	29.2	87.0	33.5	1.9
March	31.7	110.5	26.2	91.3	28.7	4.2
April	58.2	145.6	38.6	96.5	40.0	2.2
May	57.0	177.9	28.7	89.5	32.0	7.3
June	135.5	264.4	51.9	101.3	51.3	7.2
July	189.0	332.8	51.8	91.2	56.8	5.1
August	204.7	400.5	43.7	85.6	51.1	6.1
September	305.5	515.4	43.4	73.2	59.3	28.8
October	560.8	823.7	47.9	70.3	68.1	20.2
November	663.1	1004.2	23.8	36.1	66.0	35.7
December	926.4	1745.7	19.9	37.6	53.1	43.6
1994 January	1053.2	1939.2	8.4	15.6	54.3	55.1
February	1104.4	2280.6	6.6	13.5	48.4	54.1
March	1276.5	3370.2	5.0	13.3	37.9	49.9
April	1646.3	6228.3	3.5	13.3	26.4	72.2
May	2046.3	10413.2	3.1	15.6	19.7	57.6
June	2142.1	11043.1	3.0	15.2	19.4	60.2
July	2455.9	14667.9	3.1	18.7	16.7	55.1
August	4846.5	19076.8	3.6	14.2	25.4	69.5
September	7752.9	15989.0	1.9	4.0	48.5	72.0
October	14002.9	26096.0	3.9	7.2	53.7	58.4
November	15859.2	28773.6	4.3	7.8	55.1	62.7
December	21105.1	34063.6	6.3	10.1	62.0	53.5
1995 January	19859.2	31311.3	5.3	8.4	63.4	38.0
February	18968.0	30312.6	4.8	7.7	62.6	38.9
March	19286.5	30738.8	5.0	8.0	62.7	43.1
April	20617.9	30257.3	5.4	8.0	68.1	46.6
May	21175.2	30311.4	5.3	7.6	69.9	40.5
June	23531.6	33658.9	6.0	8.5	69.9	39.5
July	24702.7	36361.9	6.2	9.1	67.9	36.9
August	20977.2	35778.2	5.1	8.7	58.6	34.8
September	20737.8	43356.4	4.8	10.1	47.8	35.2
October	94954.5	108343.6	18.0	20.5	87.6	16.7
November	107528.6	131892.5	20.3	23.2	81.5	14.7
December	131364.8	157644.8	24.0	28.5	83.3	12.8
1996 January	129294.0	149343.3	23.1	26.2	86.6	13.4
February	128816.6	147968.0	22.3	25.6	87.1	18.9
March	128964.8	150570.0	21.7	25.3	85.7	20.6
April	132204.6	159069.0	21.9	26.3	83.1	
May	133974.0	163769.6	22.0	26.9	81.8	
June	139711.1	176195.0	22.9	28.9	79.3	12.1
July	151959.0	188984.0	25.2	31.3	80.4	13.2
August	162393.0	194244.0	26.9	32.1	83.6	13.5
September	171987.0	202052.0	28.3	33.2	85.1	14.7
October	168316.0	198336.0	27.6	32.5	84.9	15.9
November	164595.0	196166.0	26.7	31.8	83.9	17.7
December	185574.0	217952.0	29.8	35.0	85.1	15.0

Source: National Bank of Georgia; and staff estimates.

1/ Prior to April 1993, in billions of rubles; between April 1993 and September 1995, in billions of coupons. The coupon was introduced at par with the ruble in April 1993. From October 1995, in thousands of laris. The lari was introduced at a conversion rate of 1 million coupon per lari and replaced the coupon effective from October 2, 1995.

2/ Because of irregular reporting, the data through June 1995 does not cover the former state Savings Bank. The Savings Bank merged with two other banks in 1995. Data for the merged bank are reflected from July 1995.

3/ Deflated by CPI/RPI.

4/ The ratio of foreign currency deposits to broad money M3 (M2 plus foreign currency deposits).

Table 5. Georgia: Exchange Rates, NBG Credit and Money Supply, 1993-1996
(Monthly percentage change)

	Exchange rates 1/		Inflation	Credit and money			Memorandum item:
	TICEX	Bureau	RPI/CPI	M0	M2	NDA of NBG 2/	Exchange rates ratio 3/
1992 December	-7.2	...	35.7	...	...	...	...
1993 January	37.8	...	26.7	4.4	17.4	19.9	...
February	3.7	...	37.0	4.5	28.7	62.0	...
March	15.3	...	13.8	2.2	19.4	138.0	...
April	9.8	...	24.7	83.6	31.8	-23.8	0.6
May	17.6	88.5	31.8	-2.1	22.2	42.3	0.4
June	22.5	108.2	31.3	137.8	48.6	-0.1	0.2
July	-3.3	33.3	39.8	39.4	25.9	8.9	0.2
August	671.1	20.6	28.3	8.3	20.4	19.4	1.0
September	56.6	78.0	50.4	49.2	28.7	38.4	0.9
October	191.3	139.7	66.3	83.5	59.8	49.9	1.1
November	21.1	40.0	137.6	18.2	21.9	14.0	0.9
December	129.6	124.5	67.0	39.7	73.8	69.0	0.9
1994 January	81.5	72.7	168.4	13.7	11.1	10.5	1.0
February	25.8	15.8	35.3	4.9	17.6	37.3	1.1
March	64.5	100.0	50.0	15.6	47.8	0.9	0.9
April	166.9	77.3	84.5	29.0	84.8	51.9	1.3
May	-21.5	19.2	42.7	24.3	67.2	45.5	0.9
June	-1.9	2.2	-5.0	4.7	6.0	-1.6	0.8
July	15.8	15.8	6.2	14.6	32.8	74.2	0.8
August	113.1	145.5	71.0	97.3	30.1	22.3	0.7
September	20.5	25.9	211.1	60.0	-16.2	14.6	0.7
October	-13.6	-32.4	-8.4	80.6	63.2	37.0	0.9
November	-8.9	-10.9	1.5	13.3	10.3	6.8	0.9
December	-30.8	-26.8	-8.1	33.1	18.4	36.8	0.9
1995 January	1.6	0.0	13.0	-5.9	-8.1	0.0	0.9
February	0.0	-5.7	0.8	-4.5	-3.2	19.5	0.9
March	0.0	-3.2	-3.0	1.7	1.4	32.8	0.9
April	0.0	0.6	-1.0	6.9	-1.6	-43.0	0.9
May	0.0	-1.7	5.1	2.7	0.2	39.7	1.0
June	0.0	-2.2	-1.2	11.1	11.0	35.9	1.0
July	0.0	-0.4	0.9	5.0	8.0	0.4	1.0
August	0.0	1.5	3.3	-15.1	-1.6	34.1	1.0
September	0.0	-0.7	4.1	-1.1	21.2	34.0	1.0
October	-2.1	-6.0	23.4	357.9	149.9	-43.9	1.0
November	-1.8	0.8	0.1	13.2	21.7	-1.7	1.0
December	-1.6	-1.6	3.4	22.2	19.5	11.0	1.0
1996 January	1.5	2.2	2.6	-1.6	-5.3	3.0	1.0
February	0.9	0.2	3.2	-0.4	-0.9	15.8	1.0
March	0.2	-0.3	3.2	0.1	1.8	13.5	1.0

Source: Georgian authorities; and staff estimates.

1/ + depreciation, - appreciation.
2/ Monthly change in net domestic assets of the NBG relative to reserve money in the previously month.
3/ Ratio of bureau exchange rate to TICEX exchange rate, in percent.

Table 6. Georgia. Ruble Inflation Equation (12)
(Monthly Data)

	Estimates of Coefficients 1/					Statistics		
	Constant	π^*	$I_{1991:1}$	$I_{1992:3}$	$I_{1992:4}$ 2/	R^2	DW	F
1991 March-1993 March								
Eq. (12a)	0.03	0.79	-0.98	1.81	-	0.90	2.65	65
	(0.04)	(0.22)	(0.28)	(0.14)				
Eq. (12b) 2/	0.02	0.77	-0.94	1.83	0.33	0.93	2.16	66
	(0.04)	(0.19)	(0.25)	(0.12)	(0.12)			

Figures in parenthesis are standard errors.

1/ π_t and I_t are Russian inflation rate and dummy for period t respectively.
2/ A dummy for April 1992 is added to capture the lingering effect of the Georgia price liberalization in the precedingmonth.

Table 7. Georgia: Coupon Inflation Equation (13)
(Monthly Data Consumer Prices)

	Number of observations	OLS estimates of coefficients 1/					Statistics	
		π_{t^*}	ϵ_t	ϵ_{t-1}	ω	DPB_t	R^2	DW
I. 1993 June-1995 Sept.								
Eq. (13a)	28	0.45	0.27	0.65	0.16	-0.01	0.92	1.53
		(0.39)	(0.09)	(0.11)	(0.10)	(0.01)		
Eq. (13b)	28	0.76		0.78	0.15	0.00	0.89	1.64
		(0.44)		(0.12)	(0.12)	(0.01)		
Eq. (13c)	28	0.68	0.26	0.70		0.00	0.91	1.89
		(0.38)	(0.09)	(0.11)		(0.00)		
Eq. (13d)	28	0.60	0.27	0.67	0.06		0.92	1.77
		(0.37)	(0.09)	(0.11)	(0.01)			
II. 1995 Jan.-1996 Dec.								
Eq. (13e)	24	0.45	0.36	-0.18	-0.01	0.03	0.47	1.33
		(0.31)	(0.17)	(0.15)	(0.04)	(0.10)		
Eq. (13f)	24	0.70	0.39		0.03	0.08	0.43	1.49
		(0.22)	(0.17)		(0.03)	(0.09)		
Eq. (13g)	24	0.76	0.39		-0.02		0.41	1.53
		(0.21)	(0.17)		(0.03)			
Eq. (13h)	24	0.64	0.36			0.06	0.41	1.58
		(0.21)	(0.17)			(0.09)		

Figures in parenthesis are standard errors.

1/ π_{t^*}, ϵ_t, π_t, DPB_t are the rates of inflation in Russia, depreciation of the coupon/ruble exchange rate (lari/ruble rate after September 1995), adjustment of public sector wages and bread prices respectively.

Table 8. Georgia. Elasticity of Inflation with Respect to Its Own Lags, 1993-1996 1/
(Monthly Data)

	Number of observations	Elasticity Estimates			R2
		First month	Second month	Third month	
1. 1993 June-1995 Sept.	28	0.68 (0.20)	0.45 (0.21)	0.38 (0.19)	0.36
2. 1995 Jan.-1996 Dec.	24	0.75 (1.38)	0.56 (0.14)	0.22 (0.04)	0.75

Figures in parenthesis are standard errors.

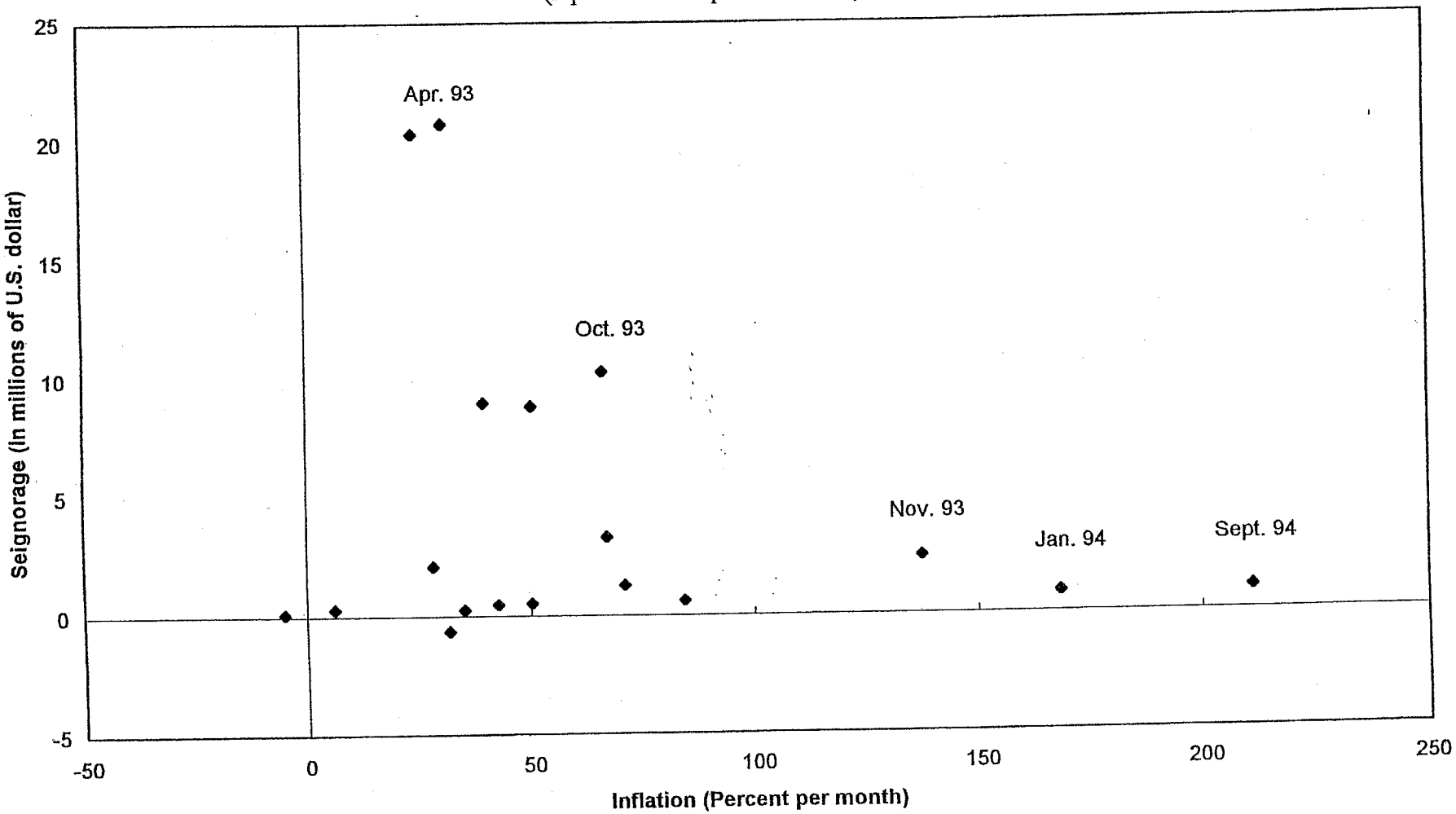
1/ The acceleration of the exchange rate was included in the regression. Estimates for lags more than 4 months were dropped as they turned out quite insignificant statistically.

Table 9. Georgia: Area Under Cultivation, 1992-1996
(In thousands of hectares)

	1992	1993	1994	1995	1996
Grain	112.8	84.9	69.3	80.0	111.9
Maize	94.8	110.0	150.0	180.0	225.0
Sunflower	12.4	12.0	18.0	45.0	54.0
Potato	22.3	18.0	12.0	25.0	32.0
Vegetables	24.9	22.0	17.0	35.0	36.0

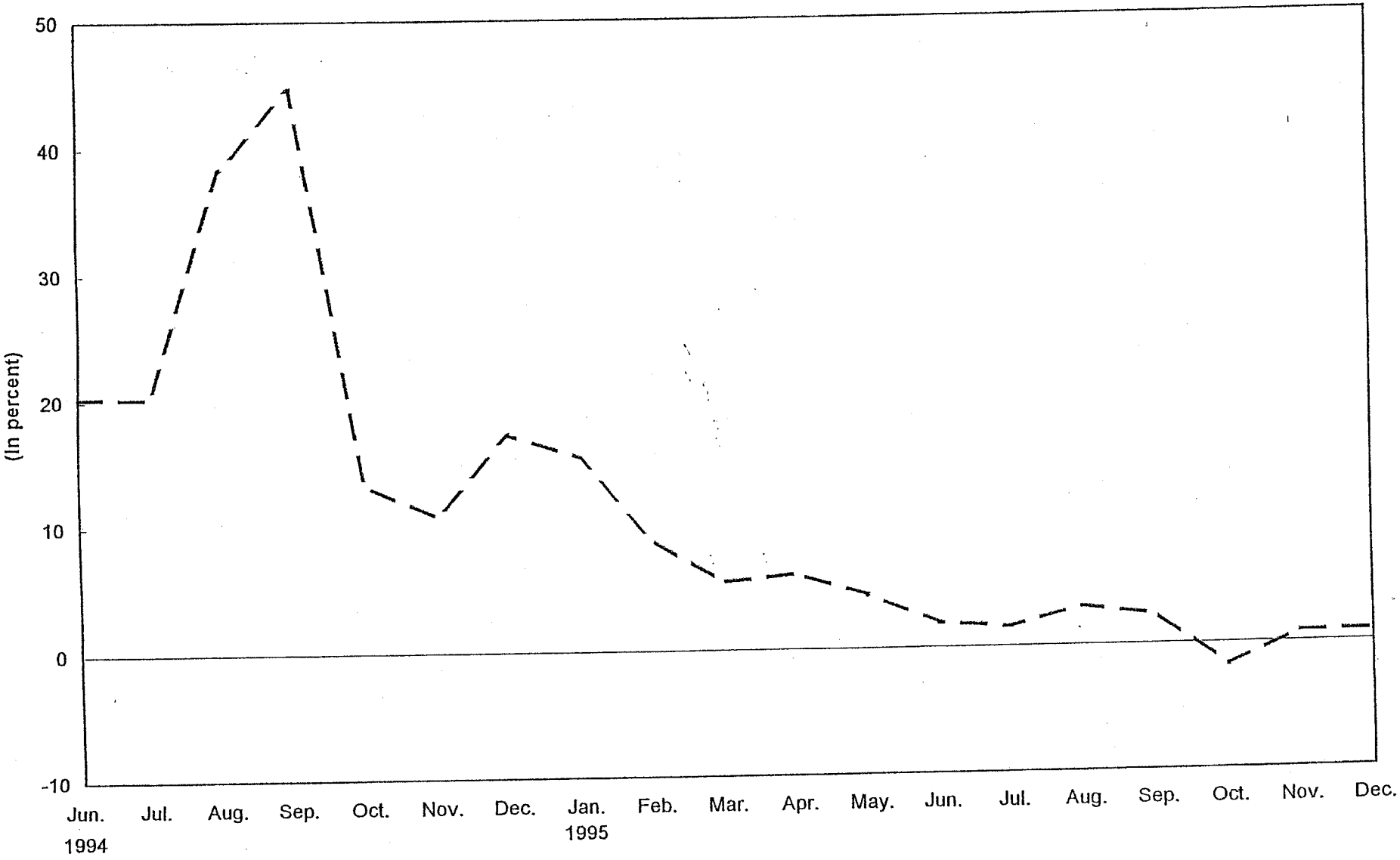
Sources: Ministry of Agriculture of Georgia.

Chart 1. Georgia: Seignorage and Inflation 1/
(April 1993 - September 1994)



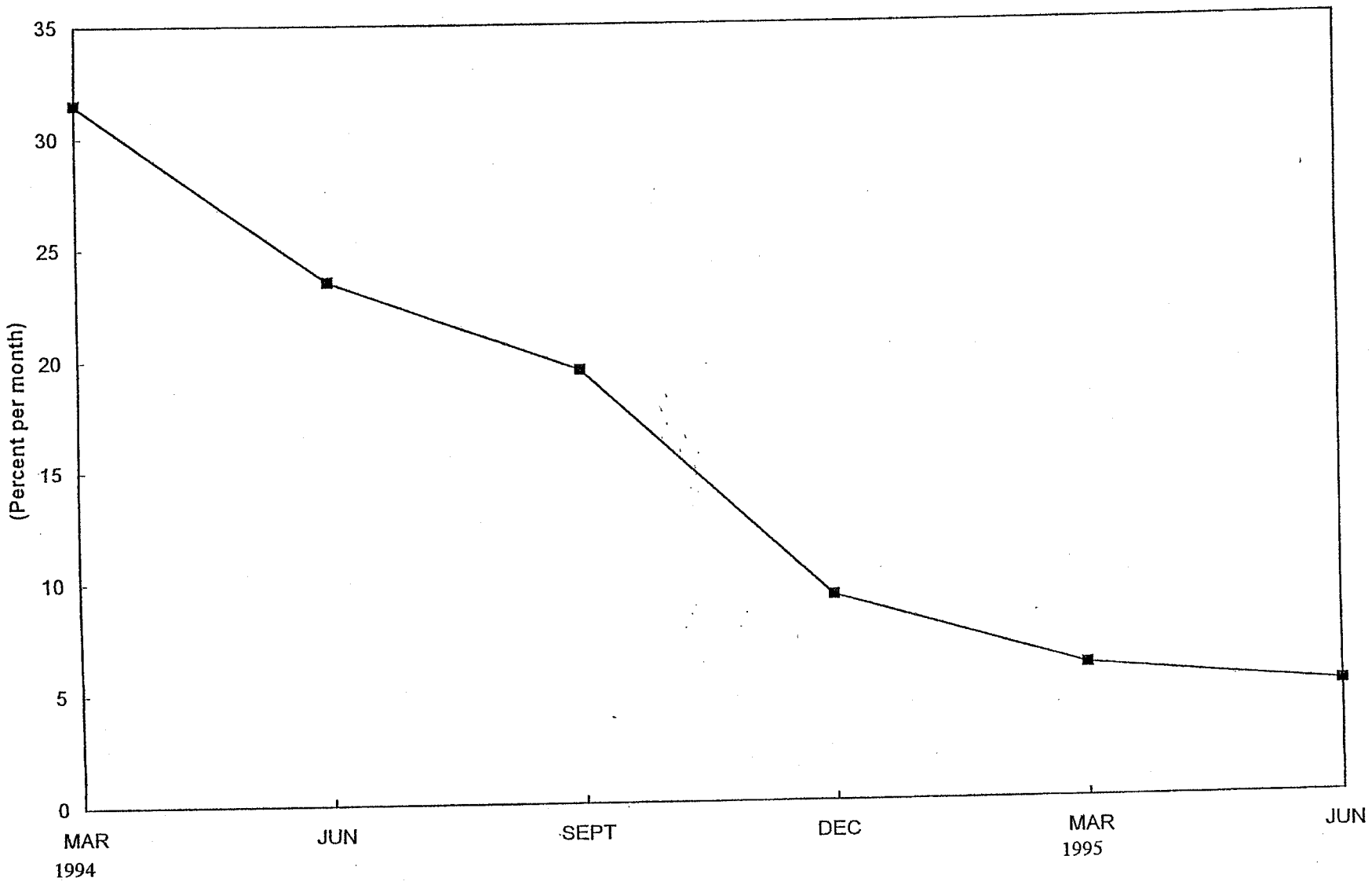
1/ Seignorage is calculated as the changes in currency in circulation from month to month and converted at the average coupon/U.S.$ market exchange rate.

Chart 2. Georgia: Exchange Rate Spread 1/
(June 1994 - December 1995)



1/ The difference between the bureau and TICEX coupon/U.S. $ rate relative to the TICEX exchange rate in the same period.

Chart 3. Georgia: Interest Rate Spread, 1994-95 1/



1/ Difference between the average coupon and foreign currency lending rates of commercial banks; simple average based on data from a diverse group of banks , and thus should be regarded as an indicator of rough trends.

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