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Bank Insolvency and Stabilization in Eastern Europe

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Abstract

The profound structural reform underway in Eastern Europe has revealed the weakness of the banking sector there; macroeconomic stability and other reforms are thereby threatened. After an overview of recent developments in the banking sectors of these countries, a model is developed that clarifies the role of banking in an emerging market economy, and the danger that the disturbances inherent to it may be magnified and prolonged by a banking collapse. The implication is that priority must be given to mobilizing fiscal resources to cover the costs of restructuring the banking sector.

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Summary

The formerly socialist countries of Eastern Europe face the double challenge of implementing profound structural change and achieving macroeconomic stability. These goals may conflict insofar as the proposed reforms may jeopardize the financial sector and thereby threaten the stability of the whole economy.

Under the traditional socialist financial system, credit allocation was a by-product of the central plan, and solvency was guaranteed through (more or less explicit) subsidies and distorted prices. Although the reforming countries of Eastern Europe have made progress in dismantling this monolithic structure, they have not yet had time to develop a complete market-based financial system. More immediately, banks inherited loan portfolios have been significantly impaired by the growing insolvency of their borrowers, and their liabilities have been inflated.

In this paper, a model is developed that clarifies the role of banking in centrally planned and emerging market economies, and the nature of the problem associated with bank insolvency in these economies. In an overlapping generations model with long-term investments, the sudden withdrawal of subsidies and the liberalization of prices lead to a brief consumption surge, bank runs, and the premature liquidation of investment. The decapitalization of the economy results in a low level of output and investment for a prolonged period. Similarly, an anticipated decline in returns on existing capital, despite an increase in the return of prospective investments, leads to bank runs, erosion of the capital stock, and persistently low and fluctuating output. In either case, banks individually act in a rational manner in restricting lending and calling in loans, but the aggregate outcome is negative net investment, which perpetuates the disruption. The problem is compounded when each household tries to be the first to withdraw its deposits from the loss-making banks.

The real costs of the reform effort will be increased and perpetuated by failure to mobilize resources to cover the costs of restructuring the banking sector. If higher inflation is to be avoided, these resources can be generated in the short term only by reducing government expenditure and raising taxes, in particular by lowering subsidies to enterprises and imposing consumption taxes.

I. Introduction

The aim of this paper is to analyze the relationship between the state of the financial sector and macroeconomic stability in the countries of Eastern Europe. ^{1/} The focus is on the conflict between the goals of efficiency and stability that reform generates, given the potential for bank insolvency. A major conclusion of the paper is that the real costs of the reform efforts will be increased and perpetuated by failure to mobilize fiscal resources to finance the costs of restructuring the banking sector in a timely manner.

The late 1980s witnessed a radical change in the orientation of the economies of Eastern Europe, with every government in the region announcing its determination to transform its economy from a centrally planned command system to one guided by the tenets of the market. The reform is young, is continuing, and is full of promise. The mammoth transformation process, however, has considerable adjustment costs associated with it. Output has declined sharply and the initial price surge following decontrol has displayed a tendency in most countries to perpetuate itself in high inflation.

The essence of reform is to destabilize the status quo; the essence of stabilization is to keep the "destabilization" within the limits required to introduce and enhance efficiency. Policymakers in Eastern Europe face the challenge of maintaining internal and external balance and revitalizing growth, while dismantling the pervasive planning system. Implementing both profound structural reform and stabilization measures at the same time complicates the design of appropriate policies. Reform measures can neither produce tangible benefits nor be sustained with continued macro-instability; robust stabilization policies on the other hand cannot be pursued for long without addressing the fundamental structural issues. The current state of the banking sector in Eastern Europe provides an important example of the intricate interaction between reform and stabilization: reform measures designed to solve the problem of misallocation of resources through inefficient financial intermediation may generate forces leading to instability unless accompanied by adequate measures to enhance the capital base of the banks.

The strength of banks' loan portfolios depends on the financial situation of their borrowers. During the process of transformation of the socialist economies, relative prices and the business environment have changed in a dramatic fashion and rendered many of the established enterprises more or less explicitly bankrupt. As a result, a large part of the inherited loan portfolio of banks has become of very doubtful quality. Even though there is an almost universal consensus that the efficiency of the economies of Eastern Europe will be enhanced in the long run through

^{1/} In this paper we concentrate on Bulgaria, the Czech and Slovak Federal Republic (CSFR), Hungary, Poland, Romania, and Yugoslavia.

better incentives and an improved allocation of resources, there is great concern about the possible fallout from the prevailing condition of banks. In particular the danger exists that, in the absence of fiscal support, the financial systems in these countries will be unable to cope with the current exceptional disturbances. In turn, a disruption of the banking sector will magnify the negative effects of these disturbances through either a financial collapse and severe output contraction, or a loose monetary stance and high inflation. The implications of the weak balance sheets of banks for reform and stabilization in Eastern Europe have been discussed by Brainard (1991) and Calvo and Frenkel (1991), among others. In this paper we present an overview of reform and financial instability as well as an analytical model with overlapping generations to clarify the nature of the problem associated with bank insolvency in Eastern Europe.

The plan of the paper is as follows. Section II provides a survey of banking activities in centrally planned and emerging market economies, and the interaction between reform and the health of the banking system. A stylized presentation of a generalized banking system and the particular system prevailing in Eastern Europe in the pre-reform period is provided in section III, where some well-known features of those economies, including suppressed inflation, distorted relative prices and sustained subsidization, are modeled. The impact of reforms that radically change the banking environment and returns on real investments is analyzed in Section IV. Section V draws some policy implications and concludes.

II. An Overview: Financial Instability and Reform

1. The banking system

The banking system in the countries of Eastern Europe, introduced along with socialism in the immediate aftermath of World War II, was fashioned after the mono-bank model in vogue from earlier times in the Soviet Union. All banks were nationalized and merged into one single bank known as the National Bank in Bulgaria, Hungary, Poland, Romania, and Yugoslavia and the State Bank in the CSFR. The single bank (the National Bank hereafter) combined the functions of a central bank and commercial bank activities. At the same time, specialized institutions were created to mobilize household deposits, and in the areas of foreign trade and business investment. ^{1/} Measured in terms of number of bank branches per person, banking was not very well developed in Eastern Europe. In October 1989, for example, Warsaw had only 41 bank branches, about one tenth of the density of branches in Western European cities of comparable size.

^{1/} The institution specializing in provision of financial services to households was the (State) Savings Bank in Bulgaria, the CSFR, Hungary, and Poland, and Savings and Loan Bank in Romania. Foreign trade activities were serviced by the Foreign Trade Bank in Bulgaria, Hungary, and Romania, Obochodni Bank in the CSFR, and Bank Handlowy w Warszawie in Poland.

Imbedded in the socialist system, banks in Eastern Europe traditionally provided loans to enterprises necessary to carry out their output and inventory accumulation targets in accordance with the central plan for material production. 1/ Banks were not mandated or motivated to pay great attention to the quality of assets since such quality was determined by the Central Economic Plan through a "carefully" worked out profile of present and future profitability of borrowing enterprises or sustained subsidization. With almost all production activities run and hence guaranteed by the state, the role of asymmetric information and delegated monitoring services in explaining the existence of banks in socialist economies seems to have been limited. 2/ The primary reason for the existence of banks was the irreversibility of long-run investments and the high liquidation costs associated with interruption of any project mid-stream.

Even if an enterprise had money, it could not acquire real resources without permission from the planning agency; any activity detailed in the plan was automatically financed by banks or the government. Only the household sector was not subject to detailed planning, except through rationing of goods. The financial system was characterized by a limited range of assets--mainly currency and bank deposits. Enterprises held financial assets largely in the form of bank deposits, many of which were earmarked; cash holdings were restricted, and utilized mostly for wage payments. 3/ Credit was available as working capital or investment loans from banks. Enterprises also obtained investment funds from budgetary and extrabudgetary fiscal sources, such as State Investment Credit Fund in

1/ Credit to enterprises was often granted by one of the specialized institutions. These specialized institutions in turn funded these loans from the refinance credits from the National Banks. Surplus of household deposits over credit at the Savings Banks was recycled by the National Bank to meet the refinancing needs of the credit institutions. Often these needs exceeded the surplus of household deposits and resulted in large injections of reserve money.

2/ One major focus of the literature on financial intermediation has been the explanation of alternative forms of financial contracts. We do not have to pay attention to the possibility of a variety of contracts as most of these, for example equity contracts, were ruled out in socialist economies by social ownership of the means of production.

3/ Enterprises indeed had very little freedom in cash management; often they could not even shift resources between affiliate branches. The need for the enterprise to have a plan authorization to operate its bank account has led to the "convenient" description of the monetary system in a planned economy as having two semi-independent circuits--one for households and the other for enterprises. The two circuits have obvious overlaps and linkages, and analytically we find it useful to think of the system as an integral one with banks imposing some additional withdrawal restrictions on enterprise accounts in accordance with the central plan.

Bulgaria and the General Investment Fund in Yugoslavia. 1/ In contrast, households received and effected payments almost exclusively in cash and, in the absence of any alternative, deposited their savings in the one and only Savings Bank. The volume of currency was set by the planners at a level necessary to finance wage payments and household consumption. The volume of enterprise credit was set at the level necessary to finance interenterprise transactions in line with the gross production level targeted in the plan.

The method of credit allocation was direct, with the banking system acting as an administrative arm of the planning organ. Full administrative control over prices, wages and quantities was taken for granted, and the State, as the owner of all means of production, received all profits and losses of every enterprise and bank. Hence the interest rate was motivated either by the administrative efficiency of an overt remuneration for intertemporal substitution, or by deviations in actual economies from a perfectly functioning planned socialist system. The rates of interest had little relation to the return on capital or the maturity structure of loans, and played a insignificant allocative role.

The daunting task of drawing up a consistent inter-sectoral central plan in a complex economy, and the growing divergence between command and response in a system with ill-designed incentives, over time led to an emphasis on decentralized decision making. 2/ In the banking sector, this decentralization manifested itself first in the breaking up of the monobank model into a two-tier banking system, with the creation of a traditional central bank and hiving off the nongovernmental loan portfolio of the erstwhile monobank to several commercial banks. Yugoslavia, like in many other areas, was a pioneer in this regard and abolished the monobank system in 1954. The other countries initiated the two-tier system only in the late 1980s and early 1990s. 3/ In 1987, Hungary transferred the commercial banking activities to three large banks, while Bulgaria established eight commercial banks. In both these countries the banks had broad sectoral concentrations. At the beginning of 1989, Poland established nine commercial banks of roughly equal size organized on a regional basis. The CSFR set up three independent banks at the beginning of 1990: two commercial banks organized on a regional basis and an investment bank. Since December 1990, Romania has transformed its National Bank into a

1/ With both banks and enterprises belonging to the public sector, the distinction between fiscal and credit financing of enterprises is an artificial one in a socialist economy. However, given that at the time of the breakup of the monobank into a two-tier banking system, the nongovernmental loan portfolio has been hived off to several commercial banks points out that the bank loans were loans and not grants.

2/ "It has been quipped that, to prepare a plan for next year which was fully balanced and disaggregated, with the help of computers, might take 30,000 years." See van Arkadie and Karlsson (1991), p. 135.

3/ See Sheng (1991) for an overview of the banking system in these economies.

traditional central bank, and established the Romanian Commercial Bank to hold the National Bank's commercial and deposit portfolio. Romania also transformed the specialized banks into commercial banks.

At the end of the 1980s, almost all the governments of Eastern Europe had committed themselves to the development of an autonomous, sound, competitive, and profit-oriented financial sector to facilitate an efficient distribution of credit and hence resources across sectors, territory and time. The financial sector reform required for such a transformation entails the resolution of a host of legal, organizational, and technical issues. 1/ For example, the appropriate laws must be passed, licensing, regulatory and prudential control systems established, the necessary manpower trained and appointed, and so on. The ongoing process of transformation will take years to complete.

2. Interaction among reform, instability, and banking insolvency

a. Reform and instability

Financial sector reform in these countries was initiated against the background of general economic malaise and crisis. Most economies in Eastern Europe have suffered from chronic excess demand, as witnessed by quantity rationing, queues, bribery of shop assistants and service personnel and low or zero retail stocks, rather than in immediate inflation and current account pressures. The root cause of the shortages was microeconomic and structural. State ownership of all means of production and the lack of material incentives led to wasteful use of energy, material inputs and labor, while emphasis on planned adjustment of quantities without adequate adjustment of relative prices led to supply bottlenecks and misallocation of resources.

The microeconomics of the system interacted with its macroeconomic aspects. First, there was, and in some economies there continues to be, an inflationary overhang or forced savings. Second, the conscious effort to maintain a domestic price structure very different from the corresponding international one, led to highly overvalued currencies. 2/ Slippages in plan implementation resulted in external deficits and a buildup of external debt. Third, the priority attached to quantitative plan fulfillment relative to financial targets led to "planners' tension" or "taut" microeconomic plans whereby output targets are maximized subject to constraints on planned inputs and technical coefficients. This in turn resulted in "...more fixed-capital formation to be planned within any given

1/ For a good discussion of these issues see Sundararajan (1990).

2/ The differentiated domestic price structure was chosen to support egalitarian domestic goals and was sustained by granting a monopoly on foreign trade to a state agency which acted as a vacuum lock between the domestic and international markets.

rate of saving by reducing the inventory-to-output ratio," ^{1/} and excessive vulnerability of the system to exogenous supply failures. Fourth, the emphasis on quantitative output targets and protection of full employment in an environment of virtually fixed prices entailed widespread supplementation of enterprise revenues by budgetary subsidies and bank credit. ^{2/}

During the 1980s the growing inefficiency of the system, adverse external shocks, and various attempts at partial reform worsened the macroeconomic imbalances in these economies. ^{3/} The introduction of more substantial and comprehensive reforms, starting in the late 1980s (the lifting of price controls, realignment of exchange rates to restore international competitiveness, and partial liberalization of external trade) exposed and intensified the conflict that reform generates between the goal of efficiency in the medium term and stability in the short term.

Table 1 reports inflation, current account balances, and income growth in the countries of Eastern Europe during 1980-1990. As can be seen, inflation became a persistent problem from as early as 1981 in Poland and Yugoslavia, and in Hungary, to a lesser extent, since 1988. Inflation accelerated markedly in all countries in 1990. Developments in the external positions of the Eastern European countries were more varied; Hungary and Poland, which were furthest along the path of reform but also two of the most burdened by external debt, managed to reverse their persistent current account deficits in 1990; the other countries suffered a sharp worsening of their external positions. Real growth has been poor in all six countries since the mid-1980's, and large falls were experienced everywhere in 1990. Preliminary data for 1991 suggest that these tendencies have if anything worsened for most of the countries, and that these economies remain severely disrupted. This instability, in turn, has diminished both the tangible benefits from and euphoric popular enthusiasm for reform.

^{1/} See Kaser (1990), p. 601.

^{2/} This is a phenomenon of "soft budget constraint" a la Kornai.

^{3/} According to Kaser (1990): "...shortage can be exacerbated through the Barro-Grossman supply multiplier..., whereby labor is withdrawn when leisure has greater utility than the available bundle of consumer goods and services and of saving for purchases in future periods." The adverse external shocks include the oil price shocks and the increases in interest rates in world financial markets. For examples of partial reform, see the New Economic and Financial Mechanism introduced in Romania in 1979, the legislations introduced in Poland in 1981-82, and in Bulgaria and Czechoslovakia in 1987. Yugoslavia has experimented with various reform measures within the confines of the principle of self management since the mid-1970s, and in 1968 Hungary began to implement price and structural reforms.

Table 1. Eastern Europe: Some Selected Macroeconomic Indicators

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Rate of Inflation ^{1/}											
Bulgaria ^{2/}	14.0	0.5	0.3	1.4	0.7	1.7	2.7	2.7	2.5	6.4	26.3
Czechoslovakia	2.9	0.8	5.1	0.9	0.9	2.3	0.5	0.1	0.2	2.3	10.8
Hungary	9.3	4.6	7.2	7.4	8.4	7.8	5.2	8.4	16.1	17.1	30.1
Poland	9.4	21.2	100.8	22.1	15.0	15.1	17.7	25.2	60.2	251.1	585.8
Romania	1.5	2.2	16.9	5.2	1.1	-0.4	2.0	0.5	2.9	0.6	4.7
Yugoslavia	...	46.2	29.4	39.1	56.8	75.7	88.1	118.7	198.9	1,258.1	583.8
Current Account Balance											
(In millions of U.S. dollars) ^{3/}											
Bulgaria	953	92	115	6	503	-147	-1,035	-710	-144	62	-751
Czechoslovakia	...	225	557	848	955	937	168	371	1,093	939	-1,310
Hungary	-577	-893	-534	-180	39	-455	-1,362	-676	-572	-571	377
Poland	-3,417	-3,986	-1,941	-1,581	-1,083	-982	-1,106	-379	-107	-1,409	3,067
Romania	-2,420	-833	1,040	1,160	1,719	1,239	1,489	2,043	3,922	2,514	-3,254
Yugoslavia	-2,317	-959	-473	275	478	833	1,100	1,248	2,487	2,427	-2,364
Real GDP Growth											
Bulgaria ^{4/}	...	5.0	4.2	3.0	4.6	1.8	5.3	4.7	2.4	-0.3	-12.0
Czechoslovakia ^{5/}	2.9	-0.1	0.2	2.3	3.5	3.0	2.6	2.1	2.3	0.7	-1.1
Hungary	0.2	2.9	2.8	0.7	2.7	-0.3	1.5	4.1	-0.1	-0.2	-4.0
Poland ^{6/}	...	-10.0	-4.8	5.6	5.6	3.4	4.2	2.0	4.1	0.2	-12.0
Romania	4.0	6.0	5.9	-0.1	2.4	0.8	-0.5	-5.8	-7.9
Yugoslavia ^{7/}	2.3	1.5	0.4	-1.1	1.9	0.5	3.5	-1.0	-2.0	0.8	-7.5

^{1/} Relates to year-on-year average inflation in retail or consumer price index.

^{2/} Relates to only retail prices of goods prior to 1990. The methods of calculating the price index are different for 1980-85, 1986-89, and 1990.

^{3/} Refers to global balance of payments.

^{4/} Growth in net material product at constant prices, as reported in membership paper and RED.

^{5/} Growth in net material product at constant prices, as reported in Prust et. al. (1990).

^{6/} Figures prior to 1986 from "Rocznik Statystyczny 1990", Rok L. Warszawa, pg. 113.

^{7/} Growth in gross social product for 1989 and 1990.

Given the steep decline in output experienced in the countries of Eastern Europe in the recent past, there is an urgent need to create a system that preserves and promotes economic activities that yield positive value added. A financial collapse should not be allowed to destroy whatever viable enterprises have been inherited over from yesterday's socialism and prevent the emergence of new enterprises. Calvo and Frenkel (1991) have underscored the importance of this point by emphasizing the need to "...delink the fortunes of enterprises that ought to go out of business from those that should continue operations".

b. Reform and bank insolvency

Even prior to the launching of the bold reforms, many banks in Eastern Europe had dubious portfolios. Many of the loans were nonperforming and rolled over after capitalization of interest. The losses on account of quasi-fiscal operations such as subsidized selective credit operations or valuation losses on account of exchange rate movement were carried in the books for years as assets under "other items, net". At the time of the break up the monobank model and the setting-up of the commercial banks, the assets transferred to the commercial banks were not cleansed of non-performing loans and many of the banks had solvency problem from the outset. The reform has only revealed and compounded a long-standing problem. Price decontrol, trade liberalization, and exchange rate adjustments have led to dramatic shifts in relative prices in the course of the reform. "Profitable" enterprises have almost overnight turned into lossmakers. ^{1/} Consequently, banks' balance sheets suffered an equally dramatic deterioration.

Banks in many of these countries have also been seriously affected by devaluations because of their foreign exchange exposure. Banks had borrowed heavily, either abroad or domestically, in the form of foreign currency deposits, and on-lent domestically in local currencies. Typically the rate charged on such credits was considerably less than the rate applicable on foreign currency borrowing plus the rate of currency depreciation. During the pursuit of international competitiveness through devaluations, undertaken as part of the reform process, the failure to achieve ex-post uncovered interest rate parity added greatly to the losses accumulating on the balance sheets of banks. It is estimated, for example, that the devaluation of the leva in Bulgaria from lev 0.8 per US\$1 (official rate) to leva 3 per US\$1 in May 1990 resulted in commercial bank losses of some leva 20 billion (or about one half of 1989 GDP). Similarly, in Poland the rapid depreciation of the zloty has led the zloty value of foreign liabilities of the banking system to exceed the net domestic credit of the

^{1/} See Hughes and Hare (1991) for a detailed microeconomic analysis of how profitability changes due to the removal of distortions through liberalizations.

banking system by about 6 times at the beginning of 1990. 1/ In Hungary, accumulated valuation losses on account of foreign exchange operations amounted to as much as 27 percent of total National Bank assets in 1990.

The reforms have also profoundly affected the character of money and credit. Under the traditional socialist system, monetary assets served largely as a means of accounting. With price decontrol and partial or total removal of rationing, households have found alternative uses of money and the rates of interest have had to be raised to entice them to leave their money with the banks. Given the state of past loans granted at fixed, preferential rates of interest, the increase in deposit rates implied greater losses for banks. 2/ 3/ Even when the rates could be recontracted, the deterioration in the economic prospects of the borrower often implied a greater chance of delinquency in the near future.

c. The feedback from bank insolvency

The weak balance sheets of banks have had unfavorable consequences. First, given the demand for "distress borrowing" from enterprises, and in the absence of new, well-capitalized banks with clean balance sheets, existing banks could increase spreads between lending and deposit rates and/or offer negative real rates of return on deposits. 4/ These trends in interest rates in turn has penalized efficient borrowers, including the emergent private sector, and complicated the pursuit of tight monetary policies, either because lending rates are perceived to be "too" high (and political pressures mount to ease monetary policy), or because deposit rates

1/ In September 1991 the State Treasury indemnified the banking sector for losses incurred on foreign currency deposits with dollar-indexed bonds worth more than U.S. dollar 5 billion.

2/ One example of such loans is the "credits on permanently rolling over inventories" in CSFR, the so-called TOZ loans granted at the rate of interest of 6 percent with indefinite maturity.

3/ Part of this problem was solved in some of the countries by recontracting past loans, sometimes in ingenious ways. For example, in Hungary, housing loans were granted at preferential rates ranging from 0.0-3.5 percent prior to 1989. A new tax was imposed in 1990 on the holders of these mortgages to finance these subsidies. From January 1, 1991, the pre-1989 mortgage loan debtors could choose between either having the interest rate raised to 15 percent or having half of the outstanding loan forgiven while the other half would bear market rates.

4/ In Bulgaria, for example, in December 1990 six-month deposits paid 3.5 percent while loans to enterprises carried interest charges of 4.3-5.8 percent. The corresponding rates in CSFR were 3.3 percent and 9 percent, respectively, in Hungary 19 percent and 32.1 percent, in Poland 53-62 percent and 54-68 percent, in Romania 5 percent and 5 percent, and in September 1990 in Yugoslavia 8-17 percent and 18-40 percent.

are "too" low and there is insufficient saving. 1/ Second, the weakening of banks' balance sheets, effectively reducing or even eliminating their capital and reserves at risk, has tended to promote lending practices that increase the riskiness of the banks' portfolio. This moral hazard problem has arisen because each bank expects that losses will be borne ultimately by the depositors or the deposit insurer, namely the central bank or the government, while only extraordinary gains could restore the institution. The least creditworthy borrowers can manage to pre-empt the available loanable funds by being willing to pay the highest rate of interest. 2/ In the absence of rigorous prudential regulations, there is no effective way of countering the reduced incentive in insolvent banks to appraise new loans in a careful manner.

Many of the countries in Eastern Europe have already embarked on loan classification of bank portfolios, while the others are planning to start the process in the near future. No definite estimates of the impaired assets of banks exist as yet. In the meantime, however, the financial distress in the banking sector has already resulted in the extension of support from the fiscal and monetary sectors. In Bulgaria, for example, the outstanding stock of foreign debt of the Foreign Trade Bank has been fully serviced by the Government in recent years until a moratorium began in mid-1990. An initial state subsidy of around Ft 30 billion was granted to the banking system in Hungary when the two-tier banking system was created at the end of 1987. The subsidy was to cover the discrepancy between the book value and the underlying worth of the transferred claims on borrowers. Furthermore, the outstanding stock of concessional housing loans from the National Savings Bank of Hungary was exchanged for bonds with market-related yield by a public sector housing fund, with the losses covered by budgetary transfers. In the CSFR, in March 1991 a new agency, the Consolidation Bank, was created to take over Kcs 110 billion of the permanently revolving credits for inventories extended by the banks at 6 percent interest and no maturity date. These loans were replaced by eight year claims on the Consolidation Bank with an interest rate of 13 percent. 3/ In Poland, the extrabudgetary Foreign Debt Servicing Fund (FOZZ) has been used to disburse subsidies to Bank Handlowy for servicing the foreign debt of the banking system since 1986. 4/

1/ This problem of insufficient saving because of inadequate returns becomes particularly acute when quantity rationing, the chief instrument of generating forced saving, is abandoned in favor of more market-based distribution mechanisms.

2/ See Stiglitz and Weiss (1991).

3/ On its liability side, the Consolidation Bank took a portion of the banks' liabilities to the State Bank and the deposits of the Savings Bank. The assumption is that the TOZ loans to enterprises will be renegotiated to definite long maturities and commercial rates to solve the problem without any need for subsidies to the Consolidation Bank. By isolating and concentrating the problem in one bank the Government, however, may have also provided an implicit guarantee about its resolution.

4/ The FOZZ was liquidated in January 1991.

In Romania, "...at end-1989, an estimated lei 300 billion (almost 40 percent of 1989 GDP) of outstanding bank loans were classified as unserviceable", of which in early 1990 lei 265 billion were written off against accumulated government deposits from past fiscal surpluses and another lei 125 billion refinanced by the National Bank of Romania. 1/ In December 1989 the Federal Government of Yugoslavia took over the accumulated valuation losses (valued at about Din 130 billion) of the National Bank as its own public debt and in 1990 made a budgetary provision of Din 3.1 billion for the newly established Bank Rehabilitation Agency.

The medium-term solution to the above problem is to rehabilitate the banks and to remove the nonperforming loans through recapitalization and/or fiscalization of losses. But this raises questions about sequencing: does it make sense to resolve the stock problem before the problem of continued losses in enterprises which banks are under pressure to finance? It also raises questions about interest rate liberalization: should there be a ceiling on interest rate spreads? These questions are addressed and other possible solutions are discussed in Section V. But prior to that, Sections III and IV provide a stylized theoretical representation of the problem.

III. A Theoretical Framework

In this section a model of banking in socialist economies is developed to capture the basic function that banks fulfilled in these economies, namely, converting illiquid assets into liquid assets. The basic model belongs to the genre developed by Bryant (1980), Bryant and Wallace (1980), Diamond and Dybvig (1983), Williamson (1987), and Jacklin and Bhattacharya (1988). Simplifications and an emphasis on long-run phenomena are accepted in order to concentrate on the special features characteristic of socialist economies introduced into the model. 2/

1. The Basic Model

a. Banks not only provide transaction services but also fulfill a supervisory function by exploiting their superior access to information about their clients, and serve to spread risks. But perhaps most importantly, banks transform short-term liabilities into long-term assets to satisfy the demands of both consumers and enterprises. Banks therefore

1/ Demekas and Khan (1991), pp. 14 and 28. Although in purely technical terms the effect of the writing off of bad loans against accumulated government deposits is equivalent to that of a money-financed writing off, due allowance should be made to the stringently contractionary policies by Romania under the Ceausescu regime.

2/ In light of the persistent disturbance observed in Eastern Europe in recent year, the attention devoted to "equilibrium" in the first parts of this section may indeed appear as odd. We, however, find this "equilibrium" essential to serve as a reference point for the disequilibrium discussed later.

depend on their ability to attract a continuous inflow of deposits and to recover loans from borrowers. Hence the stability of a banking system depends on expectations about the continued solvency of the constituent parts of the system. When confidence in the banking system is weak, intermediation will be difficult or impossible, and investment financing will be hard to obtain. Output will suffer, with a suboptimal capital stock and limited opportunities for intertemporal substitution. A temporary decline in confidence can lead to a bank run, which in turn can have deep and lasting real effects as borrowers are forced into liquidation, investment lending is shut down, and the expectation of future bank solvency is undermined.

b. Time is discrete and indexed by t ; time subscripts are dropped whenever ambiguity is not thereby created; there are an infinity of periods. All agents are sufficiently small that each takes prices and the behavior of others as unaffected by his own decisions.

A cohort, of constant size, is born each period and lives for two periods. The young receive an endowment $E_t = aE_{t-1}$, $a > 1$, of the investment good, and may inherit any financial assets of past generations that have not been disposed of. Only the old consume. 1/ Each unit of the endowment can be converted into K units of the consumption good or sold to firms. Thus the investment good is an input which may even be interpreted as labor. 2/ Neither the investment nor the consumption good can be stored as inventory. An investment of I yields sI units of the consumption good after one period and SI units after two periods. It is interesting to concentrate on the case where $S > K > s$, $S > 1$. The capital stock depreciates entirely after two periods. There is a government which absorbs G_t of the consumption good, where G_t is a fixed proportion $\gamma < 1$ of the final consumption in the economy in any period. 3/ Government consumption is financed by seignorage, which adds ΔM_t to M_t , the stock of outside money at the start of the period.

Banks hold cash and loans to firms as their assets and their liabilities consist of nontradable demand deposits. Banks provide an intermediation service which transforms short-term savings into long-term

1/ Relaxation of this assumption and allowing for intertemporal substitution in consumption introduces complications which may be addressed in further research.

2/ The means of direct conversion of the investment good into K units of consumption goods can be thought of as an alternative production process taking place in the kitchen garden.

3/ None of the results below depend importantly on this specification of the government's expenditure rule. Note that in purely theoretical terms the introduction of government expenditure is not explicitly related to the need to provide a public good or to the need to correct any market failure, and only provides an easy route for increasing money supply in the model over time. Without an increasing money supply, the expanding economy would experience continuous deflation.

investments. Note that by the time the investment matures an individual alive when it was undertaken is dead. Individuals can only hold cash or deposits as stores of value, and no individual can "go short" in any asset. In notation, banks in period t lend an amount B to firms, which promise to repay LB at time $t+2$ if they are able. The loan is "callable", in that the bank can demand its money back after one period; if all banks call in the loans of a firm, they receive at most the liquidation value of the firm. A deposit made at time t can be redeemed at $t+1$ with a gross yield R if the bank is not in financial difficulties; if a bank cannot honor all claims, its creditors divide the available resources in proportion to their claims.

All transactions in the goods market are conducted in cash. The consumption good has a price p and the investment good costs q per unit. In each period the goods and financial markets operate according to the following pattern: banks can lend what cash they initially have on hand to firms, which are then able to buy the endowment from the young for investment; the young may deposit their income with the banks, which are then able to meet withdrawals of deposit plus interest by the old; the old and the government buy the output of firms (and any of the consumption good directly provided by the young), so firms receive the cash with which to repay loans to the banks. All going well, banks will have cash on hand at the start of the next period. The pattern of transactions in the economy is depicted in Figure 1.

2. Two Equilibria

a. The "good" equilibrium: One Nash equilibrium of this economy is characterized by successful, sustained intermediation. Prices are flexible. Each period the banks begin with a stock of money M_t , which they lend to firms to buy the endowment; the entire money stock is spent purchasing the quantity of the investment good E_t , which must, by an accounting identity, achieve a per unit price of $q_t = M_t/E_t$. The young deposit M_t with banks, confident that their deposits are safe. The banks can then pay out M_t on deposits to the old, who along with the government buy the output of mature investments made two periods ago. Output is $C_t = SE_{t-2}$, of which the government buys a share γ . Since consumers spend M_t on the purchase of $(1-\gamma)C_t$ of the consumption good, its price must be

$$p_t = \frac{M_t}{(1-\gamma)SE_{t-2}} .$$

The young have no incentive to convert their endowment directly into the consumption good provided that $p_t K < q_t$. Given p_t , government consumption $G_t = \gamma SE_{t-2}$ and the government's budget constraint $\Delta M_t = p_t G_t$, it is easy to establish that $M_{t+1} = M_t + \Delta M_t = M_t/(1-\gamma)$ and $p_{t+1} = p_t/a(1-\gamma)$. ^{1/} Without government consumption supported by seignorage, and with positive

^{1/} Note that the government determines its desired consumption and is then a price taker.

growth, the economy would experience continuous deflation. The government generates positive inflation in the economy whenever $a < (1-\gamma)^{-1}$. Firms repay the banks with their earnings $M_t + p_t G_t = M_{t+1}$, so banks will be liquid at the start of the next period. The banks can pay depositors and charge borrowers a nominal, one period gross return of $R = 1/(1-\gamma)$ while $L = M_{t+1}/M_{t-2} = 1/(1-\gamma)^3$, and the real gross return per period equals the growth factor a .

Typical time-paths of investment, consumption, and input and output prices are shown in Figures 2(a) and 2(b). The economy grows and prices inflate steadily, with the entire endowment being invested each period. ^{1/}

Cash, that is, "outside" money, may seem to play a minor role in the model because all equilibrium transactions could as well be conducted by check and only banks are motivated to hold cash from period to period. However, the availability of cash as store of value will be important in other possible equilibria or when the economy is in transition between equilibria.

b. The "bad" equilibrium: Another Nash equilibrium exists, characterized by autarky and the absence of intermediation and therefore of investment. Each period the young all convert their endowment into the consumption good, which is bought by the older cohort using their cash holdings. The available supply of the consumption good each period is KE_t , of which the government consumes γKE_t . Since the old spend their entire wealth on the consumption good, their budget constraint implies that

$$p_t = \frac{M_t}{(1-\gamma)KE_t}.$$

None of the endowment is left over for investment. The young use only cash as a store of value and there is no intermediation.

For this to be a Nash equilibrium, it must be that no individual wishes to deviate from it, given the behavior of others. Suppose that an individual decides at time t to deposit his earnings with a bank, which then would be able to lend to firms to purchase some of the investment good. If everyone else holds cash and at $t+1$ the endowment will again be converted into the consumption good, and taking the price level as given, the individual who places his money on deposit will receive a gross return of at most p_{t+1} s next period because, to honor his claim, the bank will have had to call in its loans early and real investments will have to be liquidated prematurely. But using the banks will be dominated by holding cash when $p_t K > p_{t+1} s$. If inflation is not too high, no individual will be motivated to break the autarkic equilibrium and banks never have any liquidity to lend to firms; the "bad" outcome is a Nash equilibrium. Because investments are

^{1/} This and subsequent figures are based on the parametrization of the model: $a = 1.04$; $S = 1.20$; $s = 0.15$; $K = 0.85$; $\gamma = 0.18$.

Figure 1
Flow of funds

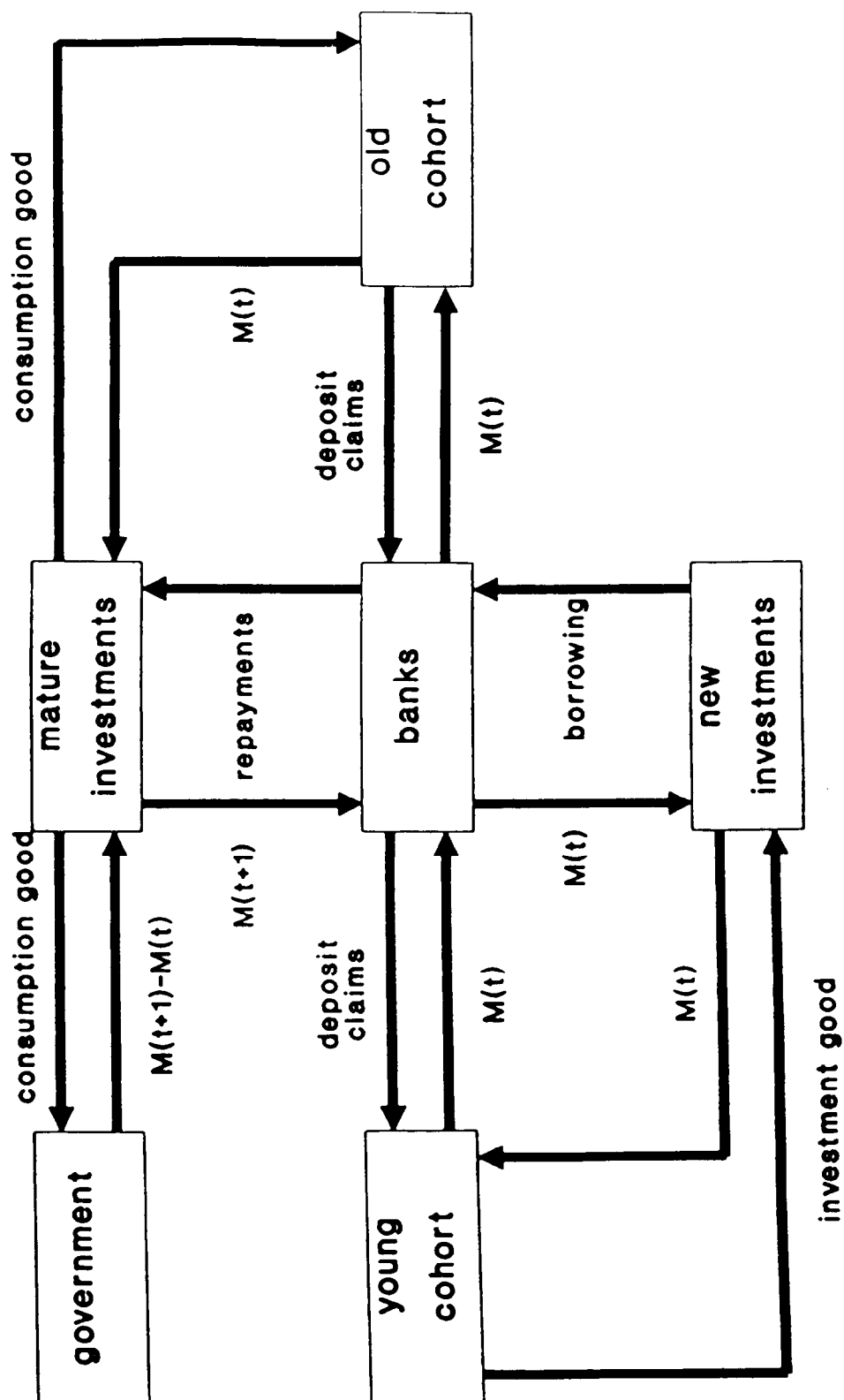
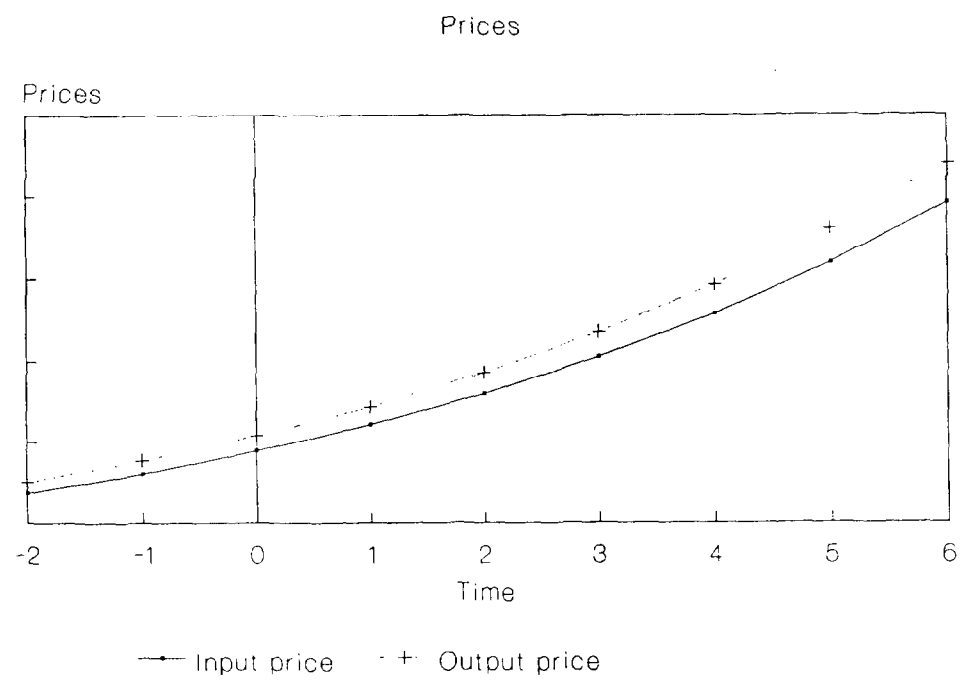
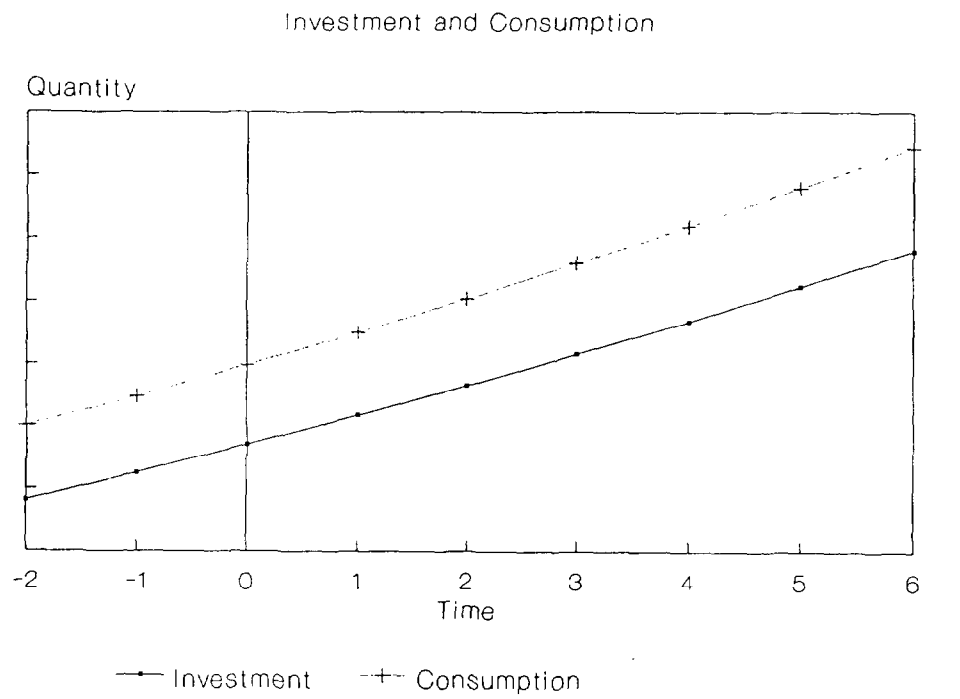


Figure 2
The "good" equilibrium



long-term, confidence in banks depends on the soundness of their portfolio of existing loans and assets, not on the long-term potential profitability of new investments.

Notice that, as long as $(1-\gamma)S > Ka^2$, direct conversion of the investment good into the consumption good is sufficiently inferior to its conversion through the technology in the firms, and therefore just two possible Nash equilibria in pure strategies are possible: the intermediated economy and the autarkic economy. Suppose that there were a third equilibrium that stands between the other two. Every period the young hold back a fraction Φ , $0 < \Phi < 1$, of their endowment to convert directly into the consumption good and to sell to the old generation. Output from mature investments is $(1-\Phi)SE_{t-2}$ and the young provide a further ΦKE_t of the investment good. Setting expenditure by the old cohort divided by the quantity they consume equal to price yields

$$P_t = \frac{M_t}{(1-\gamma)[(1-\Phi)SE_{t-2} + \Phi KE_t]} .$$

Firms, having borrowed M_t , buy up the residual supply of the investment good, implying a unit price of $q_t = M_t/[(1-\Phi)E_t]$.

An individual young person must have no incentive to change his behavior, taking prices and the behavior of others as given, for this to be an equilibrium. He chooses the share $(1-\phi)$ of his endowment to sell to firms and the share ϕ to convert directly into the consumption good so as to maximize his income $(1-\phi)q_t + \phi Kp_t$. If an equilibrium obtains, $\phi = \Phi$. As the problem is linear, an interior solution with $0 < \phi < 1$ requires $q_t = Kp_t$. 1/ Substituting the expressions for q and p and rearranging, we obtain

$$\phi = \frac{(1-\gamma)S - Ka^2}{(1-\gamma)S - Ka^2 - (1-\gamma)Ka^2} .$$

But by assumption $(1-\gamma)S > Ka^2$, so $\phi > 1$, which is impossible. Hence there is no third equilibrium. With the available technology favoring long-term investment, the young have an incentive to supply as much of the investment good as possible if the banking system is operational.

3. Subsidies, Monetary Overhang, and Suppressed Inflation

It is widely accepted that the socialist economy of Eastern Europe had evolved into a system of rationing, controlled prices and subsidization through the financial system. In this subsection a representation of such a system, which is fully intermediated by a banking sector, will be developed.

1/ This concept of an interior solution will be useful later.

The traditional socialist financial system was, as it were, locally stable, in that government manipulation of administered prices, fixed interest rates, and the provision of subsidies ensured the continued liquidity of all institutions. The sustainability of the system, however, was undermined by the growing discrepancy between the stocks of banks' assets and liabilities, and by the widening gap between administered and world market prices.

Banks start some period t with M_t , which they lend to firms at a two period rate of interest L . Firms receive in addition a "quasi-fiscal" subsidy $\pi_1 M_t$ from the monetary authority, and use their combined liquidity to bid for the investment good, the price of which is flexible; in equilibrium price equals expenditure divided by quantity, so $q_t = M_t(1+\pi_1)/E_t$. 1/ 2/ The firms end every period with zero net worth and the subsidy $\pi_1 M_t$ measures the losses incurred in their operations measured at the prevailing prices.

With a positive interest rate on deposits ($R > 1$), the young prefer to place their cash income with the banks, which are therefore able to meet withdrawals by the older generation. To determine the rate of interest on deposits it is assumed that the banks must have just enough cash on hand to meet all potential withdrawals: the current old generation deposited $M_{t-1}(1+\pi_1)$ in period $t-1$, which has since grown by a factor R ; the bank now holds $M_t(1+\pi_1)$ in liquid form; hence with a constant rate of subsidization the interest rate just equals the rate of growth of money supply from period to period ($R = M_t(1+\pi_1)/M_{t-1}(1+\pi_1) = M_t/M_{t-1}$).

The price of the consumption good is fixed artificially low at \hat{p}_t , which is always below the market-clearing price. The government still buys a fraction γ of the available supply (SE_{t-2}) of consumer goods at the low price. Hence the money supply must be increased by an additional amount

$$\hat{p}_t \gamma SE_{t-2} = \pi_{0t} M_t$$

to finance public consumption. The old are rationed in the market for the consumption good and therefore cannot spend all their wealth; they need actually withdraw only $\hat{p}_t(1-\gamma)SE_{t-2}$ from the banks to make what purchases they can. Their remaining deposits are bequeathed to the young of period t . Firms earn $\hat{p}_t SE_{t-2}$ in revenues with which to repay banks their debt service

1/ Subsidies are not fully motivated within the model, but they may be the product of a political process that favors seemingly generous rewards to factors of production. One may think of q_t as the wage rate that is continually raised despite the absence of productivity gains or an elastic supply of consumption goods.

2/ Taxes have not been introduced in the model to preserve its simplicity. Without taxes there is no possibility of modeling more conventional types of subsidy, e.g., payments directly from the budget. Introduction of such subsidies, however, only strengthens the results reported in this paper.

obligations LM_{t-2} . The banks end the period with cash holdings of $M_t(1+\pi_{0t}+\pi_1) = M_{t+1}$. ^{1/}

A few features of this economy with subsidies to firms and suppressed inflation are noteworthy. First, the input market is not rationed and $q_t/q_{t-1} = (1+\pi_{0t-1}+\pi_1)/a$, so the price of the investment good inflates as long as the money supply grows faster than the endowment.

Second, were there no rationing in the goods market, the market clearing price would be given by

$$p^*_t = \frac{(1+\pi_1)M_t}{(1-\gamma)SE_{t-2}}.$$

Thus, the market clearing price also grows at the same rate as the input price. A natural definition of suppressed inflation is

$$\frac{p^*_t}{\hat{p}_t} = \frac{\gamma(1+\pi_1)}{(1-\gamma)\pi_{0t}}.$$

Thus if \hat{p}_t is not adjusted by an average factor of $[1+\pi_{0t-1}+\pi_1]/a$ per period, seigniorage as a share of the outstanding money stock approaches zero and the degree of suppressed inflation becomes infinitely large. A very large degree of suppressed inflation encourages black-markets and threatens a sudden collapse into the autarkic mode with endowments directly converted into the consumption good by the inefficient kitchen-garden technology. If the system is to survive, controlled prices must be inflated. Henceforth it will be assumed that \hat{p}_t is indeed suitably adjusted and that π_{0t} is constant.

Third, the "forced" bequests by the older generation, which equal the excess of savings over expenditure

$$RM_{t-1}(1+\pi_1) - \hat{p}_t(1-\gamma)SE_{t-2} = M_t(1+\pi_1) - (1-\gamma)\pi_{0t}M_t/\gamma$$

is a measure of the "monetary overhang", the relative amount of excess liquidity which will put pressure on the goods market if prices are liberalized.

^{1/} Note that here seigniorage supports two different policies, namely subsidies to firms and government consumption. The part of seigniorage that supports government consumption ($\hat{p}_t G_t$) is given to firms in exchange for goods when the goods market meets at the end of the period and accounts for the growth in money supply during the second half of the period from $M_t(1+\pi_1)$ to M_{t+1} .

IV. Immediate Response to Liberalization

Although there is an almost universal consensus that eventually there will be a sustained upsurge in economic activity in Eastern Europe in response to liberalization, there are large costs to shifting economies from a socialist hierarchy to a market-based system. This section is concerned with one particular source of this non-monotonicity of the dynamic response, namely the financial sector.

The banking system is assumed to have been decentralized and broken up into separate relatively small banks at the beginning of the reform process. ^{1/} For clarity of exposition, two phenomena associated with the reform process will be dealt with in turn: (1) the removal of price controls and subsidies, and (2) a decline in the rate of return on preexisting projects and a simultaneous emergence of superior "technology". We regard both these developments as important features of the reform effort either already undertaken or under way in Eastern Europe. While the effects of these developments are not at all independent of one another, it is useful to distinguish between the transformation of the financial environment faced by enterprises, and the technological, "real" shocks that have impinged on them.

1. Withdrawal of Price Control and Subsidies

a. The limitation of subsidies to enterprises and the liberalization of prices can be considered in the first instance a distributional disturbance; profitable sectors that were heavily burdened before and those who lost through the inflation tax are to gain at the expense of those sectors that were used to receiving budgetary or quasi-fiscal transfers and benefiting from other privileges. Despite freed prices, the latter may become illiquid or even insolvent. Their bankers in turn may be forced to demand the liquidation of their assets, but even so banks may face their own liquidity crisis. Existing capital may be destroyed and new investment may go unfinanced as each individual, bank and enterprise strives to maintain its own position. The spread between lending and deposit rates increases, if financing is available at all. While negative net investment may sustain consumption for a time, the multiplier effect of the banking crisis and its long-term effect on the capital stock can be severe. Recovery may be slow and halting, and relative prices may remain far from their long-run equilibrium as demand for inputs remains low.

b. Suppose that at the start of some period t the government decides to stop all subsidies and to liberalize prices. Then, as will be shown, a Nash equilibrium outcome is for the banks not to lend for new investments, the young to convert their endowment into the consumption good, all loans to be called in during period t , and for output to fall drastically and recover slowly. ^{2/}

^{1/} See section II.1.

^{2/} The uniqueness of this equilibrium has not yet been established.

Start with the old in period t . In an effort to purchase as much as possible of the consumption good they will wish to withdraw the whole of their deposits, which amount to a claim of $M_t(1+\pi_1)$ on the banks. 1/ But the banks certainly cannot have enough cash on hand, because the government has stopped the subsidy to firms and the entire supply of "outside" money is fixed at only M_t . In this sense there is a rational bank "run". Each individual bank will try to generate liquidity to honor its obligations, first by eliminating lending at the start of the period to preserve its initial cash holdings, and then by calling in loans made in period $t-1$. 2/ The investments liquidated after one period yield an output of sE_{t-1} .

For every bank acting alone, restricting lending and calling in loans is wise, but for the system as a whole the price level falls as the supply of the consumption good increases, so banks can never acquire enough liquidity. Indeed, from a global point of view the banks could lend to the firms at the start of the period and get back liquidity in the form of deposits from the younger generation, but each single bank is afraid that what it lends will end up as deposits with other banks. 3/ Investment financing is unavailable at any price.

With no lending for investment, the young of period t see no demand for their endowment unless they convert it into the consumption good. Total supply of the consumption good in period t is

$$C_t = [SE_{t-2} + sE_{t-1} + KE_t],$$

made up of the output of mature investments, liquidated early investments, and the transformed endowment. The old have benefitted from the transformation of capital into consumables, but there is no capital left to produce the consumption good in periods $t+1$ and $t+2$. 4/ The budget constraint of the old determine the price of the consumption good as

$$p_t = \frac{M_t}{(1-\gamma)C_t} = \frac{M_t}{(1-\gamma)[SE_{t-2} + sE_{t-1} + KE_t]}.$$

Note that the consumption good is certainly priced below what it would be, given the money supply, in the baseline equilibrium with successful intermediation, because its supply has temporarily increased. It is quite

1/ A bequest motive could be introduced into the model; it is sufficient that the old wish to withdraw somewhat more than under the controlled-price regime for the model to generate a financial crisis.

2/ Firms are assumed to have de facto limited liability.

3/ In this context, the assumptions that the system faces a unique shock and that banks and enterprises are each relatively small suggest that the coordination failure cannot readily be overcome by renegotiation.

4/ The consumption binge would be less if intertemporal substitution were possible.

possible, however, for p_t to be substantially above \hat{p}_{t-1} , the previous administered price.

Income from the sale of the consumption good is split between the young generation and the firms, who use their share to repay banks as much as they are able. Due to government consumption of γC_t , continued seigniorage raises the money stock to $M_{t+1} = M_t/(1-\gamma)$. The young of period t deposit their cash income

$$p_t K E_t = \frac{M_{t+1} K E_t}{C_t}$$

with the banks at the end of period t in exchange for a promise of M_{t+1} next period; the offer of a positive nominal return ($R_t = C_t/K E_t$) makes depositing with the banks superior to storing wealth as cash.

c. The banks start period $t+1$ with a total of M_{t+1} in cash, no loans outstanding and liabilities to the period t cohort. A Nash equilibrium is for the banks to lend their cash to new firms, which purchase part of the $t+1$ cohort's endowment. The young redeposit this cash with the banks, allowing withdrawals to be met in full.

Equilibrium in the goods markets is achieved at an interior solution; the young are indifferent between selling their endowment to firms and converting it into the consumption good and selling it to the old. If, say, $q_{t+1} > p_{t+1}K$, the young would wish to sell all their endowment to the firms, but then the old would bid up the price of the consumption good, for otherwise they would obtain nothing; if $q_{t+1} < p_{t+1}K$, the young would convert all their endowment into the consumption good, but then firms would bid for them not to do so. Hence the condition for equilibrium is the interior solution $q_{t+1} = p_{t+1}K$. The new price of the input relative to the output price is lower than at market clearing levels in the socialist economy or in the successfully intermediated economy, and even lower than the input price relative to the old administered output price.

Consider first the behavior of households. Let the $t+1$ cohort reserve a proportion Φ_{t+1} of their endowment to convert into the consumption good and sell to the old cohort and government. There is no capital stock inherited from previous periods, so the supply of the consumption good is just $C_{t+1} = \Phi_{t+1} K E_{t+1}$. With the government purchasing a fraction γ of the supply of the consumption good, equilibrium prices are

$$p_{t+1} = \frac{M_{t+1}}{(1-\gamma)\Phi_{t+1}KE_{t+1}}$$

and

$$q_{t+1} = \frac{M_{t+1}}{(1-\Phi_{t+1})E_{t+1}} .$$

Using the condition for an interior solution yields $\Phi_{t+1} = 1/(2-\gamma)$. Note that $p_{t+1} > p_t$ because the supply of consumption goods has shrunk due to the lack of productive investment and the conversion of only some of the endowment into the consumption good. Period $t+2$ is similar because as yet there is no mature investment and the banks have no incentive to call in loans made at $t+1$.

The young of period $t+1$ receive the full money stock ($M_{t+1} + \Delta M_{t+1} = M_{t+2}$). Banks will not be able to offer a positive nominal rate of interest because withdrawals during $t+2$ will be made before the government injects new money; at best the young obtain a real return on their wealth of $(1-\gamma)a$, which could well be negative. If the young hold their wealth as cash the economy will fall into the "bad" equilibrium without intermediation. Here it will be assumed that bank deposits offer some small nonmonetary advantage over holding cash.

In contrast, firms borrow M_{t+1} at the start of period $t+1$, which they repay with their earnings $p_{t+1}S\Phi_{t+1}E_{t+1}$ two periods later. Inverting the expression for p_{t+1} to solve for M_{t+1} , and using the expression for Φ_{t+1} given above allows one to show that the real return on the investment is S/K , where the consumption good is the numeraire. Hence by the zero profit condition firms face a positive real borrowing rate and, in normal circumstances, positive nominal rates. The term structure steepens and lending and deposit rates diverge, which are phenomena observed in the countries of Eastern Europe.

In subsequent periods $t+2+i$ ($i = 1, 2, \dots$) there is some production $(1-\Phi_{t+i})SE_{t+i}$ from investment in period $t+i$. The $t+2+i$ cohort reserves a fraction

$$\Phi_{t+2+i} = \max \left[0, \frac{1}{2-\gamma} - \frac{(1-\gamma)(1-\Phi_{t+i})S}{(2-\gamma)Ka^2} \right]$$

of its endowment to be converted into the consumption good. Slowly output and investment recover as the successful, intermediated equilibrium is approached. Recovery may be protracted and for certain parameter values oscillations may be induced. The relative price of the input remains at $q/p = K$, below its long-run equilibrium level, so long as Φ_{t+2+i} remains greater than zero.

An example of the behavior of the economy after the withdrawal of price controls and subsidies is shown in Figures 3(a) and 3(b). ^{1/} Investment collapses and recovers only slowly and with fluctuations following the removal of controls at $t = 0$. After an initial surge, consumption is restricted by the limited supply, which in turn induces the young of each period to convert part of their endowment into the consumption good. Inflation is sharp but variable as the new long run equilibrium is slowly approached.

d. Note that it is the combination of liberalizing prices and stopping subsidies after a history of repressed inflation that generates these fluctuations in output and prices. Suppose that the government continued to dictate $\hat{p}_t < p^*_t$ and ration the consumption good, but firms lose their subsidies. Then firms could only pay a total of M_t for inputs and the banks would have less cash than anticipated in the middle of the period. Firms would not be able to service all their debts, but a banking collapse need not be triggered by this one-off capital loss because the old have no incentive to withdraw more than what they can spend, namely, an amount $(1-\gamma)\hat{p}_t SE_{t-2}$. Alternately, if subsidies had continued but the price of the consumption good was freed to equilibrate that market, firms would still start the period by buying the endowment for $M_t(1+\pi_1)$, which the young would deposit with the banks; the banks would then have enough cash in hand to meet the demand for withdrawals, and firms would earn enough that they can service their debts. An investment collapse can be avoided at the expense of higher inflation, which has no real costs in this model.

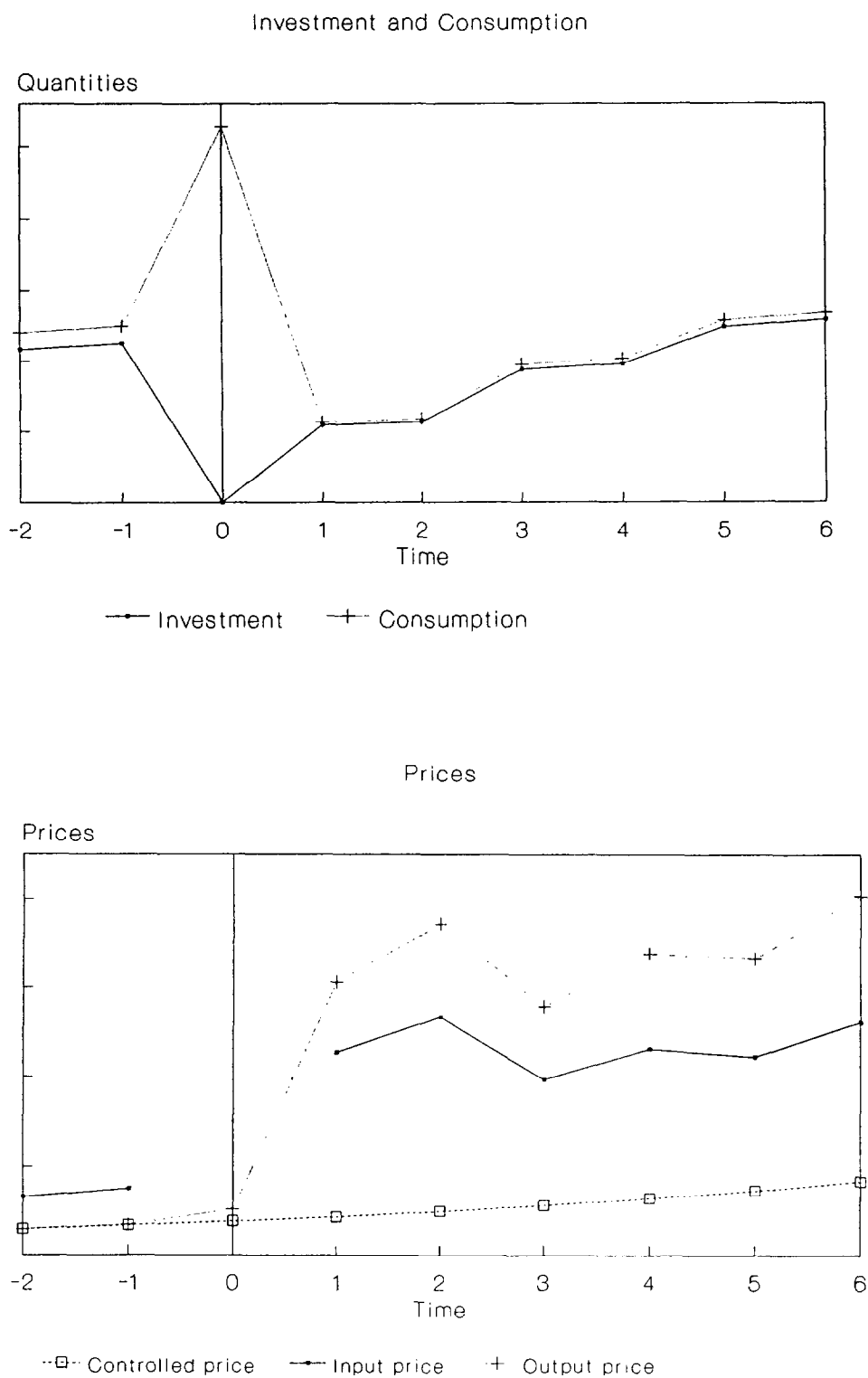
However, even if subsidies had been absent, price liberalization leads to a banking collapse when there are index-linked returns on deposits. Deposits denominated in foreign currencies, which were common in many countries of Eastern Europe, become index-linked deposits with the pursuit of devaluation in line with inflation. Let the one-period gross nominal return on deposits be set at $R_t = rp_t/p_{t-1}$, $r > 1$. If prices are liberalized at t , the price level moves up from \hat{p}_t , and the nominal claims on banks increase equi-proportionately, but the available liquidity is fixed at M_t . Banks' efforts to meet demand for withdrawals will again lead to a collapse of investment and the calling-in of existing loans.

e. If there are strong microeconomic and political grounds for the speedy removal of price controls and subsidies, financial policies may be devised that in effect slow the impact of the transition on the financial sector.

At first glance it may seem that the wholesale writing-off of preexisting liabilities would eliminate many of the transition costs, because enterprises and banks would be freed of obligations that they cannot meet. However, such a dramatic move would be distributionally unacceptable, because the old cohort would be left with nothing, and it would leave the

^{1/} In addition to the parameters listed in the context of Figure 2, Figure 3 is based on the parameters $\pi_0 = 0.09$, $\pi_1 = 0.10$, and $\hat{p}/p^* = 0.40$.

Figure 3
Effects of removing price controls and subsidies



economy at the "bad" equilibrium without intermediation. Within the confines of the model presented here, a more promising solution would involve the expropriation of part of the deposits of the old by a partial suspension of convertibility. If the deposit claims of the old cohort in period t could be reduced from $(1+\pi_1)M_t$ to M_t by fiat, banks would be able to acquire enough liquidity from new deposits by the young to meet their obligations, and so they would not have to restrict lending or call in loans. Banks would still suffer a capital loss on outstanding loans. However, in a more elaborate model such a betrayal of people's confidence in the banking system may have long lasting effects on the reputation of financial institutions and the government.

A nearly equivalent but more subtle policy would provide a transfer of $\pi_1 M_t$ to the banks so that they can meet their short term obligations. Inflationary pressure would be accommodated, causing p_t to rise. A danger here is that, if an attempt is made to make the increase in the money supply transitory by removing $\pi_1 M_t$ next period, banks may be unable to offer a positive nominal rate of interest; the young in period t will prefer to hold their wealth as cash and the economy will fall into the "bad" equilibrium without intermediation. Furthermore, if banks have index-linked liabilities, the increase in p_t will exacerbate the banks' difficulties and the transfer to them will be insufficient to meet their liquidity needs.

Therefore a temporary tax on the consumption good may be a useful adjunct to direct intervention in the financial system. Besides discouraging the direct conversion of the endowment into the consumption good, such a tax would reduce nominal demand and slow inflation, thus limiting banks' index-linked liabilities and generating revenue for government, which would not have to rely so much on seigniorage. However, enterprises would then not receive sufficient revenue to make all loan repayments due in periods t and $t+1$. Further subsidies, to service their debts rather than to purchase inputs, would be necessary to keep the system operating; these subsidies need not be channeled through firms but could be given directly to banks. ^{1/} The model presented here suggests, then, that a practical way to ease the transition from a repressed, administered economy to one with flexible prices and a "hard" budget constraint is to reassign funds that had been used to subsidize enterprises and support government consumption to the servicing of financial obligations, to accept some inflation during the transition, and to concentrate taxes on the consumption good.

2. Divergent Movements in Returns on Existing and New Capital

a. The imposition of financial discipline ought itself to have a real effect as enterprises adjust production levels, management and work procedures to improve profitability. Eastern European industry also faces radical changes in the competitive structure of domestic and foreign markets

^{1/} Notice that when prices are liberalized in period t , firms and banks need to be concerned with debts falling due in both periods t and $t+1$.

for both inputs and outputs, for example because of the disbanding of the CMEA, while novel Western technology and techniques are introduced and the regulatory and macroeconomic environments are transformed. Existing capital has been depreciated yet new investment opportunities that have the potential for high productivity and profitability have been created. The danger is that, if the "real" shock is large, the insolvency of enterprises will lead to their immediate and wholesale liquidation. While consumption may initially be cushioned, investment and the demand for inputs will slump. The old, relatively unproductive capital will be scrapped before new investments mature, and so the effects of the shock will be magnified in later periods. A temporary disturbance may be transmitted through the banking system and result in persistent volatility in output and relative prices.

Following the lead of Bernanke (1983), in this section it is shown that these shocks can be perpetuated and magnified by financial linkages between investments and across time. In particular it will be assumed that firms are long lived, and that, in any period, a firm is engaged in new investment, the development of investments made one period ago, and the exploitation of mature investments. If a firm is unable to meet its debt servicing obligations, its bankers are allowed to seize and liquidate its assets. New investments have no immediate liquidation value.

b. In order to concentrate on real rather than monetary phenomena, here the peculiar features of socialist economies such as fixed prices and permanent subsidies will be ignored. Consider the "flexprice" economy where intermediation is successful and sustained, with a "good" equilibrium as described in section III.2. At the end of period t the firms are due to repay $M_{t+1} = p_t S E_{t-2}$ to the banks, having borrowed M_{t-2} in period $t-2$ to finance the now mature investments.

Suppose now that the economy suffers a temporary negative real shock at t that reduces the productivity of existing capital (i.e. that maturing in periods t and $t+1$) from S to S' ; the productivity of new investment rises permanently to S'' , $S'' > S$. ^{1/} If no capital is liquidated and the entire endowment continues to be invested each period, the price level at t and $t+1$ would rise to offset the fall in S and firms would have enough revenue to meet their (nominally defined) liabilities; the price level will fall relative to that after period $t+1$; the ex post real interest rate will fall and then briefly rise; the entire adjustment effort is borne by current generations.

However, if S' is sufficiently low, the rise in the price of the consumption good may alter the behavior of the young of periods t and $t+1$. Once the young start converting some of their endowment into the consumption good, there will be less of the investment good available to take advantage of the improved productivity of new capital. Furthermore, firms will not

^{1/} It is easy to construct other scenarios where the productivity of even new investments is low during some transition period.

receive enough revenue to meet their obligations, and so banks will call in some loans prematurely. While consumption immediately increases, the capital stock is eroded and consumption is reduced for several periods into the future. The source of these large and persistent effects is the presence of long-term contracts between banks and firms and the durability of capital.

Specifically, assume that the government continues to purchase a fraction γ of the output of the consumption good. In period t the young reserve a proportion Φ_t , $0 \leq \Phi_t \leq 1$ of their endowment to convert into the consumption good at rate K . Only $(1 - \Phi_t)E_t$ of the endowment is invested. As will become apparent, firms cannot generate enough revenue to repay all debts even when all investments made in period $t-1$ are liquidated. Then banks, acting individually, will demand the maximum repayment, even if they have to close down firms. Since firms invested E_{t-1} in period t , the liquidation of these immature investments yields sE_{t-1} . By assumption the investment of $(1-\Phi_t)E_t$ made at the start of the period has no resale value or is not undertaken by new firms. Hence the total supply of the consumption good is $C_t = \Phi_t K E_t + S' E_{t-2} + s E_{t-1}$. Deposits by the young allow banks to meet their obligations M_t to the old cohort. Prices are determined by equating financing to nominal expenditure:

$$q_t = \frac{M_t}{(1-\Phi_t)E_t} .$$

and

$$p_t = \frac{M_t}{(1-\gamma)[\Phi_t K E_t + S' E_{t-2} + s E_{t-1}]}$$

In order for an equilibrium to obtain at an interior solution, the young must be just indifferent between selling their endowment of the investment good and converting it into the consumption good, which occurs when $q_t = K p_t$. Again the relative price of the investment good falls. Using the expressions for p_t and q_t and the fact that $E_t = a E_{t-1} = a^2 E_{t-2}$, it can be shown that

$$\Phi_t = \frac{K a^2 - (1-\gamma)(S' + s a)}{(2-\gamma)K a^2}$$

if an interior equilibrium exists. Certainly $\Phi_t < 1$, and $\Phi_t > 0$ if

$$K a^2 > (1-\gamma)(S' + s a) .$$

If this last inequality is not met, the "kitchen garden" technology is so inefficient that the young do not have an incentive to convert any part of their endowment; p_t rises enough that firms obtain enough cash to repay their debts without liquidating any immature investments; the transition

through the periods of low productivity and on to the periods of higher productivity is quick.

If, however, the real shock is large, its effects will be long lasting and complex. When $\Phi > 0$, by substitution it can be shown that production of the consumption good in period t will be

$$C_t = \frac{[Ka^2 + S' + sa]E_{t-2}}{(2-\gamma)},$$

and correspondingly only $(1-\Phi_t)E_t$ of the endowment is invested in the new technology despite its superior productivity. Since enterprises earn

$$p_t[S'E_{t-2} + sE_{t-1}] = M_{t+1} \cdot \left[\frac{S'E_{t-2} + sE_{t-1}}{\Phi_t KE_t + S'E_{t-2} + sE_{t-1}} \right],$$

but have obligations of M_{t+1} , they are insolvent even after the liquidation of all their investments if $\Phi_t > 0$. 1/

c. In period $t+1$ no mature capital is left to produce the consumption good, so its entire supply is generated by converting the endowment; it can be shown that in equilibrium $\Phi_{t+1} = 1/(2+\gamma)$. 2/ Output increases somewhat in period $t+2$ because limited investment occurred in period t and because productivity has increased to S'' , but it is possible that some of the endowment will still be used for consumption. Subsequently the economy can take many periods to return to maximum investment and consumption despite the improvement in technology. Because investments are long-term while the shock results in the liquidation of capital of all vintages, recovery need not be monotonic; rates of investment, output and relative prices may fluctuate as they converge towards their new equilibrium paths. The real interest rate charged to borrowers jumps at period t , but the rate to depositors falls; convergence occurs as long-term equilibrium is reestablished.

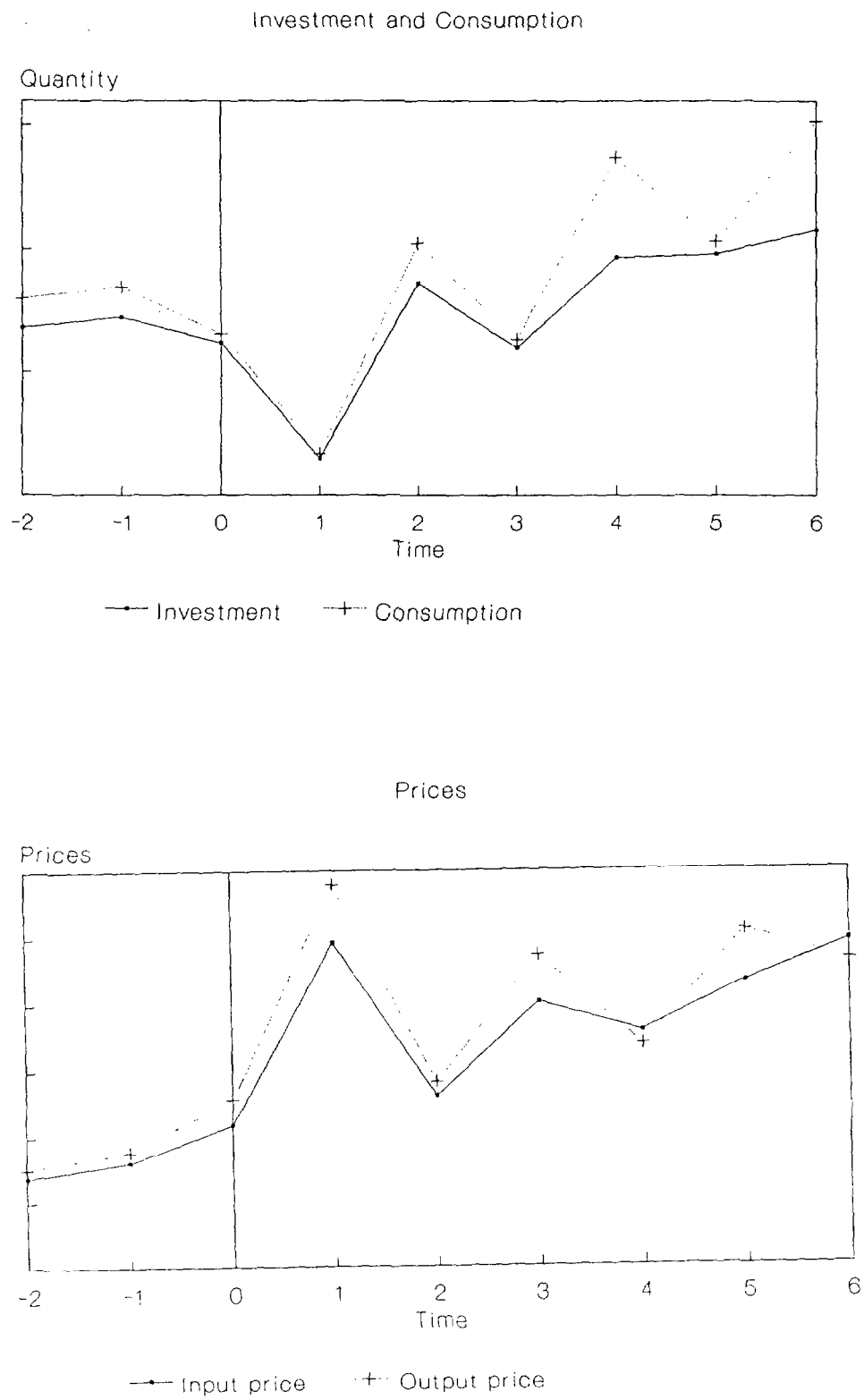
The equilibrium reaction of the economy to a large real shock is illustrated in Figures 4(a) and 4(b). 3/ The decline in the return on existing capital occurs at $t=0$. Rather than accepting a brief reduction in consumption and maintaining investment, the impact of the shock on consumption is delayed but magnified and perpetuated by the uncoordinated actions of banks, firms and the sequence of consumers. Disturbances to

1/ If banks held callable term deposits, there would be a bank run.

2/ Note that the investments undertaken at t are not liquidated already at $t+1$; banks have no incentive or grounds to call in loans early, and the behavior of p_{t+1} and p_{t+2} are assumed to be such that the investing firms do not volunteer to produce early.

3/ The Figures are based on the parameters $S' = 0.70$ and $S'' = 1.40$.

Figure 4
Effects of a large real shock



relative prices induce some of the endowment to be used for immediate consumption, and investment is correspondingly lower.

d. A transitory real disturbance with persistent effects presents in some ways a more complex policy problem than the removal of subsidies and price controls. Policy needs to be directed both towards the rapid attainment of a "good" long run equilibrium, and to ensuring the optimal degree of consumption smoothing. An unavoidable real cost has to be borne, and the intergenerational distribution of this cost is an essentially political issue.

Suppose, first, that the aim is to keep investment equal to the endowment each period and to prevent the premature liquidation of capital; those who consume in periods t and $t+1$ make the maximum effort on behalf of future generations. To remove the incentive for the young cohort to convert their endowment directly into the consumption good, policy must ensure that $q_t > Kp_t$, and to prevent firms becoming insolvent they must have at least M_{t+1} in hand towards the end of period t when loan repayments fall due.

One method to achieve these intermediate targets would begin by subsidizing firms' purchases of the investment good, financed by money creation. 1/ It is always possible to subsidize the purchase of the input enough that none is converted into the consumption good. The old may then withdraw the full amount M_t from their bank deposits, which they spend on their share $(1-\gamma)S'E_{t-2}$ of the supply of the consumption good. Including revenue from sales to government, firms earn enough to repay their loans from the banks due to the large rise in the price of the consumption good; no revenue is earned by the young by selling the consumption good. Hence the banks do not call in any loans, the pre-existing capital stock is preserved for the next period, and the whole endowment is invested. The outside money created to finance the subsidy can be eliminated through taxation and reduced government consumption in subsequent periods. 2/ Only temporary inflation in input prices is accepted.

A smoother path of consumption can be achieved if some of the endowment is not invested. Such behavior can be induced by setting $q_t = Kp_t$ after net taxes, and ensuring that firms have the revenue to service their debts. 3/ A subsidy on the investment good, say at a rate σ , can be chosen to determine the desired proportion of the endowment converted. Since

$$C_t = \Phi KE_t + S'E_{t-2},$$

$$p_t = M_t / [(1-\gamma)C_t],$$

1/ In the absence of a bond market there is no other financing available at the start of the period.

2/ Taxing the consumption good in period t is not useful because it removes revenue from enterprises.

3/ If, as assumed here, $K > s$, converting some of the endowment into the consumption good is more efficient than liquidating immature investments.

and

$$q_t = \frac{M_t}{(1-\sigma)(1-\Phi)E_t} ,$$

in equilibrium

$$\Phi = \frac{Ka^2(1-\sigma) - (1-\gamma)S'}{Ka^2(2-\gamma-\sigma)} .$$

Note that Φ is strictly decreasing in σ , so the desired level of Φ can always be achieved. ^{1/} The old withdraw M_t from banks and spend it on consumption goods produced by both the young cohort and enterprises, so the latter will not receive enough revenue from sales alone to meet all their obligations to the banks. Hence additional subsidies will be needed to prevent foreclosures. A similar pattern of subsidies on investment goods and to enterprises will be needed in period $t+1$ when old, inefficient capital installed in $t-1$ matures.

The model has only one final good and one input, and the scope for improving allocation is restricted to the choice of only a few technologies. Nor does the model take into account the possibility of intertemporal substitution of consumption by an economic agent. It also abstracts from the issue of allocation of inputs to the production of alternative consumer goods as well as the distinction between efficient and inefficient state firms. But the paper does predict the complications that bank insolvency may generate during the process of reform. We conjecture that the broad thrust of the results will survive even if greater substitution possibilities, across both time and goods, and heterogenous firms are introduced into the model.

V. Policy Implications and Conclusions

The model developed in the last two sections, while abstracting from many institutional and economic complications, clarifies the role of banking in centrally planned and emerging market economies, and the nature of the problem associated with bank insolvency in these economies. We have shown how, in an overlapping generations model with long-term investments, the sudden withdrawal of subsidies and liberalization of prices leads to a brief consumption surge, bank runs and the premature liquidation of investment. The decapitalization of the economy leads to a low level of output and investment for a prolonged period of time. Similarly, we have shown that an anticipated decline in returns on existing capital, despite an increase in the return of prospective investments, leads to bank runs, erosion of the

^{1/} If, in the absence of policy, $\Phi = 0$, one may wish to tax use of the investment good to promote consumption smoothing by converting a positive amount of the endowment.

capital stock, and low and fluctuating output for several periods. In either case, banks individually act in a rational manner in restricting lending and calling in loans, but the aggregate outcome is negative net investment, which perpetuates the disruption. The problem is compounded when each household tries to be the first to withdraw its deposits from the lossmaking banks.

Bank insolvency in Eastern Europe is not a product of malfeasance on the part of bank officials in the past but the result of a radical change in the economic environment in the countries concerned. Banks in the former socialist system were relatively large, on-going institutions which provided transaction services, catered to households' life-cycle savings pattern, and financed investments according to the dictates of the Central Plan; the past bank contracts were not written to suit the new circumstances. The reform has generated a situation where the depositors' continuing claims on banks are no longer backed by the repayment capacities of the banks' debtors. ^{1/} Failure to arrive at a comprehensive resolution of this divergence between depositors' claims and banks' payment abilities, over the medium term, can jeopardize the system of financial intermediation and may even lead to a financial collapse.

Enterprise reform, privatization, and establishing a system of appropriate incentives are the most crucial parts of the reform program that need to be implemented to provide the durable solution to the problem of inefficiency in the economies of Eastern Europe. However, during the ongoing process of structural adjustment, if bankruptcies become a generalized phenomenon that has no micro but only a macroeconomic solution, then there will be a growing perception among pressure groups that postponing bankruptcy long enough by capitalizing interest and rolling over loans will make a government bail-out more likely. This is what needs to be avoided by strengthening banks' balance sheets by injection of fresh equity and writing off nonperforming loans and thereby enabling the banks to make a fresh start with proper loan appraisal and portfolio management.

A long run and durable solution to the bank insolvency problem in Eastern Europe requires the building of an adequately capitalized and competitive banking system under appropriate prudential regulations and supervision. Such a system requires clear definition of property rights, the development of banking and managerial skills suitable for a market economy, and the drafting and implementation of new banking regulations and accounting standards--all of which are likely to take some time. Furthermore, banks will continue to reflect the state of the real economy.

The recapitalization of the banking system by the government should not in the end be excessively onerous in the countries of Eastern Europe. The

^{1/} Banking crises are traditionally associated with substantial changes in relative prices, balance of payments problems, major political uncertainties, weak bank supervision. Many of these factors are present in Eastern Europe.

state owns a vast array of land, property, and enterprises, which have paid scanty returns under the system of central planning. The proceeds from privatization, however, can be reasonably expected to be substantial enough to recapitalize the state-owned banking system. Furthermore, the new owners of banks, as and when they are privatized, may be expected to put in fresh capital.

Privatization, however, cannot be done in a hurry. ^{1/} Thus, the short-run problem of financing the nonperforming loans of banks will continue to be present for some time to come. Policy must seek to sustain the liquidity and solvency of banks and enterprises, so that investment continues and there is no liquidation of firms which generate positive value added, and at the same time establish incentives and regulations that stop the self-perpetuation of past misallocations. In the short run, it is not the outstanding stock of nonperforming loans but the discrepancy between the cash inflows and outflows that needs a solution. Channeling extra fiscal resources into the banking system even in the form of public sector deposits can solve the cash flow problem of banks while prudential regulations and supervision are being put into place to stop misallocation of loanable funds to inefficient enterprises, and audits and loan classification carried out to estimate the magnitude of impaired assets of banks. The attempts by banks to roll over existing debt in order to preserve the appearance of their balance sheet, thus delaying their own reform and "softening" the budget constraint of their borrowers need to be prevented by prudential regulations.

The insolvency of banks have implications for financial programming for these economies. The quantification of the financial policies and consequent flow of funds through economic sectors, and in particular the banking system, that are associated with the desired improvement in the balance of payments and the rate of inflation has to take into account the insufficiency in cash flows of banks because of the nonperforming loans. While balance sheet corrections can wait for the time being, unless fiscal resources are mobilized to plug the holes in banks' income statements, a policy of unrelieved financial rigor may not only hurt inefficient banks and enterprises but also destroy confidence in the banking system, eliminate productive capital and new investment, and create output and price

^{1/} Whether privatization should be done in a "hurry" is a matter of debate, see, for example, Lipton and Sachs (1990). In the context of the financial sector, however, there is a clear need for caution. For example, the rapid privatization of the nationalized banking sector by auctions in Chile in the post-1973 period is alleged to have resulted in the banks ending up in the hands of a few conglomerates which combined financial and nonfinancial corporations but had no banking credentials. Nonperforming assets of banks rose from 11 percent of their capital and reserves at the end of 1980 to 113 percent in May 1983 and the Central Bank had to undertake rescue operations leading to a virtual renationalization of banks and enterprises. See Diaz-Alejandro (1985).

fluctuations. The pursuit of such a policy has a large probability of reversal, and hence the cost of a failed stabilization associated with it.

In this context, experience in other countries shows that immediate and total decontrol of the financial sector far in advance of reform in other sectors may have severe negative consequences. ^{1/} The unintended consequences of financial liberalization in Argentina, Chile, and Uruguay during the late 1970s and early 1980s should not be allowed to revisit Eastern Europe more than a decade later. The burden of nonperforming loans in the banks in Eastern Europe, the monopolistic structure of the banking industry and the interlocking interests among enterprises and banks make the case for a gradual approach stronger. The rehabilitation of banks, improved prudential supervision and the imposition of financial discipline on enterprises should precede full liberalization of the structure of interest rates in Eastern Europe. A rapid decontrol of interest rates may otherwise lead to lending rates rising to extravagant levels (e.g., 32 percent in real terms on the average for short-term loans in Chile during 1976-82) either because they "...expected them to last for very brief periods, or if they did not, borrowers expected them to bail them out, knowing as they did that many other borrowers were in a similar situation." ^{2/} However, although interest rate spreads can be carefully engineered to give some relief to banks' cash flow positions, it is possible that, without taking them to dangerously risky levels, such spreads may not be sufficient to make up for the foregone interest on nonperforming loans by banks in all the countries.

While privatization of the vast array of state property may eventually become a major source of revenue, in the short run the only noninflationary way of mitigating the flow problem associated with weak balance sheets of banks is the mobilization of additional fiscal resources through a combination of additional taxes and reduced expenditure.

There is good reason for part of the cost of adjustment to be shifted forward to future generations by, first, not seeking to maximize investment in the short run, and second by borrowing abroad, as long as return to investment in reformist Eastern Europe is expected to be higher than the rate of interest in international markets. A partial suspension of convertibility of deposits, their conversion into equity, and a de facto confiscatory monetary reform amount to tax measures with cosmetic cover-ups. To avoid a banking collapse and inflation at the same time, it is imperative to generate additional fiscal resources to be transferred to the banks in distress. Answering the difficult question of how to generate such

^{1/} See Villanueva and Mirakhor (1990) for a brief discussion of the theoretical reasons as well as empirical experience with strategies for financial reforms. Cho and Khatkhate (1989) provide a detailed analysis of the lessons of financial liberalization in Asian countries. In his own characteristic way, Diaz-Alejandro (1985) provides an explanation by a discussion of why banks are special and really different from butcher shops and a discussion of Southern cone experience.

^{2/} Diaz-Alejandro (1985), p. 16.

additional resources when the tax base is weak and there are pressing demands on the expenditure side to provide a social safety net and infrastructural facilities goes beyond the scope of this paper.

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