IMF WORKING PAPER

WP/92/64

INTERNATIONAL MONETARY FUND

Research Department

Output Collapse in Eastern Europe: The Role of Credit

Prepared by Guillermo A. Calvo and Fabrizio Coricelli 1/ 2/

August 1992

Abstract

Real bank credit in Eastern European countries after their recent stabilization programs is shown to have fallen sharply, except in the case of Hungary. The meaning of the fall is discussed under the present value and liquidity perspectives. Moreover, it is shown that the hypothesis that output contraction may be partly due to credit contraction cannot be ruled out. The hypothesis is tested on a sample of 85 branches of industry in Poland. The rationale for expecting a connection between credit and output and policy options to attenuate the liquidity crunch in post-socialist economies is also subject to analysis.

JEL Classification Numbers:

P20

1/ This paper was presented at the conference on "The Macroeconomic Situation in Eastern Europe", organized by the IMF and the World Bank, which took place in Washington, D.C., on June 4-5, 1992. We wish to thank, without implicating, Gérard Bélanger, Mark Gertler, George Kopits, Josef Tosovsky and the European I Department at the Fund for useful comments.

2/ Mr. Coricelli is an Economist at the World Bank.

Table of Contents

		Page
I.	Introduction	1
II.	The Role of Credit: Basic Issues	1
	1. Overview	1
	2. RCPEs and PCPEs: Interenterprise Credit and Output	3
III.	The Role of Credit: Evidence	5
IV.	Further Statistical Analysis	9
V.	Conclusions	12
Tables		
	1. Credit and Money in the Enterprise Sector After the Reforms	15
	2. Full-Capacity Credit/Liquidity Requirements	16
	3. Poland: Regressions on Output and Credit	17
	4. Output Level and Credit	18
	5. Poland: Credit to Socialized Sectors and Capitalization of Interest	19
Charts		
	1. Real GDP Growth	20
	2. Poland: Bank and Interenterprise Credit	20a
	3. Poland: Real Sales and Credit Exposure	20b
References		21

I. Introduction

Output collapse in Eastern Europe after the implementation of the recent economic transformation programs has exceeded expectations by a wide margin (Chart 1). The basic view presented in this paper is that a large proportion of the fall could be explained by "trade implosion," i.e., a situation in which trade is destroyed for lack of market institutions, not just as a consequence of text-book changes in relative prices or movements "along transformation frontiers." The trade-implosion view is relevant for explaining the collapse of both domestic and international trade (particularly trade among CMEA countries).

We single out the credit market as one of the key underdeveloped institutions in Eastern European economies. Moreover, we advance the hypothesis that negative output effects associated with monetary contraction may be significant when credit markets are underdeveloped.

The conjecture that credit contraction may partly explain output decline is examined for the cases of Bulgaria, Czechoslovakia, Hungary, Poland and Romania, with special reference to Poland. Although results are highly tentative, we show that the above conjecture cannot be dismissed out of hand. Much to the contrary, statistical analysis for the case of Poland suggests that at least 20 percent of the output decline, during the first quarter of the stabilization program, can be attributed to the initial credit contraction.

The paper is organized as follows. Section II discusses the role of credit in centrally-planned economies, and other recent mutations, in order to rationalize the fact that credit markets in those economies are highly underdeveloped. Section III looks at the empirical evidence focusing on the behavior of credit (and other measures of enterprise liquidity) during the first quarter after the implementation of their transformation programs. Different credit/liquidity measures are discussed, all of which point to a substantial decline in enterprise credit/liquidity. Hungary suffers the smallest credit/liquidity contraction and, interestingly, Hungary's output exhibits the smallest drop. The positive association between output and credit is further explored in Section IV by studying the case of Poland. Results are consistent with the conjecture that output decline can be partly explained by the initial credit contraction. The paper is closed with Section V with a summary and a discussion on policy recommendations.

II. The Role of Credit: Basic Issues

1. Overview

In a centrally-planned economy, CPE, bankers are a mixed breed of accountants and public notaries. They extend credit for firms to be able to buy inputs to fulfill the program's targets, and take deposits from firms

and individuals. Bank transactions are dutifully recorded, thus providing central planners with additional information about the flow of real transactions. Furthermore, since as a general rule banks' management is kept separate from that of firms, banks' incentive for hiding information from the central planner is low, which enhances their role in the program's supervision mechanism (see Garvy (1972)).

In contrast, banks' role for screening financially viable from non-viable firms is relatively minor, if at all relevant. Firms, as well as banks, are state-owned. Therefore, managers have no control on firms' revenues, leave alone profits. The central authority, for example, could confiscate a firm's entire revenue from sales, making such firms technically bankrupt and unable to repay their bank debts. However, this is of no significance for the normal operation of firms, because "next period" the above-mentioned firm will get new bank credit to buy new inputs. Banks continue to lend because they are ordered to do so. And they can actually do so, because loans can be produced with negligible amounts of "real" inputs. In particular, the creation of new bank loans does not require previous loans to be served.

Consequently, in CPEs, firms' creditworthiness is taken for granted as long as managers comply with the dictates of the central program. Little firm-specific information need be collected by the bank extending credit, since no firm-specific collateral is involved in the credit transaction.

Since the early 1980s CPEs like Poland and the former Soviet Union gave enterprises more freedom on their profits. Firms acquired some freedom to use their net profits to (1) accumulating fixed capital and inventories (occasionally comprising durable consumption goods for their workers, like imported freezers), (2) holding bank deposits (including foreign-exchange deposits), (3) lending to other firms (interenterprise credit) and (4) paying bonuses to their workers. As a counterpart, credit was less automatically granted and banks started to pay closer attention to the debtor firm's collateral. The new system--which we call "reformed centrally-planned economy," RCPE--inherited many of the characteristics of the previous one. In particular, although managers and workers had greater control on firms' profits, firms were not allowed to go bankrupt and wages were set largely independently of firms' profitability. The latter gave rise to perverse behavior like shirking and absenteeism, low investment, and strong pressures to raise wages above sustainable levels (i.e., levels that are consistent with target growth and price stability). In particular, wage pressures became more acute in countries like Poland in which sustainable wages likely fell after the 1970s' energy crises.

Recent developments in Eastern Europe have led to a higher degree of decentralization, but have not yet succeeded in radically changing the perverse incentive structure. Bankruptcies, for example, are now allowed, but there are very few examples of large enterprises undergoing bankruptcy procedures (despite the sizable and persistent output loss experimented in the region). Privatization of state-owned enterprises is another innovation

of the 1990s. However, it took a while until privatization materialized and, so far, mainly retail and small shops have been privatized. Large enterprises are still in governments' hands.

Therefore, the new regimes--which we call "previously-centrally-planned economies," PCPEs--have most of the RCPEs' fundamental distortions. In contrast with RCPEs, however, authorities have liberalized most prices and attempted to follow tight fiscal and credit policies for price stability; these policies have generally been complemented by incomes policies (e.g., wage ceilings) to help offset the above-mentioned perverse incentives. 1/ It was hoped that if such policies were accompanied by substantial international trade liberalization, domestic relative prices would reflect more closely those prevailing in the rest of the world--thus, helping to achieve a more efficient allocation of resources. Unfortunately, reality has proved to be harder than expected. Output loss and unemployment, in particular, have shown surprising severity and persistence (see Chart 1).

2. RCPEs and PCPEs: Interenterprise credit and output

An outstanding feature of RCPEs is that the basic structure of a "command economy" was maintained, namely, the central authority designed and, to some extent, was able to enforce a basic output plan involving output targets for individual firms. Thus, even though freer than under pure central planning, firms' output was still heavily controlled by the central authority. Under those circumstances, output was not allowed to fall for "financial" reasons. If necessary, more money was pumped into the system to keep firms afloat. In fact, the resulting heightened sensitivity against a credit crunch was probably an important ingredient behind inflation and shortages in RCPEs. Individual firms were not threatened by lack of financial support and may thus have followed risky financial policies, eventually requiring bail-outs from the central bank.

A financial innovation in RCPEs is the emergence of interenterprise credit. Greater autonomy as to the use of profits made it permissible for firms to lend to other firms. 2/ This facilitated not only the transfer of profits among firms, but also the transfer of any momentary liquidity they happened to possess. A relevant aspect of this market is that it developed under the protection of the banking system since, as pointed out above, production plans were not supposed to be disrupted by financial trouble.

The presence of interenterprise credit contributed to making the task of monetary control more complicated. For example, attempts to control domestic credit tended to be quickly followed by offsetting expansions of

---

1/ It should be noted, however, that incomes policies have also been tried in RCPEs, so they cannot be listed as a major innovation of PCPEs.

2/ It should be noted that in CPEs interenterprise credit was forbidden by law.

interenterprise credit (see Kornai (1992) for the case of Hungary and Calvo and Coricelli (1992a) for the case of Poland). The latter momentarily increased the velocity of money, slowed down the effect of the stabilization program and--most importantly--increased the financial vulnerability of the whole enterprise sector. Thus, continuation of the tight credit stance was accompanied by financial stress in some enterprises, particularly net lenders. Since the production program had priority over other targets, more often than not the central bank was forced to follow a much more accommodative policy than originally intended. Consequently, interenterprise credit may have further contributed to the existence of steady-state inflation and/or generalized shortages. 1/

Despite the similarities between PCPEs and RCPEs, the former have exhibited large across-the-board output losses and unemployment. This may reflect the fact that policy makers in PCPEs have welcomed structural adjustment, even if it was to be accompanied by a sizable output decline. Such policy stance may have sent a strong signal to economic agents that the government was no longer behind them in case they ran into financial distress.

In a certain sense, a PCPE is an orphan relative of a RCPE or a CPE. It contains much of the same traits, but it has been thrown into a world in which markets--and credit markets in particular--are essential, without the benefit of central bank shepherding. Thus, a PCPE is forced to develop "private" credit markets starting from a weak base. The past dependence on the official banking system provided implicit partial insurance against bad financial deals. Thus, even when "private" credit existed--as when there was an active interenterprise credit market like in Poland--the removal of previous guarantees is likely to have caused firms to be much more cautious about credit transactions or, for that matter, any transaction in which highly marketable goods were not being simultaneously exchanged. This "lack of trust" situation may have gotten worse in most of the socialized sector as a result of the big increase in domestic energy prices, and trade liberalization. The latter shocks were strong and unprecedented in all Eastern European countries (except Hungary), and increased the relative price of energy in terms of the socialized sector's output (excluding the energy sector). Therefore, in the early stages domestic trade is likely to have been seriously impaired, particularly in those PCPEs that followed "big-bang" type policies.

Temporary trade impairment does not imply a sizable fall in output in the short run. Lower interenterprise credit could be partially

---

1/ This is only a very partial account of the inflationary mechanism in RCPEs. As pointed out by Blejer and Szapari (1989) and Kopits (1991), for example, RCPEs appear to have a tendency for developing higher fiscal deficits than under strict central planning due to the greater difficulty of collecting taxes in a more decentralized environment. This point has been further developed by McKinnon (1991).

compensated by (1) using up inventories, (2) falling into arrears, (3) lowering wages and, finally, (4) borrowing more from the banking system and international lenders. "Solutions" (1) to (3) have been widely adopted in recent experience. However, the first two solve the financial problem of one firm by worsening that of another (unless inventories are exclusively composed of highly tradable goods), while "solution" (3) is at best transitory given that firms are run by workers, and that stabilization programs have set in place "safety nets" that allow firms to lower their wage bill by charging some of it to the government budget (through layoffs)--thus reducing firms' incentives to lower wages. The availability of solution (4) (notice that quotation marks are not used on the word because (4) could actually be a real solution) is a function of policy and access to the international credit market. The latter was likely limited because international creditors faced the same uncertainties that helped to paralyze interenterprise credit. Thus, the only real hope for a solution relies on greater short run availability of bank credit. Such hope, however, may never materialize because larger bank credit could just result in higher prices.

The next section will examine the behavior of credit and other financial variables in Eastern Europe.

III. The Role of Credit: Evidence

The objective of this section is to present different estimates of credit contraction in Bulgaria, Czechoslovakia, Hungary, Poland and Romania, after the implementation of their market-oriented transformation programs.

Table 1 shows bank credit deflated by producer prices. In all cases credit falls by a substantial amount. However, there is a large dispersion. Hungary exhibits a relatively small credit contraction of 10 percent, while all the other countries exhibit contractions of more than 20 percent, with Bulgaria showing a spectacular fall of about 75 percent. Notice that, except for Hungary, actual credit contraction is substantially larger than planned. Except for Hungary, credit contraction is mostly due to the actual price rise being much higher than planned. Another contributing factor for Bulgaria, Czechoslovakia and Poland was that credit ceilings were not binding during the first few months of their transformation programs. However, real credit in those countries would have still suffered a precipitous fall even if credit ceilings had been binding. It is nevertheless interesting to note that credit ceilings were not binding in Bulgaria, Czechoslovakia and Poland, where real credit experienced a sharp contraction. Two main reasons have been suggested to explain this phenomenon. First, especially in the case of Poland, interest rates may have increased so much that the demand for credit dropped below credit ceilings (Calvo and Coricelli (1992b), Pinto (1991)). Second--and especially relevant for Czechoslovakia where the central bank set ceilings on lending interest rates--commercial banks may have been reluctant to lend to enterprises in the first months of the reform program (OECD (1991)).

A possible objection to using the change in the stock of real bank credit to measure the fall in real enterprise liquidity is that the initial price jump could actually improve firms' net worth since their real debt to banks falls. This criticism does not appear highly relevant for the countries in question because (1) before reforms were implemented, either real interest rates were highly negative (Poland), or firms' were not expected to service a large portion of their debt (Bulgaria and Romania); in the latter case, in which there is an initial stock of non-performing bank loans to enterprises, any capital gain from previously performing loans will go to service previously non-performing loans, leaving the firm in the same net-worth position; furthermore, as far as interest rates are concerned, economic transformation programs aimed at generating positive real interest rates and firms were supposed to risk becoming bankrupt if they did not service their debt; therefore, although real debt fell, positive after-reform real interest rates implied that enterprises went from a situation in which they received net real transfers from banks to a situation in which firms were supposed to make real transfers to banks; (2) firms' capital gains were heavily taxed (Czechoslovakia, Poland). In addition, part of working-capital credit was held in the form of bank deposits which were also subject to the inflation tax. Therefore, there are no strong a priori reasons to expect that firms greatly benefitted from the initial erosion of their bank debt through inflation.

At any rate, even when a firm's net worth increases as a consequence of the initial price jump, its "liquidity" or ability to purchase basic inputs could go down. To fix ideas, consider the case in which, before reforms are implemented, a firm produces Q units of output at full capacity by means of inputs acquired a period before. Let B indicate credit granted to that firm to purchase those inputs and, for the sake of concreteness, let us assume that the firm has no other means of its own for that purpose. We assume that, before the reform, prices of output and inputs equal unity, and that the interest rate is zero. 1/ Thus, profits = Q - B. To ensure that the firm continuously depends entirely on credit before reform, we further assume profits to be zero, i.e., Q = B. Let $P > 1$ and $P_i > 1$ denote the prices of output and inputs after the reform, respectively.

We will examine the situation of the firm in the first period after the reform is implemented, assuming that the firm acquired credit at the pre-reform low interest rate (= 0). Thus, after-reform profits = PQ - B > 0, implying that the firm's net worth has increased. Let us now examine the firm's post-reform ability to buy new inputs (i.e., the firm's "real liquidity"), assuming that nominal credit remains constant, i.e., nominal credit keeps being equal to B. Hence, the firm's real liquidity satisfies:

1/ Under the present assumptions, the real interest rate would also be zero.

$$(1) \quad (B + \text{after-tax profits})/P_i = [B + (PQ - B)(1 - \tau)]/P_i,$$

where τ is the profit tax, $0 \leq \tau \leq 1$. Clearly, if $P = P_i$ (i.e., no change in relative prices) and $\tau = 0$ (i.e., no profit tax), expression (1) equals $Q = B$ (where equality follows from the pre-reform zero-profit assumption). Therefore, under these special assumptions the firm would still be able to buy inputs to ensure full-capacity output. However, this ceases to be the case if $\tau > 0$ (i.e., there is a positive profit tax)--a highly realistic assumption--or $P < P_i$ (i.e., the relative price of output with respect to inputs falls)--a realistic assumption for most non-energy producing sectors. Notice that for a large profit tax, real liquidity could be approximated by real credit, B/P_i. 1/

An alternative, and more direct, way to estimate enterprise liquidity is to compute M2 in the hands of enterprises. According to Table 1 this alternative way provides the same orders of magnitude as those obtained on the basis of real credit. However, in general, M2 is a less useful variable because stabilization programs specified ceilings on credit, not on M2. Furthermore, M2 does not necessarily measure firms' ability to purchase new inputs. Conceivably, an increase in credit to enterprises could be entirely spent on imported inputs or inputs produced by other sectors, like agriculture, and never take the form of higher M2 held by enterprises.

However, one could still criticize the adequacy of bank credit to enterprises as a measure of enterprise liquidity because: (1) it does not take into account changes in fiscal variables and in interest rates, and (2) a sizable share of outstanding loans could be non-performing and, thus, their liquidation should have no deleterious effects on output. The following discussion will tackle these issues.

In Table 2 we try to measure liquidity needs after the first quarter of the transformation programs <u>if</u> firms had been able to operate at full capacity (at actual prices), taking into account the new interest rates and profit taxes. 2/ In this fashion, our liquidity definition is less subject to the criticism that it <u>reflects</u> the fall in output and, therefore, could not be an appropriate variable to test the hypothesis that enterprise liquidity has an effect on output. For the cases of Bulgaria and Romania we adjust the initial credit variable by an estimate of non-performing loans--which in these countries appear to be substantial (partly explaining the sizable fall in credit registered in Table 1). In this fashion, estimates in Table 2 correct for the omissions noted in points (1) and (2) above. Furthermore, by assuming full capacity utilization, we get a measure of the

---

1/ Notice that in Table 1 we deflated credit by the wholesale price index, which likely underestimates the increase in input prices (i.e., the relevant price index for estimating B/P_i).

2/ Furthermore, Table 2 assumes that previous liquidity/sales or output ratios reflect normal liquidity needs and, thus, apply to the period after the transformation programs were implemented.

liquidity squeeze before output decline. Thus, these estimates come closer to a measure of the exogenous financing gap generated by credit policy.

Table 2 confirms the findings of Table 1. Except for Hungary where real liquidity fell by only about 6 percent, all countries show a shortfall of liquidity of more than 20 percent. Once again, Bulgaria shows the largest liquidity contraction (more than 65 percent), followed by Poland (about 40 percent), Czechoslovakia and Romania (about 20 percent).

As noted above, however, enterprises could partly offset their liquidity shortage by running down their stock of inventories, and by borrowing (or falling into arrears) in the interenterprise credit market, or borrowing from their own workers (e.g., by paying wages below the program's ceilings).

We first note that despite the fact that the fall of inventories in all these countries appears to be sizable (e.g., in Czechoslovakia and Poland was between 20 and 30 percent), the extra liquidity brought about by such a depletion of inventories is only capable of covering around 50 percent of the liquidity shortfall. 1/ Czechoslovakia would have been able to fully cover the shortfall shown in Table 2. However, Table 2 gives us a substantial underestimate of the liquidity shortfall of countries like Czechoslovakia and Poland, because nominal capital gains on inventories incurred as a consequence of the initial price rise were subject to taxation. 2/

Regarding the interenterprise credit market, the outcome after reform differs across countries, and information is sometimes skimpy (for example, in Czechoslovakia, Hungary and Romania available figures only capture interenterprise arrears). For Poland, where information is relatively good, the behavior of interenterprise credit appears to differ markedly from the past. While in the past, contraction of bank credit was accompanied by an expansion in the interenterprise credit market, after reform the two types of credit tended to move in the same direction. This is confirmed by Chart 2 which depicts the relationship between changes in bank credit and changes in interenterprise credit ("payables") across 19 industrial sectors during the first quarter of 1990. Therefore, interenterprise credit reinforced, rather than cushioned, the liquidity contraction provoked by lower bank credit--supporting the conjecture that firms perceived the 1990 program as a

---

1/ It should be noted that the fall of inventories in Czechoslovakia reported in the text is an estimate of the authors. It has been calculated by assuming that the revaluation of the stock of inventories on January 1, 1991, does not include January inflation.

2/ In Czechoslovakia firms were taxed on such capital gains independently of whether or not inventories were actually spent on production. It is estimated that revenue from this tax amounted to about 3 percent of GDP in Czechoslovakia, and to more than 10 percent of GDP in Poland (see Barbone (1992)).

change of regime in which lending firms would be less likely to be bailed out by the central bank in case their loans were not repaid. 1/

"Borrowing from workers" represented a cushion for enterprises in Bulgaria, Czechoslovakia, Poland and Romania in the first few months following reforms. In all these countries wages were set well below the norms established by the government programs. In contrast, in Hungary, where enterprises in 1990 did not suffer a significant liquidity squeeze, this phenomenon did not take place, and wages increased slightly above the program's targets. 2/ Thus, there seems to be a correlation between tight liquidity conditions and wage behavior in the countries examined. 3/

The evidence presented above suggests that, except for Hungary, the reform programs implied a sizable contraction of enterprise liquidity. Another relevant piece of information concerning the correlation between output decline and credit/liquidity squeeze comes from sectoral data available for Poland. Chart 3 shows a negative correlation across 19 industrial sectors between change in output during the first quarter of 1990 and credit dependence at the end of 1989. 4/ Thus, sectors which were characterized by larger exposure to bank credit at the end of 1989 displayed the larger decline in output. In addition, the cross-sectional data confirm for the case of Poland the positive correlation between credit conditions and wage behavior. 5/

IV. Further Statistical Analysis

Previous sections show that credit and, more specifically, enterprises' liquidity suffered a sizable contraction in the early stages of stabilization programs. Hungary exhibits the smallest such contraction and,

---

1/ It is still an open question whether the after-reform positive association between bank and interenterprise credit persisted after the first quarter of 1990.

2/ It is worth noting that--in contrast with the sharp declines in the other four countries--real wages in Hungary increased by about 2 percent during 1990.

3/ For Bulgaria, Czechoslovakia, Poland and Romania wage behavior partly explains the high profitability of enterprises in the face of large increases of non-labor input prices. However, the share of wages in total costs is relatively low in these countries, which are characterized by high energy and material intensity of production processes. Consequently, the liquidity that can be generated by borrowing from the workers is limited.

4/ Credit dependence is measured by the ratio of bank credit for working capital and total costs.

5/ Regressing proportional wage changes against proportional credit increase (first quarter of 1990) for 85 branches of industry in Poland (as described in the following section) we obtain a credit coefficient equal to 0.33, with a t-statistic equal to 1.9.

interestingly, also suffered the smallest output decline. Thus far, however, we have not established a strong line of causation going from credit to output. Actually, credit could follow output decline induced by other factors like, for example, the collapse of the CMEA trade. To look more closely into this issue, we examine the case of Poland, which launched its stabilization program one full year before the collapse of the CMEA trade.

We run cross-section regressions involving 85 branches of industry in Poland. First, we regress proportional changes in output against proportional changes in real credit (using as a deflator the own output price index 1/) from the last quarter of 1989 to the first quarter of 1990. Since credit ceilings were non-binding in the first quarter of 1990, the proportional change in real credit is an endogenous variable. Thus, we instrument it by the ratio of working-capital credit to sales in the last quarter of 1989 (which exhibits a negative correlation with credit growth of about 50 percent). The point estimate is around 0.2 (with a t-statistic of 2.1), meaning that a 10 percent contraction of real credit results in a 2 percent fall in output (see Table 3). 2/ Second, to check the robustness of our results with respect to the credit deflator, we run the same regression using nominal, instead of real, bank credit expansion as an independent variable (and instrument it in the same fashion). 3/ As shown in Table 3, results are similar. Third, we regress (the log of) output against (the log of) credit for the first quarter of 1990. Once again, since credit is an endogenous variable we instrument it by (i) the ratio of working-capital to sales and (ii) real sales, both corresponding to the last quarter of 1989. The point estimate is around 0.6 (with a t-statistic higher than 8), meaning that a 10 percent fall in real credit results in a 6 percent output decline (see Table 4). Therefore, the statistical analysis suggests that there exists a positive association between credit and output. The point estimates of the output credit elasticity, however, vary widely from a low 0.2 to a high 0.6. Since real credit in the sample falls, on average, by 27 percent, output decline that could be associated with credit contraction runs from a low 5.4 percent to a high 15 percent. Average output fall in the sample is about 24 percent. Therefore, the analysis suggests that the decline of output may have reflected credit contraction but, in addition, there appear to be other factors or mechanisms contributing to such process.

1/ This would be the proper deflator if input prices were highly correlated with output prices.

2/ A linear version of this equation is reported in Berg and Blanchard (1992). Using the same sample, they show that point estimates predict a negligible (although statistically significant) impact of credit on output. However, the linear restriction is not warranted by the underlying model that is being tested (see Calvo and Coricelli (1992 a and b)).

3/ This would be the proper procedure if input prices across sectors moved up at about the same rate.

In particular, if the relevant elasticity were around 0.2, a large share of the output decline would be due to those other factors or mechanisms. In this connection, it is worth mentioning that aside from direct effects, credit contraction could have indirect output effects if prices and wages are not perfectly downward-flexible. A credit squeeze, for example, may lead firms to run down inventories. Thus, if inventories contain domestically-produced goods, demand for those goods will fall, giving rise to a typically Keynesian impasse. Moreover, output from inventory-producing sectors will tend to be low until inventories reached their desired lower levels, which thus helps to rationalize a prolonged period of output contraction.

The credit view about output decline in Eastern Europe can be challenged by pointing to developments in Poland after the first quarter of 1990. Table 3 shows that although real credit to enterprises fell by about 50 percent in the first quarter of 1990, it rose by about 70 percent in December 1990 compared to March 1990. However, gross enterprise output in December 1990 grew by only 9.56 percent from March 1990. This suggests that credit expansion had a very small impact on output, seemingly contradicting the above econometric results.

There are several complementary arguments to reply to the above criticism. In the first place, as the econometric results suggest output reaction to credit may exhibit an elasticity that is well below unity, e.g., 0.2. Hence, credit expansion has a positive effect on output, but only 20 percent of the credit growth will be reflected in output growth. However, even if the credit coefficient were equal to 0.2, the criticism that output did not increase as much as expected would still carry some weight. Credit expansion from April to December 1990 was 72 percent which, when multiplied by the 0.2 coefficient, implies that output should have grown by 14.4 percent--still somewhat larger than actual output growth (= 9.56 percent).

We now proceed to add another important ingredient to our response to the above-mentioned criticism. Credit has to reflect actual purchasing power over inputs. Thus, it is not clear that the deflator used to compute "real" credit (namely, the wholesale-price index) is the relevant one after the first quarter of 1990. This is so because, due to the removal of subsidies to some key inputs like coal and oil, input prices appear to have risen by much more than output prices. For example, if the CPI were to be used as a deflator--an index that may better capture the effect of increases in administrative prices--real credit would increase by only 46 percent from April to December 1990 (see Table 5). Thus, if the output credit elasticity is low (i.e., 0.2), output growth in 1990 after April (= 9.56 percent) would have required a "real" credit expansion of about 50 percent, which exceeds actual real credit expansion if we use the CPI as a proxy for the input price index. Therefore, under those circumstances, the above-mentioned criticism would be fully answered by noting that (1) output credit elasticity is around 0.2 and (2) input prices rose much faster than output prices.

However, if we believe that output credit elasticity lies on the high side of our range of estimates, say 0.6, then actual output growth would still be substantially less than expected. We now introduce another ingredient to our reply to critics. Once again, we would like to stress that the relevant credit variable should be directly associated with enterprises' ability to purchase production inputs. Thus, for example, the credit view would attach no significance to an increase in credit that reflected capitalization of interest, i.e., refinancing of interest on outstanding loans. We suspect that interest capitalization may have played a significant role in the expansion of credit after April 1990. This is indirectly confirmed by Sheng (1991) who shows that in 1990 from 18 to 28 percent of total bank portfolios were composed of "problem" loans. In what follows, we show that if interest payments were capitalized, then credit expansion--adjusted downwards by interest capitalization--is substantially smaller, and would result in the observed weak output growth in 1990, even though the output credit elasticity is assumed to be high and equal to 0.6. This new ingredient of our response to critics is somehow more speculative than the previous ones. However, it receives some support from (1) the emergence of problem loans in 1990 (as noted above), and (2) the well-known (among observers of the Polish economy) fact that during 1990 banks capitalized interest at the beginning of each quarter (especially in April and July). The latter is quite apparent from Table 5, which shows the presence of spikes in the credit series at the beginning of each quarter, starting in April 1990.

To account for the 9.56 output growth in the period from April to December 1990, "real" credit must have risen by about 16 percent (= 9.56/0.6, where 0.6 is, by assumption, the output credit elasticity). As shown in Table 5, interest capitalization may have augmented credit by about 19 percent. Thus, total credit expansion accounted for in this manner would be about 35 percent. The latter is very close to real credit expansion in the period April-December 1990 if the CPI is used as a proxy for the input price index, supporting our contention.

In sum, statistical analysis shows that critics of the credit view are likely to have a hard time proving that credit is of little significance for output. In particular, the popular view that credit could not possibly be relevant for output--because strong credit expansion in the period from April to December 1990 in Poland led to only feeble output response--has been shown to rely on several questionable assumptions.

V. Conclusions

The above discussion gives further support to the hypothesis that credit may play a significant role in PCPEs' output determination. The hypothesis, however, should not be taken to imply that credit policy would be able to restore output to socially optimal levels. As pointed out in Section II, the new rules of the game in PCPEs could have led to a situation of "trade implosion" or "trade destruction" which is not easily cured by

infusing more credit into the system. The situation is further complicated by the collapse of the CMEA which represented a serious blow to all of these countries. 1/ Strictly speaking, our econometric findings are confined to the first stages of the Polish stabilization program. Therefore, the finding that credit may have an effect on output should not be taken to imply that credit alone will be able to maintain the initial high output levels in the medium term. In fact, Commander and Coricelli (1992) suggest that, despite the smaller credit contraction in Hungary than in Poland, the cumulative output decline after two years is about the same in the two countries.

There are different ways to ensure that firms have access to the necessary liquidity to operate at "full capacity." 2/ The first obvious one is to adjust bank credit initially in order to ensure that "real" credit--in terms of input prices--stays unchanged. This should, in principle, involve a once-and-for-all operation. Afterwards credit could be as tight as necessary to ensure the achievement of low-inflation targets. A common criticism of the initially-easy-credit position is that such a policy may impair the credibility of the program, making it more likely that the initial price jump escalates into persistent high inflation. A full discussion of this issue will take us beyond the limits of this paper. However, it should be recalled that the price jump in Eastern European programs in the first quarter after their implementation was quite sizable (118 percent on average). Credit accommodation may have added more spring to the initial price jump, but if a 118 percent price jump does not destroy credibility, we do not see any clear reason why a larger jump will.

A more persuasive criticism, however, is that credibility may be a function of credit tightness. For example, upon noticing that credit is plentiful enough that it would be possible to continue operations as before reforms were implemented, managers may have little incentive to adjust. Credit may, thus, end up being treated by firms as a substitute for previous subsidies. As argued in Section II, banks have no expertise in evaluating creditworthiness (and any expertise they had, was likely wiped out by the sizable change in relative prices). Hence, banks may be largely unable to detect "bad loans" until it is too late, and the central bank--to avoid financial panic--is forced to monetize enterprises' liabilities, jeopardizing the effectiveness of the stabilization program.

1/ The collapse of the CMEA could also be seen as partly reflecting the absence of credit markets across Eastern Europe and the former Soviet republics. Thus, one possible way to help the recovery of CMEA trade (but not necessarily of domestic trade) would be to expand international credit--an outcome that requires the cooperation of all countries concerned, but cannot be achieved by expanding domestic credit.

2/ For the sake of brevity, the following discussion will stay away from structural issues like privatization and cancellation and socialization of enterprise debt, which are discussed in Calvo and Coricelli (1992b) and Calvo and Frenkel (1991 a and b).

It is worth noting, however, that tight credit could have a negative effect on credibility, especially if it creates across-the-board financial difficulties. Tight credit conditions may lead a single firm to quickly "put its house in order." However, if its managers realize that many other firms are in the same situation, they may decide to postpone adjustment in the expectation that the government will bail out everybody in trouble. 1/

Another candidate for a solution to the credit-squeeze problem is a swap of government debt for enterprise debt. Through this operation, firms receive government bonds, for example, in exchange of their own debt. Since presumably government debt is much less risky in the eyes of private investors than enterprise debt, enterprises may find it easier to borrow in private credit markets, using their stock of government debt as collateral. Alternatively, enterprises could increase their liquidity by simply selling their stock of government debt in the market. However, this solution may not be effective for a PCPE because there usually is no well-developed market for government debt instruments.

Finally, a more gradualist policy, like the one in Hungary, may be followed. This policy would involve a gradual dismantling of subsidies, and a consequent smoother increase in input prices. Thus, the credit shock will be less violent, and firms will have more time to build up their liquid balances in anticipation of the future price rise. However, critics may point out that gradualism detracts from policy transparency, leads to speculative behavior, and may invite future postponement of reforms. 2/ More basically, a gradualist policy may simply not be feasible. Subsidies may be so large that their maintenance could lead to ever-rising inflation.

1/ See Calvo and Coricelli (1992b) for an application of this argument to Poland in the second semester of 1990.

2/ Argentina in the early 1980s is a case in point. In 1976 Argentina's authorities announced a gradual phasing out of import subsidies. The program was discontinued in 1981 and tariffs remained high until very recently.

Table 1. Credit and Money in the Enterprise Sector After the Reforms

(Real stocks deflated by producer prices; in percent)

	Credit to enterprises		Enterprise	Inflation	
	Actual	Target	Money	Actual	Target
Bulgaria					
(1991.I/1990.IV)	-75.1	-61.0	-71.7	277.0	167.0
(1991.IV/1990.IV)	-67.0	-61.0	n.a.	338.0	234.0
Czechoslovakia					
(1991.I/1990.IV)	-28.3	-11.4	-34.4	39.5	25.0
(1991.IV/1990.IV)	-18.4	-8.1	0.7	58.7	30.0
Hungary 1/					
(1990.I/1989.IV)	-12.0	n.a.	-6.9	15.0	n.a.
(1990.IV/1989.IV)	-7.0	-7.0	24.8	30.0	20.0
Poland					
(1990.I/1989.IV)	-49.0	-10.0	-38.2	229.4	75.0
(1990.IV/1989.IV)	13.0	25.0	-15.0	193.0	94.0
Romania					
(1991.I/1990.IV)	-16.0	n.a.	n.a.	31.0	n.a.
(1991.IV/1990.IV)	-39.0	-45.0	n.a.	227.0	120.0

Source: Authors' calculations on data provided by the authorities of the various countries.

1/ Quarterly data on Hungary are affected by seasonality. Gérard Bélanger has pointed out to us that seasonal factors account for a difference of 6-8 percent between enterprise deposits in the fourth and first quarter (with the latter lower). The annual change reported may thus be more relevant.

Table 2. Full-Capacity Credit/Liquidity Requirements

(Percent of Sales)

	Bulgaria 1/			Czechoslovakia			Hungary			Poland			Romania 2/		
	1990	1991.I	%	1990	1991.I	%	1989	1990.I	%	1989	1990.I	%	1990	1991.I	%
Bank credit	28.9	16.1	-44.2	125.7	99.7	-20.6	26.3	25.9	-1.5	41.5	21.3	-48.6	24.7	19.2	-20.2
Liquidity 1	62.5	20.7	-66.8	131.5	101.7	-22.6	33.1	31.0	-6.3	63.5	29.3	-53.8	26.4	21.0	-19.5
Liquidity 2	80.6	27.1	-66.3	178.6	135.9	-23.9	41.2	39.1	-5.1	69.7	38.7	-44.4	n.a.	n.a.	n.a.

Source: Authors' calculations

1/ The credit's stock for 1990 has been reduced by 50 percent to eliminate the share of non-performing loans. For 1991 all the credit is assumed performing.

2/ Data refer only to profit-making enterprises.

Definitions:

Bank credit = Credit ceilings
Liquidity 1 = Bank credit & full-capacity profits
Liquidity 2 = Liquidity 1 & monetary holdings at the beginning of the period

The following methodology is employed in Table 2:

(i) An estimate of full-capacity sales/output is obtained by multiplying the value of sales/output in the quarter preceeding reforms by the actual increase in prices in the first quarter of reforms.

(ii) Net profits are estimated by applying the actual net profit/sales ratio after reform to full-capacity sales.

(iii) The credit stock is taken to be equal to the credit ceilings.

Table 3. Poland: Regressions on Output and Credit

1. Change in real output and change in real credit

Period: 1990.I/1989.IV; Sample: 85 observations; Estimation Method: 2-Stage Least Squares. t-statistics in parenthesis.

$$DY = \underset{(-6.1)}{-0.2} + \underset{(2.1)}{0.2} * DCRE$$

Instruments: constant, ratio of bank credit to sales in 1989.IV.

DY= change in real output (log-difference)
DCRE= change in real credit (log-difference)

2. Change in real output and change in nominal credit

Period: 1990.I/1989.IV; Sample: 85 observations; Estimation Method: 2-Stage Least Squares. t-statistics in parenthesis.

$$DY = \underset{(-6.1)}{-0.37} + \underset{(2.2)}{0.16} * DNCRE$$

Instruments: constant, ratio of bank credit to sales in 1989.IV.

DY= change in real output (log-difference)
DNCRE= change in nominal credit (log-difference)

Table 4. Output Level and Credit

Period: 1990.I; Sample: 85 observations; Estimation method: 2-Stage Least Squares. t-statistics in parenthesis.

$$Y = \underset{(10.8)}{7.1} + \underset{(8.2)}{0.55} * CRE$$

Instruments: constant, ratio of bank credit to sales in 1989.IV, real output in 1989.IV.

Y= log of real output
CRE= log of real credit (initial period (1989.IV) credit deflated by producer prices in the period (1990.I).

Table 5. Poland: Credit to Socialized Sectors and Capitalization of Interest

(in percent)

	1990.03-1989.12	1990.12-1990.03
Change in real credit Deflated by PPI	-34.3	71.6
Change in real credit Deflated by CPI	-35.1	45.6
Change in production	-32.3	9.6
Change in real credit due to capitalization of real interest	-18.0	18.9

Chart 1. Real GDP Growth
(percentage changes over previous year)

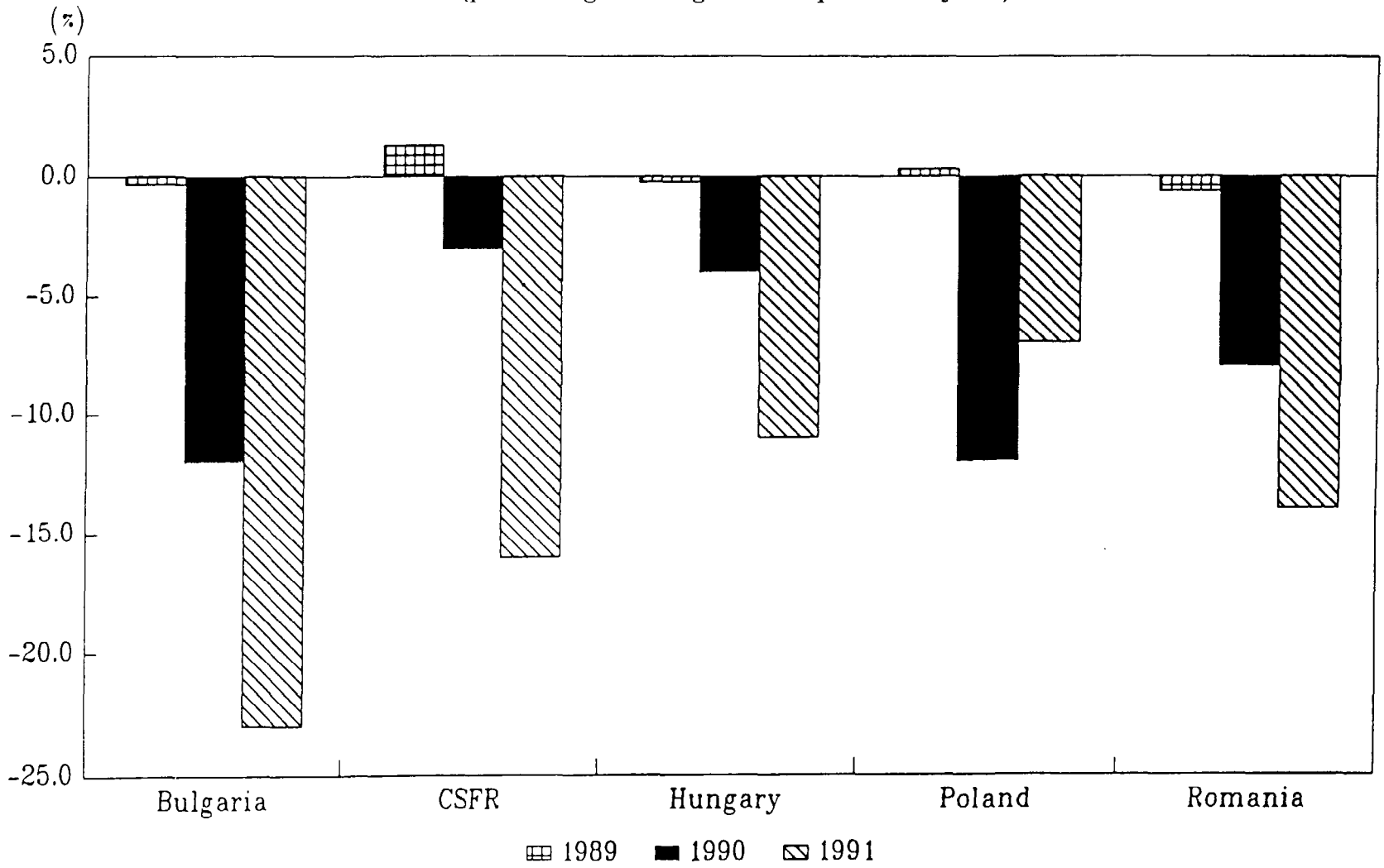


Chart 2. Poland
Bank and Interenterprise Credit
(percentage change from previous quarter)

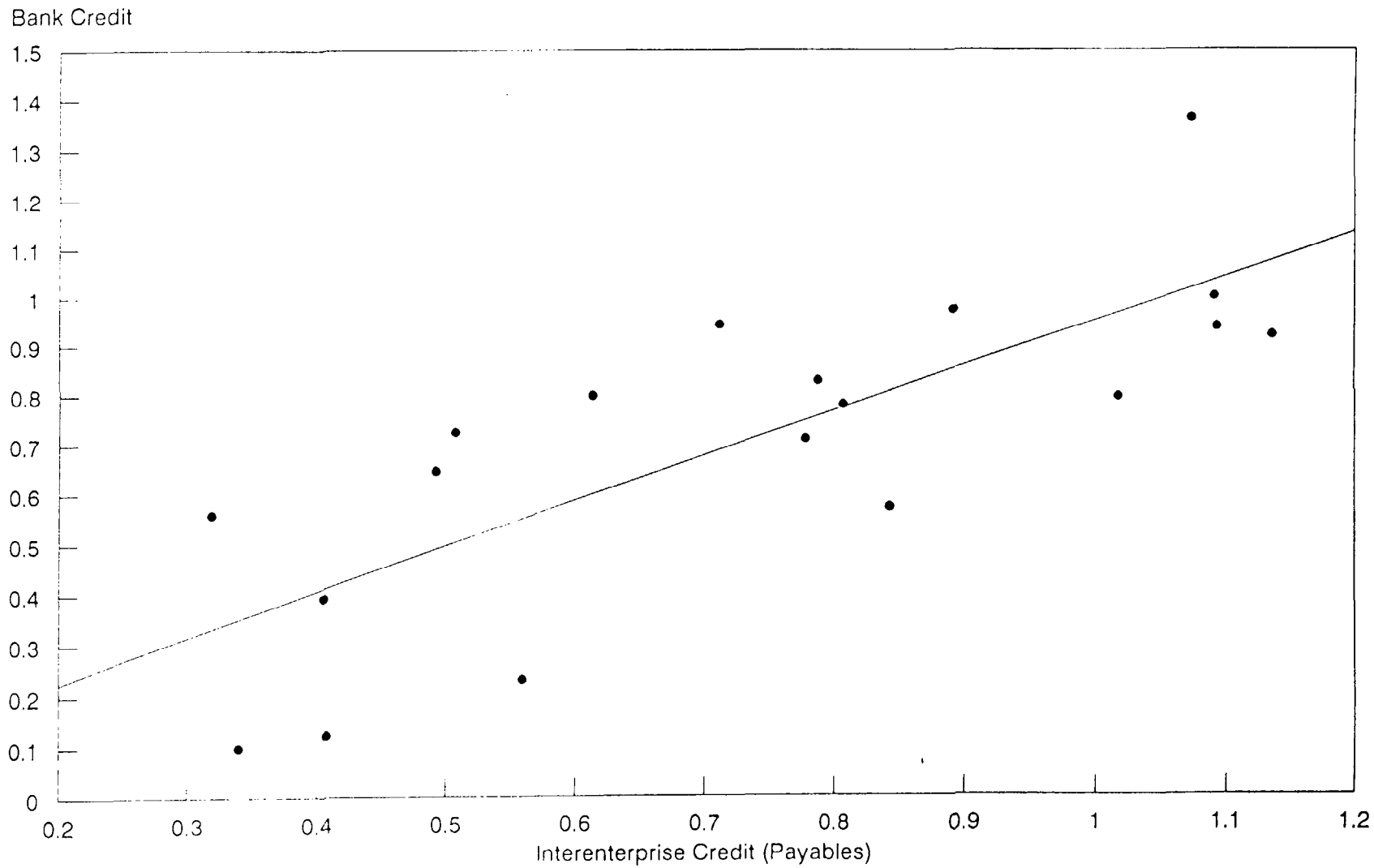
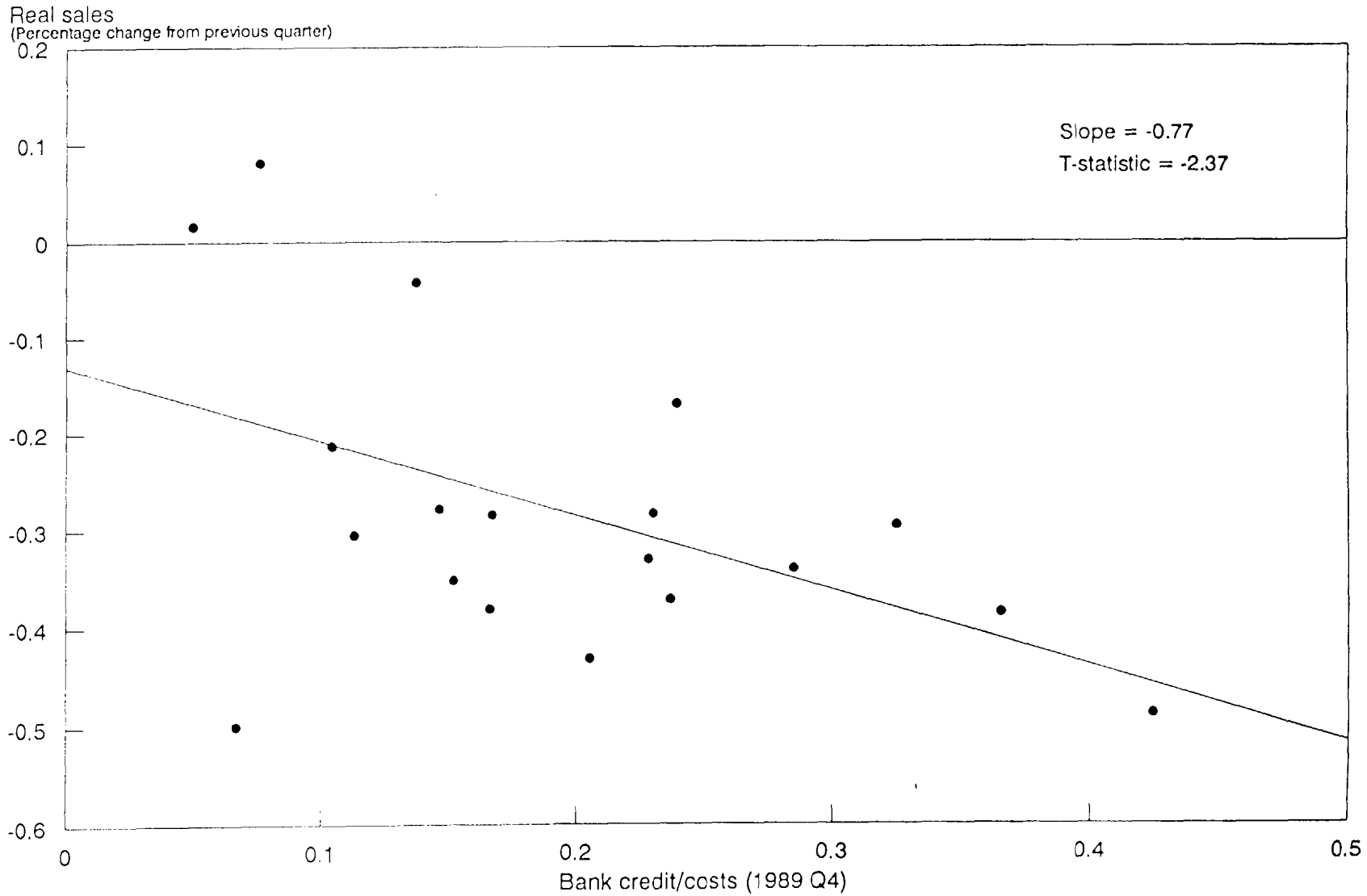


Chart 3. Poland
Real Sales and Credit Exposure



References

Barbone, L. (1992), "How Much Did the Fiscal Sector Gain in Poland from Hyperinflation? The 1990 Fiscal Surplus Revisited," mimeo, The World Bank.

Blejer, M. and G. Szapari (1989), "The Evolving Role of Fiscal Policy in Centrally Planned Economies under Reform: The Case of China, "International Monetary Fund Working Paper, Washington D.C..

Berg, A. and O. Blanchard (1992), "Stabilization and Transition: Poland 1990-1991", presented at NBER Conference on the Transition in Eastern Europe, Cambridge, MA, February.

Calvo, G. and F. Coricelli (1992a), "Stagflationary Effects of Stabilization Programs in Reforming Socialist Countries: Enterprise-Side and Household-Side Factors," The World Bank Economic Review, Vol. 6: 71-90.

Calvo, G. and F. Coricelli (1992b), "Stabilizing a Previously centrally Planned Economy: Poland 1990", Economic Policy, No. 14:

Calvo, G., and J. Frenkel (1991a), "From Centrally Planned to Market Economy: The Road from CPE to PCPE," Staff Papers, June, Vol. 38: 268-299.

Calvo, G. and J. Frenkel (1991b), "Credit Markets, Credibility, and Economic Transformation," Journal of Economic Perspectives, No. 4, Fall: 139-148.

Commander, S. and F. Coricelli (1992), "Output Decline in Hungary and Poland in 1990/91: Structural Change and Aggregate Shocks," paper presented at the Fund/Bank conference on Macroeconomic Situation in Eastern Europe, June 4-5, 1992.

Dornbusch, R. and H. Wolf (1990), "Monetary Overhangs and Reforms in the 1940s," NBER Working Paper Series, n. 3456.

Garvy, G. (1972), "The Monetary System and Payments Flow," in A. Nove and D.M. Nuti (eds.), Socialist Economies: Selected readings, Penguin Books.

Kopits, G. (1991), "Fiscal Reform in European Economies in Transition," in P. Marer and S. Zecchini (eds.) The Transition to a Market Economy, Paris, O.E.C.D.

Kornai, J. (1992), The Socialist System, Princeton university Press.

McKinnon, R. (1991), The Order of Economic liberalization, Johns Hopkins University Press.

OECD (1991), OECD Economic Surveys: Czech and Slovak Federal Republic, Paris.

Pinto, B. (1991), "Microeconomic Response to the Economic Transformation Program: Evidence from the Largest Polish State-Owned Enterprises," mimeo, The World Bank.

Sheng, A. (1991), "Bad Debts in Transitional Socialist Economies," mimeo, The World Bank.