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The Output Decline in the Aftermath of Reform:
The Cases of Bulgaria, Czechoslovakia, and Romania

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Abstract

This paper analyzes the declines in economic activity experienced by Bulgaria, the Czech and Slovak Federal Republic (CSFR), and Romania in the period since the initiation of market-oriented reforms in these countries. The paper reviews developments in the three countries and empirically investigates two questions that are key to the interpretation of the output decline: First, to what extent does the output fall reflect "structural change" (or a reallocation of resources across sectors) rather than a conventional recession? Second, to what extent have demand-side or supply-side forces been dominant in generating the output decline?

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I. Introduction

The purpose of this paper is to shed some light on a number of issues surrounding the declines in economic activity experienced by three Eastern European countries--Bulgaria, the Czech and Slovak Federal Republic (CSFR), and Romania--in the period since the initiation of market-oriented reforms in these countries. The focus on this particular set of countries (hereafter referred to as BCR) is motivated primarily by the fact that these were perhaps the most rigidly centralized economies in the region. While other countries, notably Hungary and Poland, experimented with enterprise autonomy, limited price liberalization, and private ownership before the beginning of large-scale reform, the three BCR countries remained wedded to rigid central planning more or less until the end. The three countries differed significantly, however, in their degree of adherence to financial discipline in the years of central planning. At one extreme was Czechoslovakia, with low foreign debt and relatively few shortages. At the other was Bulgaria with high foreign debt and significant shortages. In Romania, while the economy was able to generate--with considerable hardship--external surpluses sufficient to eliminate its foreign debt, significant internal imbalances were nonetheless apparent.

While the focal point of our analysis of the output decline is the move towards a market economy--which we define with reference to the date on which the liberalization of a significant proportion of previously-controlled prices took place--it should be noted that the initiation of market-oriented reforms was not a necessary condition for a fall in activity to take place, as the experience of the former-USSR (which began to liberalize much later) clearly shows; nor even is it the case that the cumulative decline in output was largest for countries that started the transition earlier, as is illustrated by the Bulgarian case. Put differently, output was already on a downward path even before the initiation of reforms in much of the region, and it is not obvious what the "counterfactual" to the reforms would look like; that is, how big an output collapse would have occurred had markets not been liberalized. To a large extent, the fact that output started to collapse prior to the reforms was a result of the situation of "neither plan nor market" that emerged after the political changes, in which state enterprises were not tightly controlled but yet did not face appropriate incentives.

The average percentage decline in output in the BCR country group in the two-year period ending in 1991 was relatively large--at 23 percent--in comparison to an average decline in the entire region of about

19 percent. 1/ 2/ In addition, the BCR group contains the country that experienced the largest cumulative drop in output in the region over this period (Bulgaria), and also one country that did relatively well in comparison to its neighbors (Czechoslovakia). The cross-country variation in the extent of the output decline should prove instructive in the empirical work that follows.

In Bulgaria and Czechoslovakia, the "big bang" of price liberalization occurred in the first couple of months of 1991, while in Romania, which followed a somewhat more phased approach, the first major step in that direction took place in November 1990. The timing therefore makes the reform in trading arrangements in the Council for Mutual Economic Assistance (CMEA), and the subsequent collapse in trade among the CMEA-member countries, strong candidates for inclusion among the list of potential factors that could account for the decline in activity. This appears to be especially true in the case of Bulgaria--given its prior dependence on trade with Eastern block countries--where exports to the former USSR had a weight of about one fifth in GDP. In addition, the CMEA shock generated a terms of trade deterioration for the BCR countries; given that an important fraction of these countries' imports of energy and raw materials came from the former Soviet Union, it is quite likely that the terms of trade deterioration also had a negative impact on output in the BCR group.

To some extent, however, the CMEA shock simply reflected a collapse of activities that were no longer competitive once the system of central planning was abandoned and enterprises began to face world market prices for their inputs and outputs. Enterprises operating in such sectors were bound to experience losses in market share to competing firms from third countries. Viewed in this way the CMEA reform, in conjunction with price and trade liberalization, would set in motion a series of changes in the BCR countries which, over time, would be responsible for a radical transformation in the productive structure of these economies. This process of resource reallocation could easily generate a decline in aggregate output initially, especially if an expansion of activities that were profitable under the new relative price structure was delayed by the presence of significant adjustment costs and uncertainty.

Apart from these longer-term "structural" factors, output is also likely to have been affected by more conventional macroeconomic forces.

1/ Eastern Europe is defined here to include, in addition to the BCR countries, Poland and Hungary.

2/ These figures are based on official statistics which may not fully take into account the growth in private sector activity (Berg and Sachs (1991)). Proper measurement of the private sector would not, however, reverse the tendency exhibited by the official numbers, given the relatively small initial shares of private activity in GDP in these countries. For a somewhat different explanation of why official statistics may overstate the extent of the output decline, see Osband (1991).

Price liberalization, in conjunction with the policy stance necessary to harness inflation, led to declines in real wages, money, and credit, which likely would have depressed domestic absorption and output. On the supply side, another factor in the output decline might have been related to the increase in domestic energy prices (as subsidies to energy use were reduced). In addition, binding credit ceilings imposed on state enterprises might have contributed to a decline in output by reducing available working capital to such an extent that firms were unable to pay for their inputs, thereby leading them to contract supply and enter into arrears vis-à-vis their suppliers. 1/

The above arguments suggest the relevance of two questions for interpreting the decline in output in the BCR countries. First, to what extent does the output fall reflect "structural change" (or a reallocation of resources across sectors) rather than a conventional recession? And, second, to what extent have demand-side versus supply-side forces been dominant in generating the output decline? This paper empirically investigates these two questions.

The paper performs several tests to investigate the first issue, namely the extent to which the decline in output is a general phenomenon, or whether there is evidence of structural change, with some sectors expanding while others contract sharply. 2/ Clearly, in response to a new relative price structure, resources would be expected to move towards sectors producing goods and services whose relative price (and profitability) had risen and away from the other sectors, in line with comparative advantage. If the type of distortion in each of the three countries was similar prior to reform (say, because energy prices faced by domestic producers were "too low"), and if technologies were also similar, resource reallocation would follow a similar pattern in all PCPEs (previously centrally-planned economies). Thus, evidence of structural change might then imply that sector-specific factors were relatively more important than economy-wide (aggregate) factors in accounting for the evolution of output. We discuss this issue below with reference to an econometric procedure that separates the effects of national and industry-specific shocks on output changes. 3/ Our findings, which are described more fully below, suggest that the bulk of the variance of output in these countries is accounted for by aggregate or national factors, with industry-specific components playing only an insignificant role. Therefore, the data do not support the view that much structural change has taken place since the initiation of reforms in the BCR group of countries.

1/ See Calvo and Coricelli (1992) and Berg and Blanchard (1992).

2/ As pointed out earlier, in the short run the sectors where relative profitability increased might find it difficult to expand, owing to difficulties in attracting resources. During this period, all sectors might be contracting, though they should be contracting at very different rates if structural change is really taking place.

3/ See Stockman (1988).

Other evidence pointing in the same direction is obtained by using principal components analysis to investigate what proportion of the variance of price and output movements can be accounted for by a small number of common macroeconomic factors. 1/ We compare these results with those obtained for a benchmark country, taken here to be the United States. Consistent with the previous tests, our results do not indicate strong evidence of structural change in any of the BCR countries, as the first few principal components are found to account for similar proportions of the variance of the series in the BCR countries as in the benchmark country.

Finally, additional evidence on the "structural change" hypothesis is obtained by investigating the extent to which output and price changes have been consistent with comparative advantage in these countries. For this purpose, we use measures of "domestic resource cost" (DRC) which have been calculated for Bulgaria and Czechoslovakia, and which act as a proxy for comparative advantage. 2/ Again, we do not find any strong indication that resources have been moving towards sectors with relatively low DRCs, as a simple version of comparative advantage theory would predict.

The second issue to be investigated in this paper is the relative importance of supply and demand factors. The simplest way to determine whether supply or demand factors have been predominant in accounting for the evolution of output is to examine the correlations between price and output changes in particular markets. If shocks to the supply function predominate, this should be reflected in a preponderance of negative correlations between price and output changes; while if demand shocks are relatively more important, relative prices and outputs should display mostly positive correlations. The evidence presented below suggests a preponderance of supply disturbances in the cases of both Bulgaria and Czechoslovakia; in the Romanian case, the relative importance of supply and demand shocks seems to vary over time.

The paper also attacks the "supply-shock-versus-demand-shock" problem by estimating a simple "supply-demand" model of output determination. 3/ Estimation of such a model allows us to decompose the source of output fluctuations between supply and demand factors. It also allows us to shed some light on the relative importance of various macroeconomic factors (energy price increases, credit contraction, wage increases) in accounting for the output decline.

1/ For a discussion of principal components analysis, see Dhrymes (1978) and Section III below.

2/ See Hughes and Hare (1991).

3/ For all three countries in the sample, the output decline was concentrated in the industrial sector, and we use disaggregated data on output, prices, etc., from this sector to estimate the model. The necessary data were available for Czechoslovakia and Romania on a monthly basis, while the data available for Bulgaria permitted only a more qualitative assessment.

The remainder of this paper is organized as follows. In Section II we briefly review the economic background to the reforms in the three countries, the main components of the reforms themselves, and the salient features of developments in the real sectors of the economies of Bulgaria, Czechoslovakia, and Romania. Section III discusses the structural change hypothesis and presents evidence on the relative importance of national and industry-specific factors in accounting for the output decline. Section IV describes the methodology and presents results on the relative importance of demand and supply factors in the output decline. Some concluding remarks are presented in Section V.

II. Developments in Bulgaria, Czechoslovakia, and Romania

1. Bulgaria

During the years of the communist regime in Bulgaria (1944-89), the state came to own virtually all means of production and to account for most of the output in the economy, except in agriculture. There, small family plots leased from collectives--though accounting for only 15 percent of total cultivated land--produced almost one half of agricultural output. In the rest of the economy, inputs were allocated and production decisions were taken in the context of the central plan. As in other centrally planned economies, prices, wages, and interest rates were controlled and played no allocative role. The domestic economy was largely insulated from foreign markets through a multiplicity of taxes, subsidies, and exchange rates. Bulgaria's foreign trade, carried out by a small number of foreign trade organizations, was dominated--more than in any other Eastern European country--by the CMEA (especially the U.S.S.R.), which accounted for about two-thirds of trade during the 1980s. Bulgaria's industrial structure went through successive phases linked to the evolving regional specialization within the CMEA area and, in particular, the trading relation with the U.S.S.R. Initially, basic industries were encouraged, while later in the 1980s the focus shifted to engineering and electronics. Although this strategy resulted in a relatively diversified industrial structure, it also culminated in low international competitiveness, as there was little pressure to adapt technology in line with international developments. In addition, the strategy overlooked Bulgaria's potentially competitive light industry sector, as well as its nonindustrial economy--including a traditionally strong agriculture.

Officially reported output growth averaged 4.5 per annum during 1980-88--representing a sharp deceleration from earlier decades--before turning negative in 1989. However, officially recorded growth rates probably overstated economic performance. With prices tightly controlled, the officially measured inflation rate was for long kept at very low levels while, at the same time, excess demand pressures built up as the passive accommodation by the banking system to credit demands by the Government and enterprises gradually led to the emergence of a large monetary overhang.

Bulgaria's external position vis-à-vis the convertible currency area deteriorated steadily in the late 1980s. Between 1985 and 1989, export earnings declined, the current account deficit rose from US\$85 million to US\$1.3 billion, and arrears emerged on Bulgaria's sizable export credits to developing countries. This required increased reliance on bank borrowing with steadily shorter maturities, and pushed the debt service ratio to 74 percent of exports of goods and services in 1989 and the total external debt in convertible currencies to US\$9.2 billion at the end of 1989 (227 percent of convertible currency exports). Vis-à-vis the CMEA area, on the other hand, sizable external current account surpluses were recorded during the same period. These, however, reflected mostly artificially favorable terms of trade for Bulgaria vis-à-vis the CMEA and especially the U.S.S.R.

In 1989, the growing social and political instability that culminated in the toppling of the Zhivkov regime in November had adverse effects on production that aggravated the already weak economic conditions. An important factor in this regard was the negative impact on agriculture of the forced exodus of ethnic Turks in 1989. The situation deteriorated even further in 1990 as the emergence of acute external debt servicing problems and a moratorium on commercial debt servicing in March 1990 led to a virtual cessation of foreign financing and a compression of imports from the convertible currency area. Dislocations in the CMEA countries and the USSR, as well as the Persian Gulf crisis, which caused higher oil prices and interrupted trade with Iraq and Kuwait, also took their toll. Despite the introduction of some reform measures in 1990, the economy was generally ill-prepared to face these shocks, as it was guided by neither a plan nor a full market mechanism. These developments resulted in a decline in domestic output of almost 12 percent in 1990, while administered price adjustments caused official inflation to surpass 26 percent (Table 1). There was a build-up of excess demand pressures stemming from reduced supplies of local products and imports, lax financial and incomes policies and--toward the end of the year--speculative behavior in anticipation of a price reform that was implemented only in February 1991. These pressures intensified shortages of goods at official prices and necessitated the introduction of formal rationing for basic commodities, including petroleum products, in urban centers, as well as a ban on the export of food in late 1990. Although estimates of the monetary overhang that had developed as a result of the growth in money incomes combined with price controls and--in late 1990--open rationing, do not exist, it has been estimated on the basis of the evolution of broad money velocity that perhaps up to one half of the broad money stock at end-1990 was held involuntarily.

a. The reform program of 1991

In early 1991, the authorities adopted a far-reaching stabilization and economic reform program aimed at introducing market mechanisms, eliminating excess demand, and limiting the external deficit while containing the decline in economic activity. The "big bang" day--considered as the start of the reform period in the empirical work that follows--was February 1,

Table 1. Bulgaria: Selected Indicators, 1988-91

	1988	1989	1990	<u>1991</u> Prelim. <u>1/</u>
(Percentage change; unless otherwise indicated)				
Real GDP	2.4	-0.3	-11.8	-22.9
Industrial output	3.4	-0.3	-13.0	-28.0
Retail prices	2.4	6.4	26.3	338.9
Nominal average wage <u>2/</u>	7.7	8.3	32.2	152.8
Real average wage <u>2/</u>	5.2	1.8	4.6	-42.0
Unemployment (in percent) <u>3/</u>	1.5	10.2
Cash fiscal balance (percent of GDP) <u>4/</u>	-5.6	-1.4	-8.5	-3.7
Broad money	10.2	10.6	15.8	114.8
Credit to non-government (in leva)	5.5	6.5	1.2	44.6
Exports in convertible currencies (in billions of U.S. dollars)	3.5	3.1	2.6	3.7
Imports in convertible currencies (in billions of U.S. dollars)	4.5	4.3	3.4	3.8
Current account balance (in billions of U.S. dollars)	-0.8	-1.3	-1.2	-0.9
Exchange rate (in leva per U.S. dollar; end of period) <u>5/</u>	1.64	2.02	9.70	21.81

Source: Data provided by the Bulgarian authorities.

1/ Estimates, based on partial data.

2/ In the state sector.

3/ End-period.

4/ Based on actual external debt service payments; for 1991, after external debt rescheduling and debt deferrals.

5/ Prior to 1991, commercial exchange rate.

when a comprehensive price reform was announced, involving liberalization of over 70 percent of retail turnover and a more than four-fold average increase in administered prices with the elimination of most subsidies. As a result, prices more than doubled in February alone, and average retail price inflation reached almost 340 percent in 1991. At the same time, a very tight monetary program was introduced, and interest rates--which were liberalized--increased drastically: the National Bank's basic rate increased from 4.5 percent per annum in January to 46 percent in February and, gradually, to 70 percent by year-end. Wages and benefits were only partly adjusted to compensate for the impact of price reform. As a result, real wages in the state sector fell drastically in the aftermath of price liberalization and, despite a strong recovery in the fourth quarter of 1991 as incomes policy was relaxed, averaged about 40 percent below their 1990 level. In the external area, a unified floating exchange rate system was introduced in mid-February, resulting in an immediate depreciation of the exchange rate by more than 400 percent, 1/ and foreign trade was liberalized.

b. The output decline

Following the "big bang", economic activity all but collapsed in Bulgaria: real GDP is estimated to have declined by about 23 percent. Although official data, which do not capture many activities of the newly-emerging private sector, probably overestimate this decline, the collapse was nonetheless larger than in any other Eastern European country. The decline was concentrated in the first half of 1991, during which output is estimated to have fallen by over one quarter, while a small recovery took place in the second half. 2/

c. Developments in industry

The decline was mostly concentrated in industry, where gross output fell by about 28 percent in 1991. On a month-to-month basis, industrial output registered by far the largest decline immediately after the "big bang" in February (about 15 percent), with much smaller declines, on the order of 3-5 percent, in March, April and May. By May, industrial output was almost 40 percent below its monthly average in 1990. Beginning in June, industrial output started a slow recovery.

1/ The unified exchange rate obtained in the first daily interbank auction on February 19 was leva 28.25 per U.S. dollar, compared with leva 7 per U.S. dollar used in most trade transactions up to then. The leva appreciated thereafter, fluctuating in the range of leva 16-19 per U.S. dollar for most of the year. Near the end of the year the amplitude of the fluctuations increased, and the rate was leva 21.81 per U.S. dollar at end-December 1991.

2/ These estimates are based on seasonally adjusted data. Actual unadjusted indicators exaggerate the decline in the first half (and, similarly, the recovery in the second half).

While output declined in all industrial sectors, the degree of the decline differed significantly across sectors: about 40-45 percent in ferrous metallurgy, construction materials, and electrical appliances and electronics; about 30 percent in nonferrous metallurgy, machine building, chemicals, and textiles; 20-25 percent in timber, glass, and food, drinks, and tobacco; and about 5 percent or less in coal, and printing and publishing (Chart 1).

The near-collapse in exports to the ex-CMEA countries had a massive impact upon the economy in 1991, especially in industry. This reflected a large prior dependence on trade with this region, given that exports to the USSR alone accounted for about half of total exports, or 15-20 percent of Bulgarian GDP in recent years. The total volume of Bulgarian exports to the ex-CMEA is estimated to have shrunk by about 66 percent in 1991. The effect of this shock on output was concentrated in the sectors that were mostly geared toward exports to the ex-CMEA area; namely, machinery and electrical appliances and electronics and, to a lesser extent, textiles and food. Predictably, it is these sectors that registered the biggest output losses, together with sectors with upward linkages, notably metallurgy. Machine building was also affected by the shortage of steel imports from the Soviet Union and the shortfall in production in domestic metallurgy. In these sectors, diversion of product to convertible-currency area markets was hindered either by its relatively poor quality and range or, in the case of textiles and food, by trade barriers. In particular, there is some evidence that EC quotas may have become binding for some textile products in the second half of the year.

There were also important supply factors behind the output decline, notably the shortage of raw materials, energy, and semi-finished goods that were previously imported from the Soviet Union, as well as the disruption in the domestic nuclear industry. Although data on total energy consumption by industry are not available, data on the domestic consumption of oil and oil products are revealing. Consumption of this type of energy fell by 38 percent in volume terms in 1990 compared with 1989, and by an estimated 30 percent in the first half of 1991, compared with the same period of the previous year. ^{1/} This impinged most directly and acutely on the heavier industrial subsectors of chemicals and metallurgy. In addition, these sectors were also directly affected by the shortage of natural gas and other raw material imports from the ex-U.S.S.R. The reduction in output in these sectors aggravated the shortages of inputs in the rest of the economy.

The compression of domestic demand, resulting largely from the negative income effects associated with the above factors and the tight financial discipline imposed on state enterprises, probably also contributed to the collapse in output. There is some evidence that demand compression played a significant role in the collapse of sectors producing final (consumer)

^{1/} Data for the year as a whole are not yet available.

goods, particularly food processing (where gross output was down by about 25 percent in 1991), and services and retailing in the non-industrial sectors.

Enterprise surveys conducted in industry during 1991 indicate that the relative importance for the output decline of demand and supply factors--as perceived by state enterprise managers--changed during the year. As Chart 2 shows, in early 1991 supply-side factors (i.e., shortage of inputs, supply line disruptions, etc.) were reported as the most important element in the output collapse by about half the surveyed enterprise managers, while demand factors (i.e., lack of orders, loss of markets, etc.) were cited by only about one in ten managers. Later, however, demand factors increased in relative importance, and by mid-year had become the most important factor for about half the enterprises, while supply factors remained relevant for only 20-30 percent of the enterprise managers that were surveyed.

It is notable that the state enterprise sector in Bulgaria during the first year of reform appears to have shed excess labor faster than in perhaps any other reforming country. Average employment in 1991 in state industry, in particular, declined by about 26 percent compared to 1990. Unemployment rose from less than 2 percent in January to over 10 percent of the labor force in December 1991. This, in addition to the real wage decline, contributed to weak domestic demand. Government expenditures did not compensate for this decline, as the authorities struggled to maintain a tight fiscal policy stance.

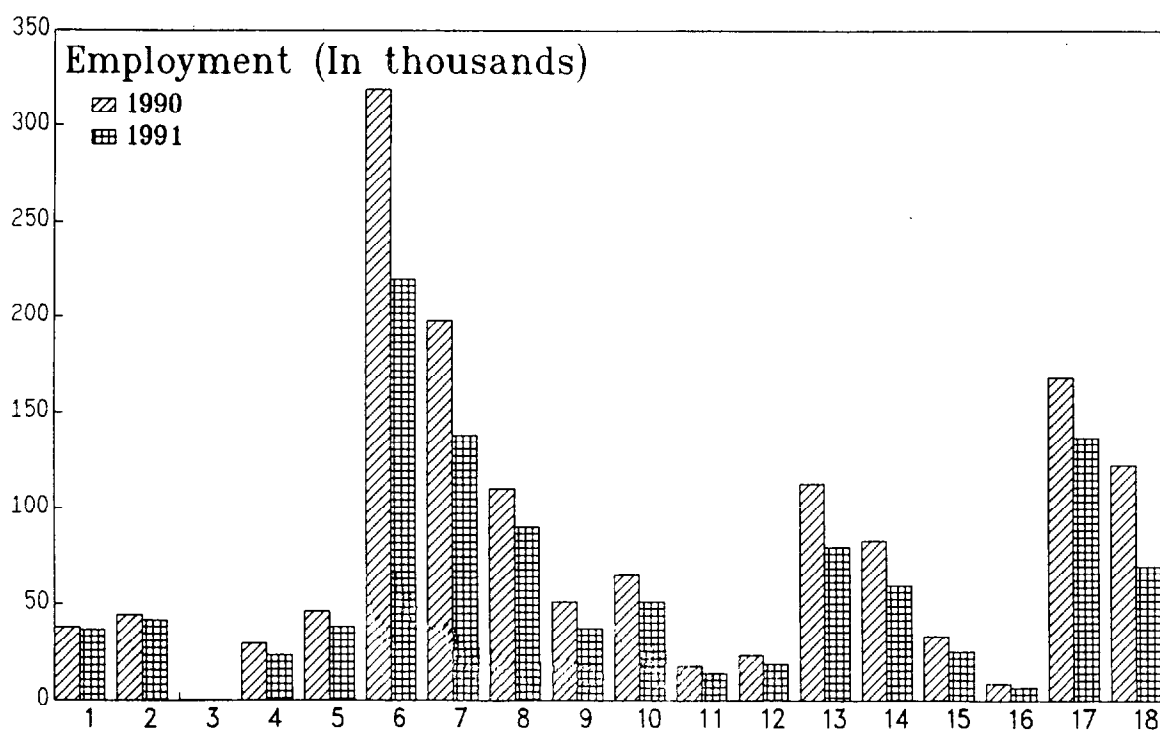
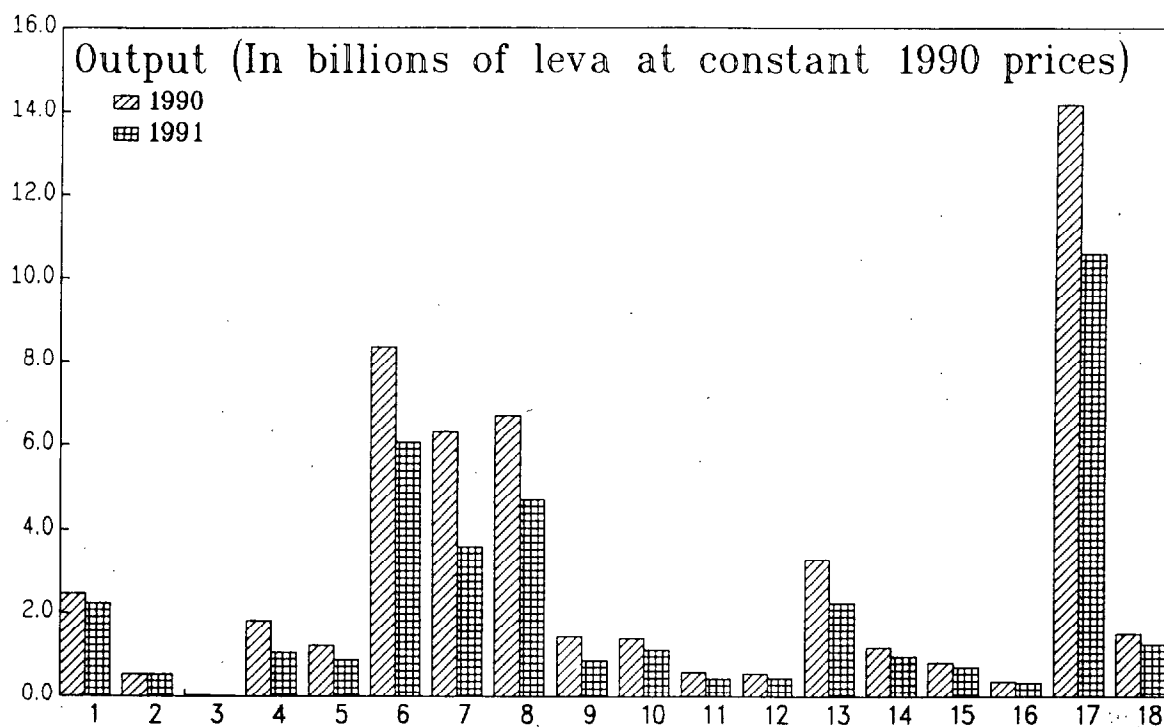
The reduction in employment took place in all industrial sectors, but to different degrees. There seems to have been some correlation between output and employment declines across sectors, as would be expected. Employment declined by about 30 percent in machine building, construction materials, electrical appliances and electronics, and textiles; and by about 20 percent in metallurgy, chemicals, glass, and food, drinks, and tobacco. However, employment also declined substantially in a few sectors that did relatively better (notably printing and publishing--down by 20 percent), and registered the biggest decline in other industry (about 40 percent). Thus, the decline in employment appears *prima facie* to have been related not only to the decline in output, but also perhaps to the extent of labor hoarding under the previous regime.

As a result, the pattern of average productivity changes differed significantly across sectors. While average output per worker in industry in 1991 appears to have remained broadly unchanged or declined by very little from 1990, some sectors registered large productivity losses (oil extraction, and ferrous metallurgy by about 20 percent; nonferrous metallurgy, electrical appliances and electronics, and chemicals by about 10 percent), while others registered gains (5-10 percent in food, clothing, and leather; and about 15 percent or more in printing and other industry, where the largest decline in employment occurred). The evidence suggests that light industrial sectors shed labor much faster than heavy industry, even if the decline in demand for their output was smaller.

CHART 1

Bulgaria

Industrial Output and Employment by Sector (1990-1991)



Source: Bulgarian Central Statistical Office.

- | | | |
|------------------------------|------------------------------|-------------------------------|
| 1. Electricity | 7. Electrical Engineering | 13. Textiles |
| 2. Coal Mining & Minerals | 8. Chemical & Oil Processing | 14. Wearing Apparel |
| 3. Oil & Gas Extraction | 9. Construction Materials | 15. Leather, Fur, & Footwear |
| 4. Ferrous Metallurgy | 10. Timber & Wood Processing | 16. Printing & Publishing |
| 5. Non-Ferrous Metallurgy | 11. Pulp & Paper | 17. Food, Beverage, & Tobacco |
| 6. Machine Building & Metals | 12. Glass & Porcelain | 18. Other Industries |

2. The Czech and Slovak Federal Republic

Before the communist regime was installed in 1948, Czechoslovakia had a well-developed market system and one of the most advanced industrial economies in the world. The centralization of economic decisions and property during the communist regime was, however, one of the most rigid in the area. State ownership extended to virtually all economic units, including agriculture and retail trade. Moreover, the application of planning methods was strict; there were no significant attempts at decentralizing enterprise decisions in a market-like environment as in Hungary and Poland.

Fortunately, the tradition of fiscal and monetary restraint that spared Czechoslovakia from hyperinflation during the 1920s was, to some extent, maintained during the years of central planning. In contrast to many of the other PCPEs, Czechoslovakia emerged from the communist period with low foreign debt (about 15 percent of GDP), relatively few shortages, and low inflation. Moreover, it was generally accepted that the "monetary overhang" was of a smaller magnitude than elsewhere in the region, despite the pervasiveness of price controls, and that the exchange rate was less out of line than in neighboring countries. These conditions portended a less demanding stabilization effort than in some of the other PCPEs.

a. The reform program of 1991 ^{1/}

The comprehensive reform program that was implemented on January 1, 1991 comprised a major liberalization of domestic prices and external trade and a rapid privatization program following an initial preparatory phase. A fairly tight set of financial policies, supported by the double anchors of wage controls and a fixed exchange rate regime--after substantial depreciation--was designed to prevent the expected price jump from igniting an inflationary spiral. This "big bang" approach seemed to be the only alternative to a slide into a "no-man's land" economy, in which the central-planning system could no longer be made to function but the prevalence of price controls and other restrictions prevented the transformation into a fully-fledged market system.

Thus, on January 1, 1991, prices of goods and services representing about 85 percent of the total value of sales were freed, and most subsidies on consumer goods were removed. Virtually all restrictions on external current account transactions were removed. A full foreign exchange surrender requirement was imposed, however, since capital account transactions remained subject to control. To bolster credibility in the fixed exchange rate system, given the initially precarious level of

^{1/} This section draws heavily on Aghevli, Borensztein and van der Willigen (1992). Other useful references include Begg (1991), Dyba and Svejnar (1991), European Economy (1991), and Prust and IMF Staff Team (1990).

international reserves, the exchange rate was set at a relatively low level. To support the stabilization effort, and also to minimize the likelihood of decapitalization in state enterprises, a tax-based incomes policy was put in place. In 1991, the policy sought to bring about a decline in real wages of about 10 percent.

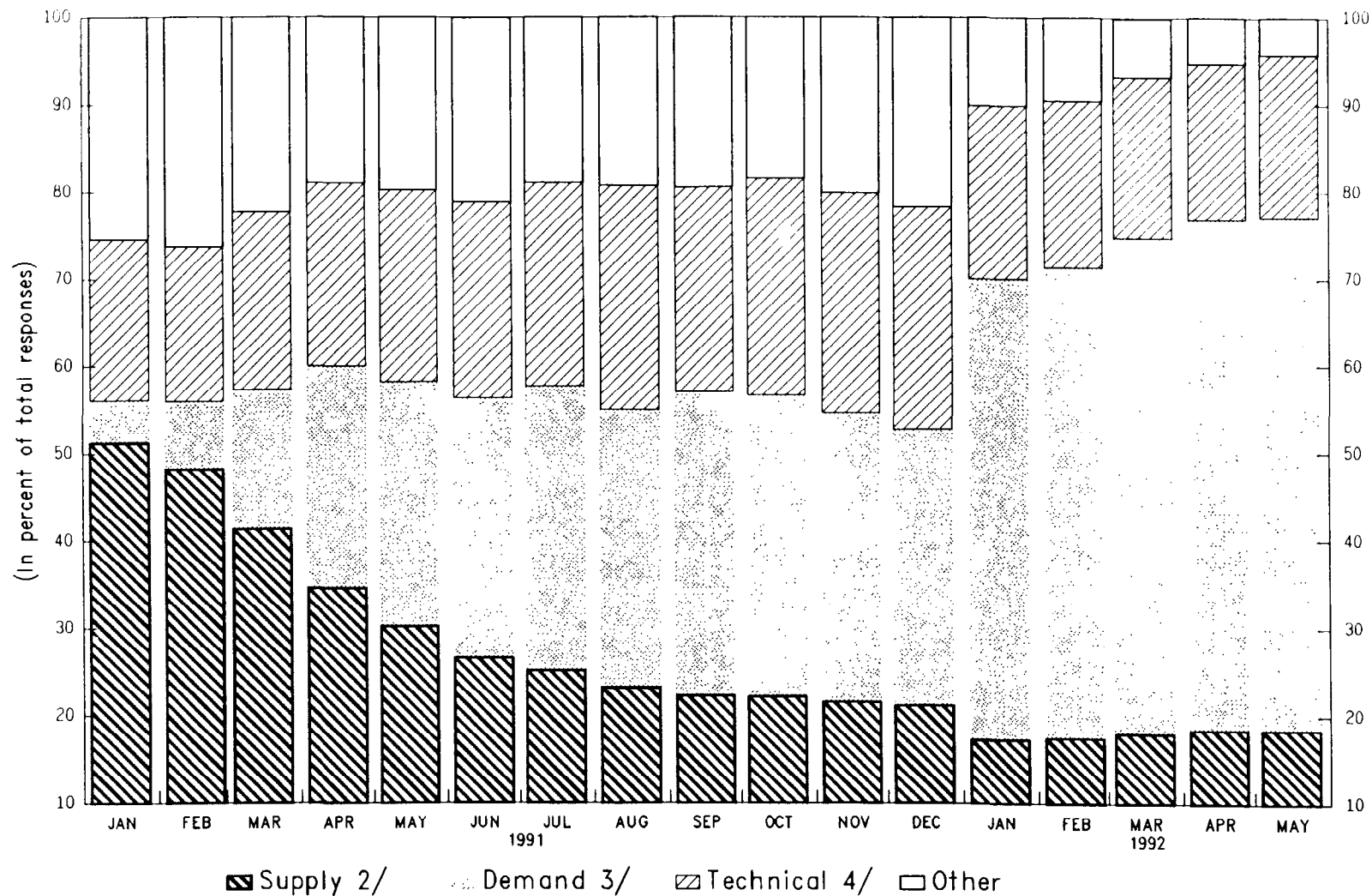
In terms of structural reforms, the most decisive initiatives were taken with respect to privatization. A massive small-enterprise privatization program converted more than 25,000 enterprises--mainly in retailing and small manufacturing--into private entities. Several more units were returned to original owners by application of a restitution law. The large-enterprise privatization program, while also including some direct sales to foreign and domestic investors, was predicated mainly on the distribution of vouchers widely throughout the population. The first wave of the mass privatization program is expected to be completed by the summer of 1992.

While price increases after the "big bang" were promptly contained, the initial price jump of about 45 percent was much higher than envisaged. This implied that the programmed monetary targets became more restrictive than anticipated. In addition, cautious behavior on the part of banks slowed credit to enterprises even more than was targeted, particularly in the first quarter of 1991. This situation was compounded by a fiscal position that proved to be much tighter than expected. An unanticipated surge in profit tax revenues--a result of extraordinary accounting profits related to the revaluation of inventories in the state enterprise sector--was mainly responsible for a fiscal surplus of nearly 10 percent of (quarterly) GDP in the first quarter of the year. These developments did not help to soften the output costs of the transition.

A strong balance of payments position--a reflection of larger declines in imports than in exports--also emerged in 1991. The weakness of imports reflected both the level of activity, as well as increases in relative import prices. While the volume of exports to non-socialist economies expanded, this was more than offset by a fall in exports to the former-CMEA area.

The collapse in trade with the former members of CMEA was an important contributing factor to the weakness of activity in the CSFR in 1991. In part, the trade collapse reflected a large change in relative prices and a reorientation of trade according to comparative advantage; in fact, for Czechoslovakia, the volume of imports from the former CMEA area declined more than the volume of exports. But the decline in Czechoslovakia's exports also reflected a scarcity of foreign exchange in some partner countries. The resulting fall in export demand exerted a significant negative influence on the level of domestic activity.

Chart 2
Bulgaria
Reasons Given by Industrial Enterprise
Managers for the Decline in Industrial Output (1991-1992) 1/



Source: Bulgarian Central Statistical Office.

1/ The methodology of compiling data changed in January 1992, and data before and after that date are not directly comparable.

2/ Supply factors reflecting primarily shortages of raw materials and other inputs.

3/ Demand factors reflecting an inability to sell output.

4/ Production interruptions due to refitting, work stoppages, etc.

b. The output decline

As elsewhere in the reforming economies of Eastern Europe, GDP fell sharply in the first year of the stabilization-cum-reform program in Czechoslovakia, by about 17 percent in 1991 (Table 2). Apart from the cessation of activities that were no longer competitive under the new rules of the game, several macroeconomic forces were at play. These included the large increases in the relative price of energy and other industrial inputs, the decline in export demand from other PCPEs, and the fairly tight policy stance adopted by the authorities to prevent an inflationary spiral, particularly during the first half of the year.

Western-style national income accounts are still in the process of being developed in Czechoslovakia, and information is therefore incomplete and perhaps not entirely reliable. Taken at face value, however, the figures suggest that personal consumption bore the brunt of the adjustment, declining by 33 percent relative to the level in 1990. Fixed investment, in contrast, fell more or less in line with GDP. Contrary to widespread belief, foreign trade appears to have had a positive impact on output (when measured on a national accounts basis). Exports fell by only 4 percent, but imports plunged by over 31 percent, both in real terms. Government consumption contracted by only 4.5 percent in real terms.

The national income accounts may have been distorted by several factors, including sharp changes in relative prices, the emergence of a private sector, and changes in statistical methodology and concepts. The staggering magnitude of the reported decline in personal consumption certainly introduces some doubts about the accuracy of the data. The magnitude of the consumption decline is roughly consistent with the fall in the measured volume of retail sales, an index that is mostly dominated by sales in state stores and that does not cover private activity with a similar degree of detail. Relative price changes (and high inflation) may have distorted the valuation of inventories and international trade.

Both demand and supply factors appear to have been behind the output fall in 1991. Energy prices increased sharply in December 1990 and April 1991 (as reflected in the producer price index for the energy sector). The cumulative increase in the relative price of energy exceeded 60 percent (relative to the aggregate producer price index). In addition, credit to enterprises was fairly tight--particularly in the first quarter--when the increase in nominal terms was only 6 percent at a time when adjustments in administered prices and the exchange rate contributed to a jump in the general price level on the order of 50 percent. This combination of increases in input costs and credit restriction appears to suggest a scenario such as that described by Calvo and Coricelli (1992) for Poland, of a supply-side shock triggering the recession. However, Czechoslovak enterprises might have entered the program in relatively better financial shape than their Polish counterparts--in terms of operating capital--enabling them to better withstand these shocks.

Table 2. Czech and Slovak Federal Republic--Selected Indicators, 1988-91

	1988	1989	1990	1991 Estimated
(Percentage change; unless otherwise indicated)				
Real GDP	2.5	1.4	-0.4	-16.4
Industrial output	2.1	0.8	-3.5	-24.7
Consumer prices	0.2	2.3	10.8	58.7
Industrial wholesale prices	--	-0.7	4.4	66.8
Nominal average wage	2.3	2.3	3.7	16.5
Real average wage	2.1	--	-6.4	-26.6
Unemployment			1.0	6.6
Fiscal balance (percent of GDP)	3.1	-2.4	0.1	-2.0
Credit to enterprises and households	11.5	-2.7	1.4	19.5 <u>1/</u>
Broad money		3.5	0.5	26.9
Exports in convertible currencies (in billions of U.S. dollars)	5.0	5.4	6.0	8.6
Imports in convertible currencies (in billions of U.S. dollars)	5.1	5.0	6.8	9.1
Current account (in billions of U.S. dollars)	-0.1	0.4	-1.1	0.2
Exchange rate (crowns per dollar; end of period)	14.4	15.0	22.7	29.5

Source: Data provided by the Czechoslovak authorities, and IMF staff estimates.

1/ Includes recent debt reduction operation.

Although possibly distorted by valuation problems, inventory accumulation data appear to be consistent with the presence of shifts in aggregate demand. Inventory accumulation amounted to 13 percent of GDP in the first quarter of 1991, and to some 4 percent of GDP in the second and third quarters. In the fourth quarter, the measured decline in inventories was equivalent to nearly 8 percent of GDP. Although seasonal patterns may have been present, the magnitudes of the inventory accumulation in the first quarter and decumulation in the fourth quarter were more than twice as high as the corresponding magnitudes a year earlier. This is consistent with a larger-than-anticipated drop in sales in the first quarter and a recovery of sales later in the year, when financial policies were eased. The abrupt fall in industrial production in March 1991, on the back of more moderate declines in January and February, is also consistent with the view that industry faced a larger-than-anticipated drop in sales at the beginning of the year. While the accumulation of inventories in the first quarter may be overstated by valuation effects, the decumulation in the fourth quarter is probably better measured, as it followed several months of price stability.

Regarding the composition of output, available information suggests a larger decline in industry (20 percent) and construction (32 percent) than in agriculture (9 percent). While data on the services sector remain fragmentary, anecdotal evidence points to a boom in activity in private services. This has been reflected in the geographical distribution of unemployment where, for example, in Prague in October 1991, the unemployment rate stood below 1 1/2 percent (a lower rate than in 1990), compared to rates in excess of 10 percent in the more industrial regions of Slovakia (the national average rate was about 6 percent).

c. Developments in industry

Developments within the industrial sector can provide clues as to the major determinants of the output decline. In the CSFR, industry accounted for roughly 50 percent of GDP and was 98 percent in state hands prior to the launch of the reform program. The average number of employees per enterprise was nearly 1,800. The overwhelming preponderance of large state enterprises in this sector ensures a more ample (and accurate) statistical coverage. A number of monthly indicators are available for a group of 21 (roughly two-digit) industrial branches.

Although the share of industry in GDP was expected to decline following the demise of central planning, a substantial reallocation of resources within industry was also expected. Comparative advantage must lie in some of the industrial activities and, while significant investment and growth may be slow to take off, there is no good reason for output to decline in sectors that enjoy such comparative advantage. Macroeconomic shocks, by contrast, would affect the whole economy, including sectors with newly-acquired comparative advantage.

With the exception of the fuels and energy sectors, all branches of industry experienced a very pronounced fall in production in 1991.

Nevertheless, the extent of the drop in production did span a wide range in other branches. The sharpest drops were experienced by the non-ferrous metallurgy, clothing, electronics, leather products, and textiles branches, which declined by about 40 percent in 1991. At the other end of the scale, the food, cellulose and paper, ferrous metallurgy, and chemicals sectors fell by about 20 percent in 1991 (see Chart 3).

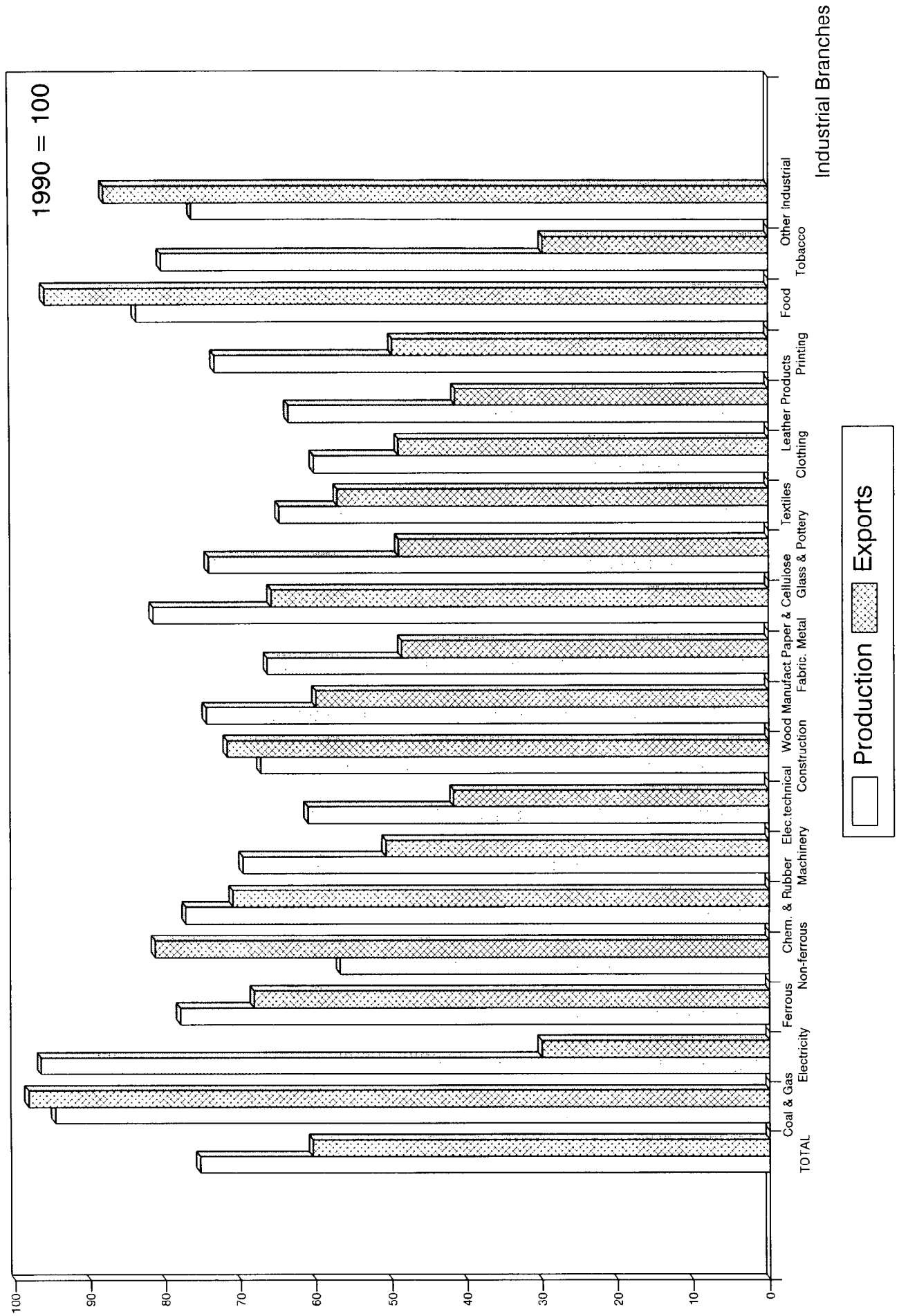
There does not appear to be an obvious rationale for this sectoral pattern of output decline. While several of the worst performing sectors are heavily oriented towards exports and are among those sectors which experienced the largest drops in exports (namely, clothing, leather products and electronics), the textile sector did not suffer a decline in exports and, in fact, exports of non-ferrous metallurgy increased considerably (although from a relatively low base). Some of the best performing sectors are basically oriented to domestic consumer markets--such as food and beverages and tobacco--but the opposite is true for ferrous metallurgy and chemicals. (See Chart 3). ^{1/}

Employment in the industrial sector fell continuously from April and, by December, industrial employment had fallen by some 17 percent from its pre-program level. The correlation between employment and output changes is not perfect. Some of the sectors that experienced the sharpest declines in output did in fact cut back drastically on employment, for example in nonferrous metallurgy (where employment declined by 40 percent) and electronics (30 percent). But some other branches that experienced similarly large drops in output reduced employment by no more than the average across industry as a whole (for example, textiles, clothing, and leather products). This may reflect different perceptions about how permanent the decline in output would be, pre-existing distortions in the level of employment, and different degrees of adaptation to new market conditions (see Chart 4).

Regarding average wage increases, there was considerably more uniformity across sectors, to a large extent because of the ceilings on wage increases imposed by the incomes policy adopted by the authorities. In general terms, average wage increases appear to have been fairly closely related to the output performance of each sector. Exceptions to this pattern are non-ferrous metallurgy and textiles, where wage increases close to the industrial average took place despite the very large declines in output experienced by these sectors. Because these two branches also shed labor the fastest, there appears to have been some relationship between changes in the wage bill and changes in output in these sectors (Chart 4).

^{1/} The data on exports correspond to information on deliveries ("dodavky") for exports provided by enterprises and not to exports as recorded in customs or balance of payments data. The data appear to be roughly consistent with the national income accounts, which show a decline in exports of about 5 percent in volume terms in 1991. Data on the volume of exports from the balance of payments show much larger declines.

Chart 3. Czechoslovakia: Production and Exports in 1991
by Industrial Branches



3. Romania

During the post-war years, the economic system of Romania developed in ways similar to that of other centrally planned economies. Unlike several among them, however, which had already engaged in economic reform efforts of varying scope by the late 1960s, Romania clung until the end to a rigid central planning model, which became increasingly distorted. The only half-hearted reform attempt (the "New Economic and Financial Mechanism") introduced in 1979, ended up increasing the degree of centralization in production decisions, while direct controls on factor allocation--notably labor mobility--multiplied. 1/ Thus, the economic system in Romania at the beginning of reform was perhaps the most centralized and distorted among the countries in the region.

After a rescheduling of commercial bank debt in 1986, one of the main goals of the Government became the elimination of all foreign debt. To that end, economic policies emphasized the achievement of substantial trade surpluses with the convertible currency area, which were achieved primarily through a significant compression of imports. In 1988, the convertible currency current account surplus reached US\$3.6 billion (6 percent of GDP at the commercial exchange rate of the time), while net exports of goods and nonfactor services surpassed 9 percent of GDP. Another implication of this policy was that the importance of the CMEA countries for Romania's exports was smaller than for some other countries in the region, notably neighboring Bulgaria: during the late 1980s, exports to the CMEA area represented about 45 percent of total exports. 2/ Convertible currency import compression, however, meant that Romania came to depend heavily on imports from the CMEA area: such imports accounted for about 60 percent of total imports during the late 1980s; almost half of the imports from the CMEA area consisted of fuels and raw materials.

The policy of generating large convertible currency trade surpluses to repay the external debt led to a decline of real gross fixed investment during the late 1980s, resulting in an increasingly inadequate and ageing capital stock. This, together with the growing shortage of inputs and the substitution of low-quality domestic inputs for imported ones, contributed to a decline of the rate of growth of value added in industry. By 1989, although nearly all foreign debt had been repaid, the deterioration of economic performance accelerated. In 1989, real GDP declined by 5.8 percent, reflecting a fall in value added in almost all sectors of the economy (Table 3). Real consumption increased slightly, while the drop in output was reflected in reductions in gross domestic fixed investment, the trade surplus--which fell to about half the 1988 level--and the level of inventories. At the same time, the growth of money incomes combined with

1/ Romania's recent economic history, as well as the economic reform program after 1989 are discussed in detail in Demekas and Khan (1991).

2/ In this calculation, trade in transferable rubles has been converted into dollars at the commercial cross exchange rate with the Romanian leu.

Table 3. Romania: Selected Indicators, 1988-91

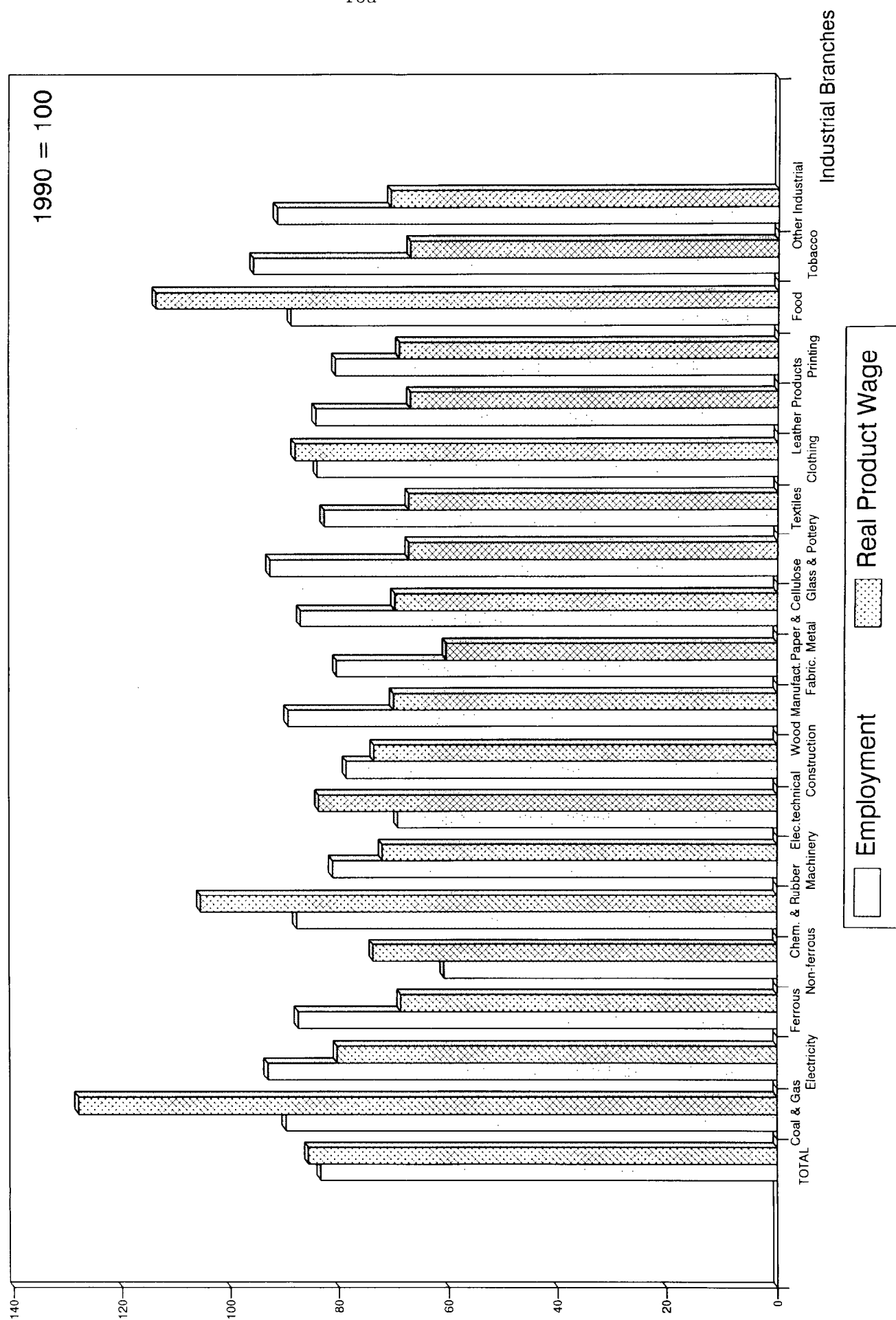
	1988	1989	1990	<u>1991</u> Prelim.
(Percentage change; unless otherwise indicated)				
Real GDP	-0.5	-5.8	-7.4	-13.0
Industrial output	3.1	-1.0	-18.2	-22.0
Consumer prices <u>1/</u>	2.6	0.9	4.7	161.1
Nominal average wage	2.6	4.0	10.5	123.8
Real average wage	--	3.1	5.6	-14.2
Unemployment (in percent)	2.9 <u>2/</u>
Fiscal balance				
(percent of GDP) <u>3/</u>	5.9	8.4	-0.1	-2.0
Broad money	10.6	5.6	17.3	100.8
Credit to non-government	5.1	--	-15.6	101.0
Exports in convertible currencies				
(in billions of U.S. dollars)	6.5	6.0	3.6	3.5
Imports in convertible currencies				
(in billions of U.S. dollars)	2.9	3.4	5.4	4.9
Current account balance				
(in billions of U.S. dollars)	3.6	2.9	-1.7	-1.4
Exchange rate (in lei per				
U.S. dollar; end of period)	14.4	14.4	34.7	189

Source: Data provided by the Romanian authorities.

1/ Weighted average of prices of goods and services sold by state enterprises and cooperatives and prices at the free peasant markets through end-1990; consumer price index for 1991.

2/ End-period.

Chart 4. Czechoslovakia: Employment and Real Product Wages in 1991
by Industrial Branches



the stagnation of the economy and pervasive price controls gave rise to a substantial monetary overhang. Hard estimates of the overhang are, of course, difficult to come by, but the income velocity of broad money held by households has often been used as a proxy for the degree of forced savings of the population. This velocity declined continuously from a historical range of 2.1-2.3 in the early 1980s to 1.65 in 1989, suggesting that perhaps up to one-third of money balances were held involuntarily by economic agents. As in other countries, however, the magnitude of the corrective adjustment of prices after liberalization indicates that this measure probably underestimated the size of the monetary overhang at the beginning of Romania's reform program. It is not possible to quantify this judgement, however, because inflationary developments in 1990 and early 1991 were also influenced by expansionary monetary and incomes policies during most of 1990.

a. The Romanian economic reform program

After the collapse of the Ceausescu regime in December 1989, the country was faced with a deep economic and social crisis. On the one hand, a large part of Romania's productive capacity was antiquated and too energy-intensive--especially in industry; in addition, the economic system was severely distorted following the policies of the previous few years, mainly as a result of the imposition of ever-tighter controls, arbitrary economic decisions prompted by political considerations, and the systematic falsification of data at all levels. On the other hand, the decline in living standards of the population had created pent-up demand for consumer goods and political pressures for immediate improvements in welfare.

Romania embarked on its transition to a market economy in early 1990. The provisional Government that took over in the last days of 1989, followed by the Government that was formed after the May 1990 elections, designed and began implementing a comprehensive economic reform program, similar to those of other countries in the region. Private economic activity and foreign investment, as well as some agricultural product prices, were liberalized in February 1990; trade barriers were reduced and the state monopoly in trade was abolished at the same time; and prices in the economy were liberalized in three rounds starting in November 1990. In 1991, the reform program gained momentum and a package of stabilization policies was introduced in January to address the widening macroeconomic disequilibria. As part of that package, tight fiscal and monetary policies were implemented (although a large expansion of credit and money took place in December 1991, as part of a scheme for clearing inter-enterprise arrears); interest rates were liberalized in April 1991; and steps were taken to reform the tax system and the financial sector. A free interbank foreign exchange market was introduced in February 1991 in parallel with the official rate, as a first step towards the unification of the exchange system that took place in November 1991. As a result, the exchange rate of the leu vis-a-vis the U.S.

dollar jumped from lei 30=US\$1 at end-1990 ^{1/} to lei 189=US\$1 at end-1991. Although in Romania--unlike in Bulgaria and Czechoslovakia--there was no clear "big bang" day, and many critical reform measures were introduced at the beginning of 1990, for purposes of the empirical work that follows, the "beginning" of reform is taken to be November 1, 1990, the date of the first major price liberalization.

b. The output decline

Despite the hopes of Romanian reformers, the stagnation and decline of the late 1980s were followed by further reductions in output in 1990 and 1991. In 1990, real GDP fell by 7.4 percent, reflecting mainly an 18.2 percent drop in gross industrial production. On the demand side, gross domestic fixed investment dropped 38.2 percent in real terms as a result of the halting of a number of inefficient projects, including various prestige projects. A rise in real consumption of about 10 percent, financed by large increases in wages and money incomes, contributed to a substantial trade deficit, as imports of consumer goods increased and exports of food and other consumer goods declined in order to satisfy domestic consumption. This trade deficit was, in turn, financed by the virtual elimination of substantial foreign exchange reserves (almost US\$2 billion at end-1989). At the same time, exports to the CMEA countries fell by about 40 percent due to the economic crisis in those countries. The decline in demand in the ex-CMEA countries and the change in the pattern of domestic demand--which was not matched by a restructuring in production--together with the hoarding by peasants of food products, led to a large accumulation of stocks.

The decline in economic activity accelerated in 1991, after economic reform got well underway, and a stabilization package was introduced in January 1991. Gross industrial production fell by an additional 22 percent from its average level in 1990. This, combined with declines in agriculture and construction resulted in an estimated decline in real GDP of 13 percent in 1991. On the demand side, real gross domestic fixed investment fell by about 30 percent, while a new large accumulation of stocks took place as a result of expectations of price increases, and because of an inadequate response of firms in the industrial sector to the sudden collapse of external demand and the shift in domestic demand.

c. Developments in industry

Due to its prominent role, the behavior of the industrial sector was central to output developments in 1990 and 1991. In 1990, the industrial sector contributed 48 percent of GDP and accounted for 34 percent of total employment. The most important branches of industry both in terms of output and employment have historically been chemicals and petro-chemicals (about 16 percent of industrial output and 7 percent of industrial employment in

^{1/} The official rate of the leu had already been devalued twice in 1990 by a cumulative 50 percent.

1990); machine building (about 14 percent and 8 percent, respectively); food processing (14 percent and 16 percent, respectively); textiles (11 percent and 16 percent, respectively); and metallurgy (10 percent and 6 percent, respectively). The structure of gross industrial production has not changed substantially since the early 1980s.

Unlike in Bulgaria and Czechoslovakia, the decline in industrial output in Romania was spread more evenly over time. A large decline in early 1990 caused by the civil disturbances following the toppling of Ceausescu was partially reversed later in the year, and by June 1990, industrial output was at about 90 percent of its average-1989 level. It then began an accelerated, if somewhat erratic, period of decline, with the largest drops being recorded in October 1990 (about 8 percent), January and July 1991 (about 10 percent). The decline continued throughout 1991, so that by December, industrial output was at 77 percent of its average level one year before (Chart 5).

The shortage of inputs and especially energy has been an important factor behind the output collapse in industry, particularly in energy-intensive sectors, such as metallurgy, oil processing, and machinery and equipment. Two factors contributed to this shortage: the decline in domestic production of energy (which affected energy supplies especially in 1991), and the collapse in energy imports (mostly in 1991). ^{1/} This decline affected industry disproportionately, as the previous policy of diverting energy from households to industry was reversed in early 1990.

Other supply factors behind the collapse in output were the disruptions associated with the violent change of regime in December 1989, which continued in various forms during at least the first half of 1990 (worker absenteeism, work stoppages, etc.); the effects of an ageing and increasingly inefficient capital stock; and a reduction in working hours introduced in early 1990.

On the demand side, domestic and external markets for some industrial products disappeared as a result of the collapse of the CMEA and the inadequate quality of production, affecting a large number of enterprises. The effects of the collapse of the CMEA, in particular, were concentrated in some sectors such as railway equipment, which had been exclusively geared toward exports to the ex-USSR, as well as industrial machinery and electrical appliances and electronics. In all these sectors, the decline in output in 1991--after the CMEA was formally dissolved--was much larger than in 1990. This fall in demand compounded supply disruptions and shortages of

^{1/} Although Romania imported little of its oil from the CMEA area during the 1980s, it was dependent on the USSR for almost all of its natural gas imports and most of its electricity imports. Total primary energy imports, in tons of oil equivalent, fell by 15 percent in 1990 and an additional estimated 41 percent in 1991.

inputs. Finally, the emergence of large inter-enterprise payments arrears in late 1991 probably also contributed to a slowdown in production.

Although production declined in all industrial sectors in 1990 and 1991, the rates of decline were not uniform across sectors (Chart 6). The biggest losses in the two-year period were registered in rail transport equipment (gross output in 1991 was 57 percent below its average 1989 level); oil processing and building materials (both sectors 51 percent below); ferrous mining (49 percent below); electrical appliances and electronics (47 percent below); and coal mining, coal coking, metallurgy, and medical instruments (43-45 percent below). In contrast, output of household appliances, clothing, tobacco, and leather declined by a cumulative 13-20 percent over the two-year period, while output in the furniture sector fell by less than 2 percent. 1/

As regards employment, unlike in Bulgaria, Romanian industrial enterprises were relatively slow to shed excess labor. Industrial employment declined from 3.7 million in January 1990 to 3.5 million at end-1990 and to 3.2 million at end-1991, a cumulative decline of 13 percent, compared with a cumulative decline in output of over 23 percent during January 1990-December 1991. Industrial employment actually increased to almost 3.8 million in the first quarter of 1990, and started declining steadily only after April. Total unemployment seems to have started increasing rapidly in mid-1991 (reliable data on the registered unemployed became available only in 1991), but the level of unemployment remained low: at end-1991, an estimated 2.9 percent of the labor force was unemployed. Unemployment is expected to increase rapidly in 1992.

The employment losses were not equally distributed across sectors, and do not, *prima facie*, appear to have been closely correlated with the decline in output. Sectors such as mining (ferrous and non-ferrous), electrical appliances and electronics, and chemicals and petro-chemicals lost only a cumulative 10-12 percent of their employment during the two years, while employment in mechanical engineering (including transport equipment) and building materials declined by about 20 percent. 2/ On the other hand, employment actually increased a little in some sectors, such as electricity and thermal power, crude oil and gas, and food. In all these sectors, however, the gains in employment materialized in the first quarter of 1990, and the number of workers remained steady or declined thereafter.

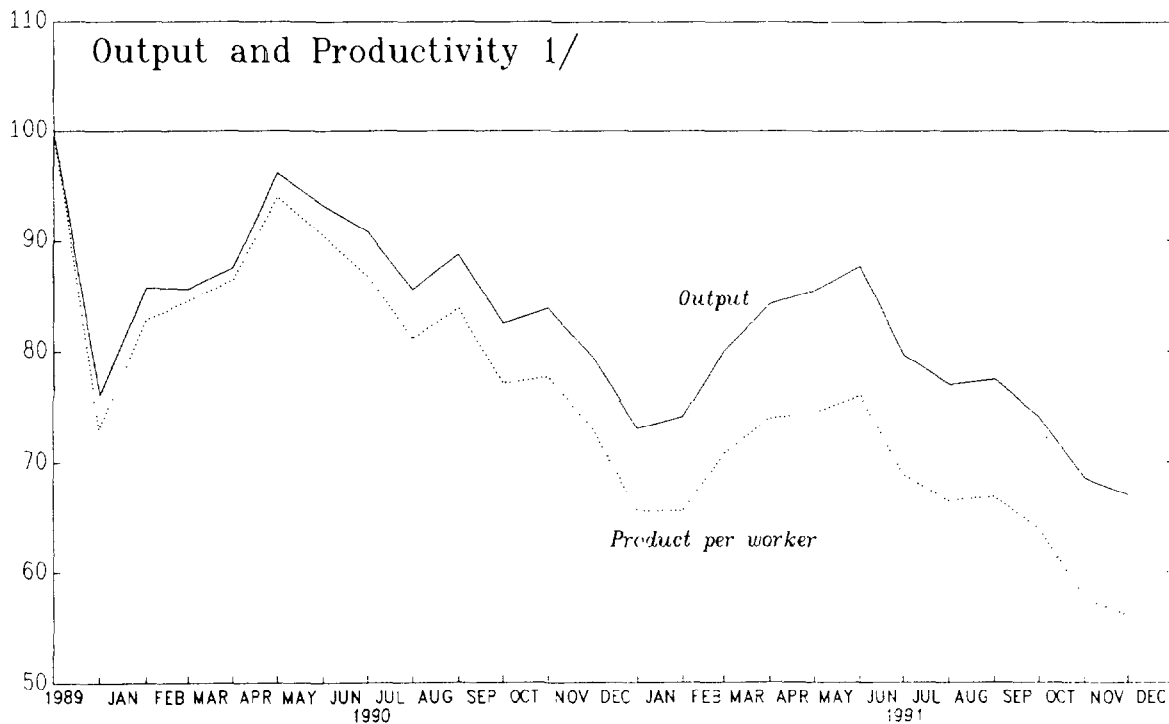
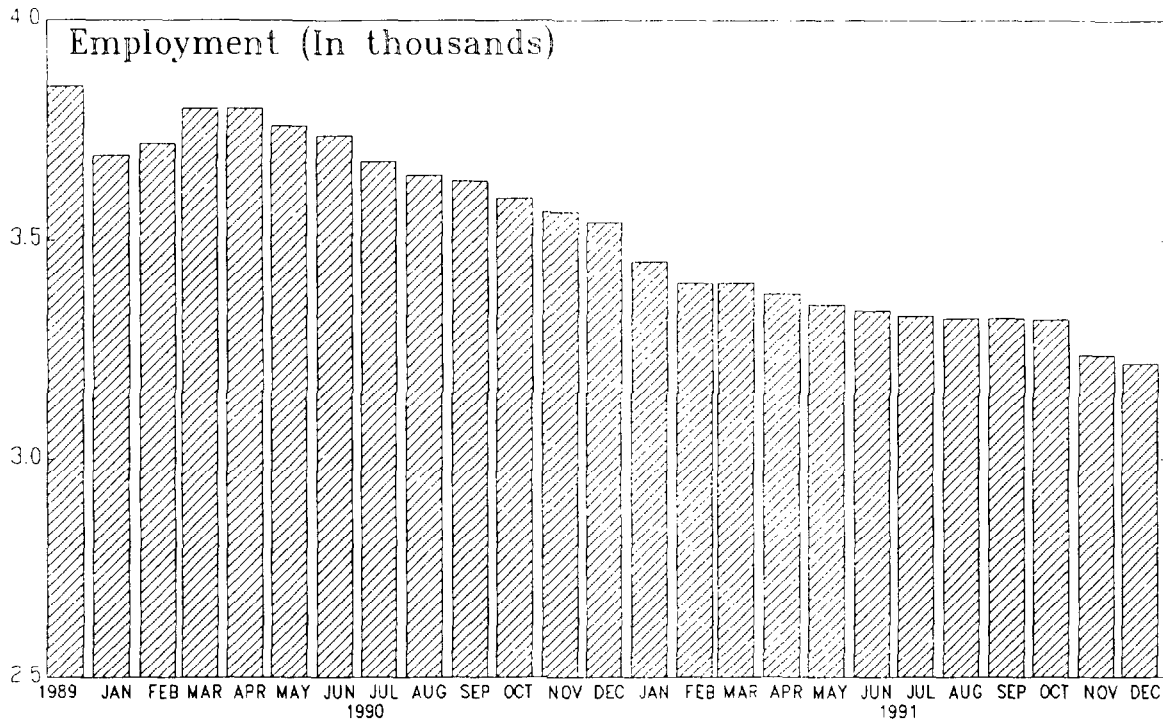
1/ These sectors are on a more disaggregated basis than the breakdown in Chart 6.

2/ Data on employment are available on a less disaggregated basis than those on output.

CHART 5

Romania

Industrial Employment, Output, and Productivity (1990-1991)



Source: Romanian National Commission on Statistics.

1/ In percent of annual average for 1990.

III. Is There Evidence of Structural Change?

Successful economic reform in the PCPEs will require a massive reallocation of productive resources within the industrial sector, as well as between industry and the rest of the economy. This process is likely to have begun already, as price and trade liberalization, together with a "hardening" of budget constraints, would have been expected to lead to a reorientation of economic activity towards more profitable sectors. The boom in the services sector in most PCPEs is commonly mentioned as an example of resource reallocation underway.

Structural change is likely to generate a drop in output in the short run, however, because of asymmetric responses. Enterprises that become uncompetitive may be forced to curtail production sharply because of financial constraints or because demand is simply absent, while enterprises that find profitable opportunities to expand production may be slow to respond because, in addition to normal lags, they may be reluctant to undertake large investments just prior to privatization. On the other hand, macroeconomic developments can also be expected to generate a fall in output, as the combination of large adjustments in exchange rates and administered prices, and stabilization policies designed to reduce inflation, would likely have a restraining effect on economic activity in the short run. ^{1/} Distinguishing between these two sources of the output decline is important because the structural change resulting from a significant reduction in distortions will have to take place sooner or later; if the observed fall in output does not at present reflect structural change to a significant extent, it may be concluded that this shock is still to come.

While looking at the evolution of different productive sectors may give some indication of how generalized output developments have been, this is by no means sufficient to answer the question posed in this section. In any economy, there are productive sectors that are more or less sensitive to business cycles; in fact, there are activities that behave counter-cyclically. This type of divergence between sectors is normal in any business cycle, and does not signal any particular tendency towards a reallocation of productive resources. Therefore, in what follows, a statistical procedure is implemented, using data on a set of (roughly) two-digit industrial branches, that should allow us to distinguish more precisely the extent to which structural change is actually taking place, as

^{1/} The "CMEA shock" contains both structural and macroeconomic elements. On the structural side, one factor behind the collapse in trade has been increased competition from world markets. On the macroeconomic side, foreign exchange constraints and/or tightness of policies may have reduced the demand for exports among the CMEA-member countries.

opposed to the intersectoral differences that arise in the course of any normal business cycle. 1/

1. Common factors across industrial sectors

If the output decline were mainly the result of macroeconomic forces, then a relatively large fraction of the variance in production and employment across different sectors would be (statistically) accounted for by a relatively small number of common factors, or principal components. The technique of principal components finds (mutually orthogonal) linear combinations of a group of time series that can explain the highest proportion of the variability (sum of the variances) of those time series. The first principal component accounts for the highest fraction of the variability of the series, and so forth. 2/ Naturally, there are as many principal components as there are variables in the set, but the relevant indicator is how high a fraction of the variability can be accounted for by the first one or two principal components.

Results from applying this procedure to the data at hand are only mildly supportive of the structural change hypothesis. Specifically, we applied principal components to the monthly logarithmic rates of change of output and employment for the BCR countries since the initiation of reforms and, as a control procedure, on data from the United States with roughly the same level of disaggregation and sample length. The results, displayed in Table 4, indicate that the fraction of the variance explained by the first one or two factors is only moderately smaller for the BCR countries than for the US. The only exception appears to be the results on output in Romania, where less comovement between the different sectors seems to be present.

2. National and industry factors

Because the reform programs in this region share a number of common features, including the removal of a number of distortions that were common across countries, for example the subsidization of energy use, it is reasonable to expect that the resulting changes in the structure of industrial production might also be similar across countries. This hypothesis is strengthened to the extent that, in the context of the global economy, the countries of Eastern and Central Europe share a similar pattern of comparative advantage. As distortions to relative prices come down, this would likely result in intersectoral resource shifts that are similar in the different countries.

1/ While an important part of the reallocation of resources is likely to involve an expansion in non-industrial activities (for example financial and other services), structural change is also likely to involve a substantial reallocation of resources within the industrial sector itself.

2/ See, for example, Dhrymes (1978).

CHART 6
Romania
Gross Industrial Output by Sector
(1989-1991)

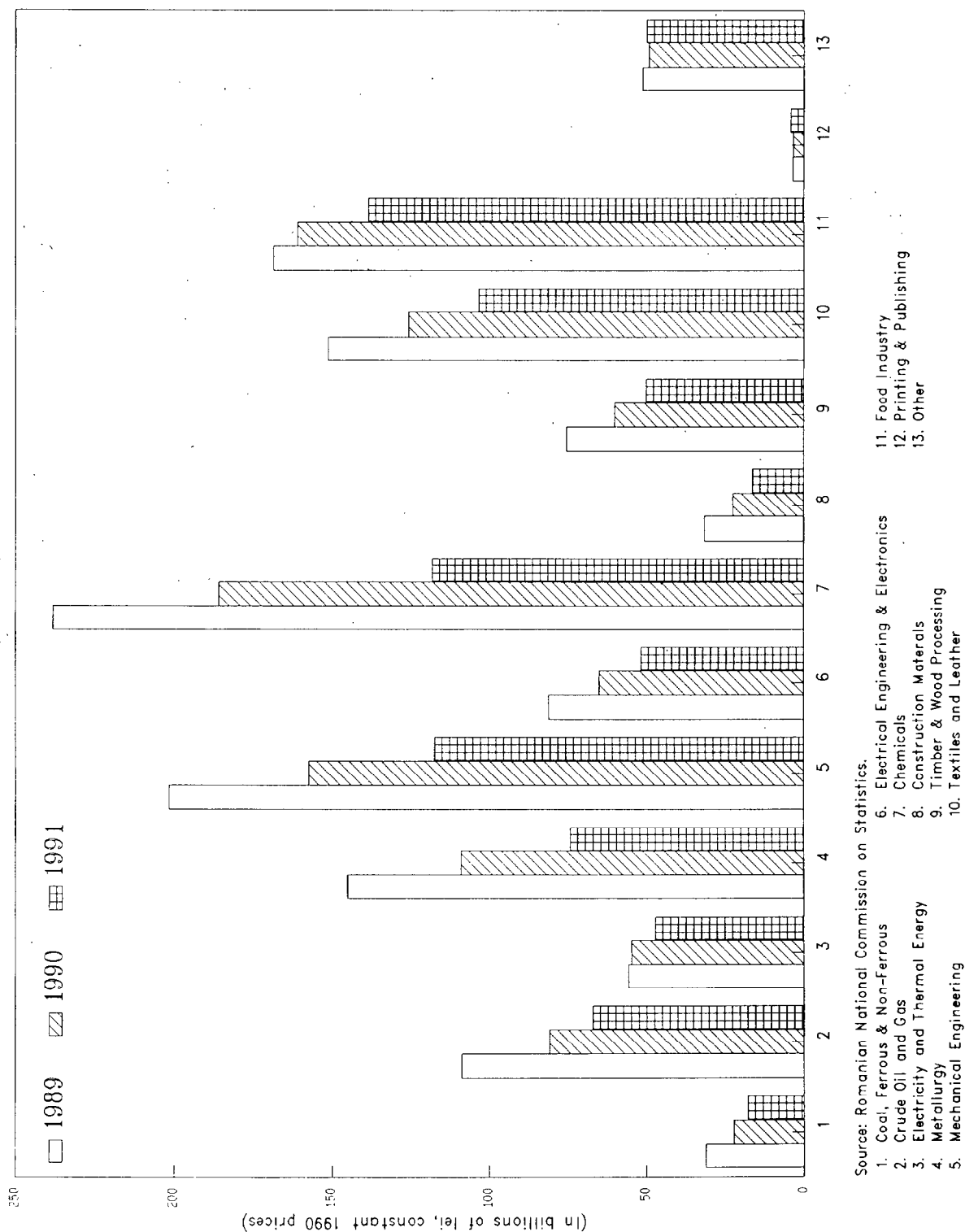


Table 4. Fraction of Variability Explained by Principal Components 1/

Output				
Principal Component	Bulgaria	CSFR	Romania	USA
1	0.53	0.55	0.29	0.60
2	0.72	0.68	0.45	0.77
3	0.88	0.79	0.58	0.85
4	1.00	0.87	0.69	0.89
5	1.00	0.92	0.77	0.92

Employment				
Principal Component	Bulgaria	CSFR	Romania	USA
1	0.49	0.32	0.32	0.38
2	0.79	0.49	0.54	0.54
3	0.98	0.65	0.68	0.65
4	0.99	0.77	0.79	0.74
5	1.00	0.85	0.88	0.81

1/ Beginning of sample periods are: Bulgaria: February 1991, CSFR: January 1991, Romania: October 1990, USA: July 1990. Ends of sample periods are December 1991 in all cases. The number of variables are: Bulgaria: 16, CSFR: 19, Romania: 24 for output and 11 for employment, and USA: 16.

The strategy in this subsection involves decomposing the change in output for each industrial sector in each country between factors that are common to all industries in a given country, and factors that are common to all countries for a specific industry. The factors that are common to all industries in each country are associated with macroeconomic developments in that country, and are therefore not related to structural change. By contrast, factors that are common to a given industry in all countries are indicative of resource reallocation in production, or structural change. Following Stockman (1988), our strategy is to pool data on rates of change of output across industries and countries in a variable y_t , and to estimate the following regression: 1/

$$(1) \quad y(t) = m(i) + n(c,t) + u(i,c,t)$$

where $m(i)$ represents (the inner product of coefficients and) dummy variables that single out industries indexed by i (referred to in Table 5 as industry factors), $n(c,t)$ represents (the inner product of coefficients and) dummy variables that single out countries indexed by c and time indexed by t (referred to in Table 5 as national factors), and u is the regression residual. Because the dummy variables are linearly dependent, a normalization is necessary, and thus one industry was excluded from the set $m(i)$. This means that the resulting coefficients represent values relative to the excluded industry coefficient. The energy industry was chosen to be the "numeraire" sector in all countries, because it showed the least variability over the sample.

Estimation of equation (1) gives overwhelming support to the view that macroeconomic factors, rather than structural factors, have accounted for most of the variability of output in the region since the reforms were initiated. 2/ As shown in Table 5, nearly all of the variance of output changes explained by the regressors is accounted for by the dummy variables that represent national or economy-wide factors. More formally, an F-test cannot reject the null hypothesis that the entire set of industry-specific dummies has no effect on the rate of change of output in these countries.

1/ While Stockman (1988) estimates essentially the same regression for a set of industrial countries, he is testing for a different effect, namely evidence of a "real business cycle" in the form of significant industry-specific shocks. There is, in fact, a small literature on the decomposition of output changes into industry-specific, regional, and national components. Stockman's methodology was applied here mainly because it imposes fewer structural assumptions on the data than some of the other papers in this literature.

2/ The estimation of equation (1) was carried out by pooling data from 14 industrial sectors for the BCR countries and Poland (data from the other PCPEs were not available), on samples that begin on the dates of each country's "big bang," defined as before with reference to the date of the first major price liberalization.

Table 5. Influence of National and Structural Factors

	F-Statistic	P-Value <u>1/</u>	Percent of Explained SS <u>2/</u>
Regression 1 $y(t) = m(i) + n(c,t) + u(i,c,t)$			
$R^2 = 0.34$, DF = 680			
National factors	6.51	0.00	97
Industry factors	0.16	0.99	0.6
Regression 2 $y(t) = m(i,t) + n(c,t) + f(i,c) + u(i,c,t)$			
$R^2 = 0.35$, DF = 638			
National factors	3.64	0.00	88
Industry factors	0.17	0.99	9
National-specific industry factors	0.77	0.84	2
Regression 3 $y(t) = m(i,t) + n(c,t) + f(i,c) + u(i,c,t)$			
$R^2 = 0.53$, DF = 364			
National factors	3.56	0.00	42
Industry (time-varying) factors	0.58	0.99	38
National-specific industry factors	0.81	0.83	10

1/ Marginal significance level.

2/ Percent of explained sum of squares attributable to orthogonal part of corresponding regressors.

It is possible to recover the path followed by the "national factors" driving industrial output in each country, as estimated by equation (1).^{1/} The (cumulative) effect of these factors is plotted in Chart 7 for each country in the sample. It is interesting that the pattern appears to roughly match the general thrust of policies in these countries.

To allow for the possibility of country-specific structural change (in addition to the structural change that is common across countries), a modified version of equation (1) was also estimated:

$$(2) \quad y(t) = m(i) + n(c,t) + f(i,c) + u(i,c,t),$$

where the additional set of dummies $f(i,c)$ identifies shocks that are specific to industry i in country c . A further normalization was now required, and this involves the exclusion of the country-effect dummies in the last period. As displayed in Table 5, the estimation of equation (2) produces essentially the same results as in (1), namely that the country-specific macroeconomic effects are the most important ones in accounting for output developments. An F-test finds that the joint effect of the industry effects $m(i)$ and the country-specific industry effects $f(i,c)$ is not statistically different from zero.

An even more general form of this equation,

$$(3) \quad y(t) = m(i,t) + n(c,t) + f(i,c) + u(i,c,t),$$

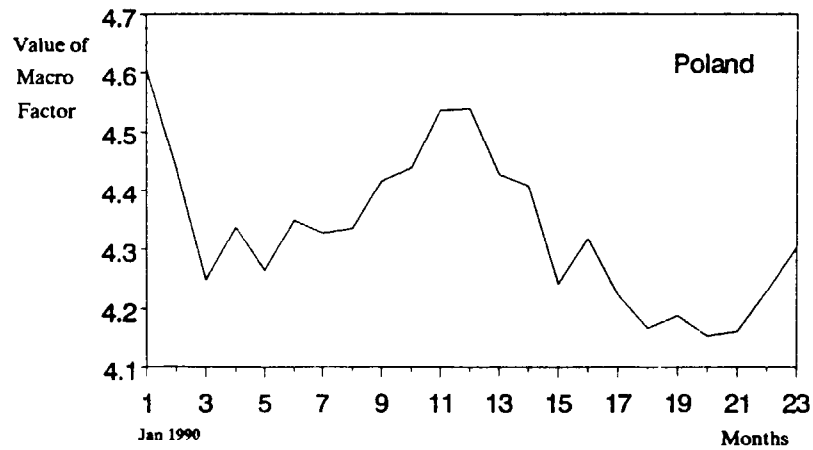
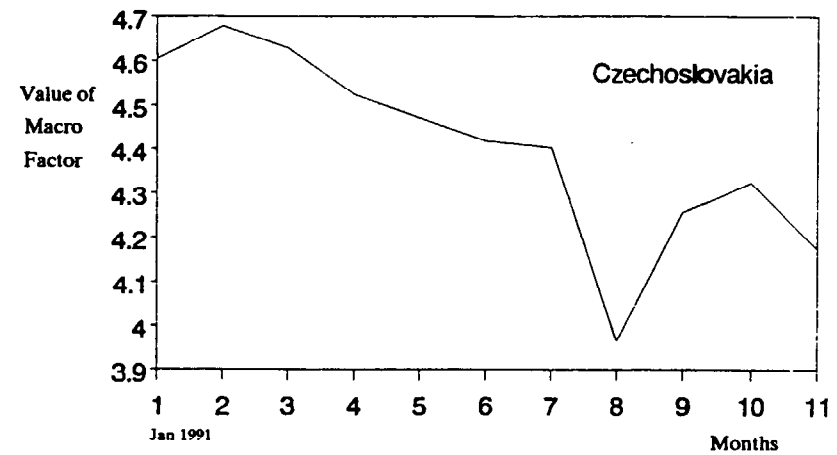
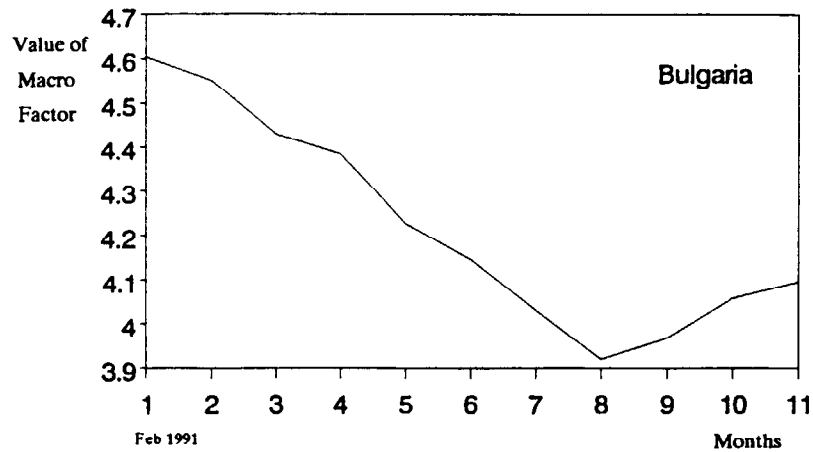
was also estimated. Equation (3) allows for international industry shocks that are time-specific. Thus, it geometrically increases the number of dummy variables representing industry shocks which are common across countries. While this has the predictable effect of increasing the fraction of the variance explained by the industry factors, it only marginally improves the statistical significance of the industry factors. The F-statistic still cannot reject the null hypothesis that the whole set of coefficients on industry dummies is equal to zero (Table 5). The evidence in favor of the view that macroeconomic shocks have been much more important than sector-specific shocks in accounting for the output decline thus appears to be quite robust.

3. Comparative advantage and sectoral shifts

An important element in the process of structural change in production is the opening of the economy to international competition. This may, in fact, be the single most powerful influence on the process of resource reallocation, both because international competition provides a particularly strong mechanism for ensuring market discipline--given the generally monopolistic character of domestic markets--and because the productive

^{1/} Again, this factor is defined relative to the--hopefully neutral--shock to the energy industry in the four countries.

Chart 7. Macroeconomic Influence on Industrial Output



structure of PCPEs is so far removed from what would likely emerge on the basis of comparative advantage considerations alone.

This line of reasoning leads immediately to the question of whether the anatomy of the output decline has followed closely the pattern of comparative advantage within industry. For this purpose, we make use of recent work by Hughes and Hare (1991, 1992) where measures of domestic resource cost (DRC) are calculated for different industrial branches in Bulgaria and Czechoslovakia. We investigate the extent to which these measures constitute an acceptable predictor of the performance of the corresponding sectors.

Domestic resource costs are defined as the ratio of value added at domestic prices to value added at international prices (that is, valuing products and inputs at their estimated domestic-currency equivalent to the world price). Thus, they measure the level of protection offered to each industry and the degree of adjustment in domestic costs and prices necessary to face international competition. It should be noted at the outset that, as Hughes and Hare acknowledge, the estimates of DRC are necessarily tentative because of a number of judgmental assumptions necessary to value products at world prices, including problems arising from the existence of nontraded goods, quality differences, and peculiar exchange rate arrangements in the CMEA area. At a more fundamental level, DRCs are based on the assumption of a fixed-coefficient technology, and do not consider the possibility of different elasticities of substitution across sectors. 1/ Notwithstanding all these caveats, the DRC estimates are the only available measures of comparative advantage, and for this reason they cannot be overlooked.

To determine the extent to which output changes are correlated with this measure of comparative advantage, we simply ran a regression of the cumulative change in output since the beginning of the reform program on the transformed measure of the DRCs suggested by Hughes and Hare. 2/ The results, presented in Table 6, do not provide evidence that resources have moved in the direction dictated by the estimates of comparative advantage in either Bulgaria or Czechoslovakia, as the level of the DRC is not statistically significant in the regression of output changes.

1/ For example, if industries that utilize underpriced inputs intensively are doing so because they have a high elasticity of substitution, the DRC criterion would nevertheless reveal these industries to be among the most uncompetitive, even though in fact they would be hurt relatively less by raising the price of the relevant inputs.

2/ The transformation is necessary because DRCs are not a monotonic measure. The transformation is such that, the higher is the measure, the more competitive is the sector.

Table 6. Comparative Advantage and Output Changes 1/

	Bulgaria	Czechoslovakia
Coefficient value	-.188	.013
Standard Error	(6.237)	(.084)
R ²	.7x10 ⁻⁴	.003
DW	1.17	2.43
F Statistic (0 slopes)	.001	.02

1/ Cross section regressions of overall change in output on inverse of domestic resource cost as computed by Hare and Hughes (1991) with the adjustment for negative DRCs suggested on page 14.

IV. Supply versus Demand Factors in the Output Decline

This section presents some evidence on the question whether supply or demand shocks have been predominant in accounting for the evolution of output in the BCR countries since the initiation of reforms. As suggested previously, there are reasons to believe that the tight financial policies pursued in order to reduce inflation and maintain a satisfactory external position, as well as the drop in export demand associated with the CMEA shock, would have adversely affected demand in these countries. On the other hand, increases in energy prices--resulting both from increases in international prices and from reductions in domestic subsidies--and financial constraints on enterprises are likely to have had an adverse impact on aggregate supply. 1/

1. Price-output correlations

In any market, changes in the equilibrium configuration of price and output will reflect both shifts in the demand and in the supply functions. However, if demand shifts have been relatively more important, the correlation between price and output changes will tend to be positive; while if supply shifts predominate, the correlation will be negative. If data on relative price changes and relative output changes in a cross-section of markets are collected, and if sectors that experience relatively more inflation are also those sectors that experience a relatively large decline in output, then the correlation between price and output changes will tend to be negative, indicating that supply shifts have been relatively more important in these markets over the period in question. Conversely, if those sectors which experienced large price changes are also those that experienced a relatively small decline in output (or an increase in output), then we would say that demand shifts have been relatively more important, and the correlation between price and output changes would be positive.

Table 7 gives results on price-output correlations for Bulgaria, Czechoslovakia, and Romania. 2/ The table suggests, in the cases of Bulgaria and the CSFR, that supply shocks have played a relatively more important role than demand shocks in accounting for the output decline since the initiation of reforms. 3/ The Romanian results are not as clear-cut.

1/ The increase in energy and other input prices would have a large impact on output if enterprises were liquidity-constrained, or if they faced limited substitution possibilities because, for example, of adjustment costs.

2/ Disaggregated price and output data from the industrial sectors in the three countries were collected for this purpose. The number of sectors varied slightly across countries: 16 for Bulgaria; 19 for the CSFR; and 13 for Romania. Data were available for the whole of 1991 for the CSFR and Romania, but only through the third quarter of 1991 in the case of Bulgaria.

3/ Which specific supply and demand shocks have played a role is investigated in the next subsection.

Table 7. Correlations Between Quarterly Price and Output Changes

	<u>Mean Change 1/</u>		
	<u>In Output</u>	<u>In Prices</u>	<u>Correlation</u>
<hr/>			
<u>Bulgaria</u>			
1991:1	-0.345	1.770	-0.593
1991:2	-0.144	0.591	-0.489
1991:3	0.084	0.001	-0.835
 <u>CSFR</u>			
1991:1	-0.191	0.400	-0.259
1991:2	-0.160	0.092	-0.332
1991:3	-0.167	-0.003	-0.051
1991:4	0.088	0.007	-0.023
 <u>Romania</u>			
1991:1	-0.122	0.856	-0.250
1991:2	0.106	0.197	0.184
1991:3	-0.105	0.194	0.354
1991:4	-0.129	0.050	-0.024

1/ Logarithmic rate of change relative to previous quarter.

For the period as a whole, there is a relatively low negative correlation, but this reflects a negative correlation in the first quarter of 1991, positive correlations in the second and third quarters, and a correlation close to zero in the last quarter of the year.

2. A simple model of supply and demand

This subsection presents results from the estimation of a simple supply-demand model of industrial output determination in Czechoslovakia and Romania. 1/ The main purpose of undertaking the estimation is to shed light on the relative importance of supply and demand shocks in accounting for the output decline. The analysis in the previous subsection was deficient in this regard, since the approach there could only reveal which type of shock predominated in a particular period. The results that follow in principle permit us to account for the output declines in terms of shocks to the exogenous variables affecting the demand function and those affecting the supply function. In addition, they should also enable us to consider the relative importance of various macroeconomic disturbances, such as increases in energy prices, and restrictions on credits to enterprises.

In fairly standard fashion, the estimated model has the following characteristics. Demand is a function of a relative price variable (the relative price of sector *i*'s output divided by the overall industrial price index) and a scale variable that proxies for aggregate spending. Supply in a given sector is a function of relative prices, an index of the price of the energy input, the level of employment, and a real credit variable. If employment is monotonically related to the real (product) wage as is conventionally assumed, then supply is simply a function of the product price and the prices of the relevant inputs (labor and energy). 2/ 3/ The real stock of bank credits to enterprises is incorporated to allow for possible liquidity constraints faced by firms over this period (see Calvo and Coricelli (1992)). 4/

Because of the relatively short sample, it was not possible to estimate the model individually for each subsector. Instead, the estimation was performed on a pooled data set, that is, forcing the coefficients to be

1/ The necessary data were unavailable in the Bulgarian case.

2/ All input prices, as well as the stock of credit, are deflated by the aggregate industrial price index.

3/ Lack of disaggregated real wage data prevented us from incorporating real wages directly into the supply function. Also, lagged (rather than contemporaneous) employment was used in the specification, in order to avoid problems of simultaneity bias, and also to allow for the fact that production takes time.

4/ While this specification only crudely reflects the "Calvo-Coricelli" hypothesis, it could represent a model in which the real stock of credit simply represents another input (like labor and capital) into the firm's production function.

equal across all sectors. An instrumental variables procedure was used in order to account for the endogeneity of the sectoral price indices and to permit the identification of both the demand and supply functions. Estimations with and without industry-specific constants, or "fixed-effects," were performed; for both countries, the fixed-effects were significant on the demand side, but produced very imprecise estimates on the supply side. 1/ For this reason, only the supply estimates without fixed-effects are reported below.

The results for Romania are reported in Table 8. On the demand side, both instrument sets produce coefficients that are correctly signed and statistically significant. On the supply side, all coefficients are correctly signed and, with the exception of the credit variable, are statistically-significant. The coefficients are jointly highly significant, as reflected by the F-statistics, and the R-squared's. The empirical results suggest that both demand and supply side factors have exerted an influence on the evolution of output. In particular, the elasticity estimates suggest that changes in the real price of energy exert a strong effect on the supply function.

Similarly, for Czechoslovakia (Table 9), the model seems to fit reasonably well on the demand side but somewhat less well on the supply side; although the coefficient values of the supply function have their theoretically-predicted signs, their statistical significance is low. Moreover, the real credit variable was incorrectly signed and not statistically significant; this justified its exclusion from the final estimations. While this result may simply be due to the crude formulation of the credit hypothesis, a similar specification for Poland did identify a significant credit variable. 2/ This suggests that credit conditions may have been less stringent in Czechoslovakia than in Poland, perhaps due to a relatively stronger financial position of enterprises at the outset of the program.

These regression results were used to allocate the change in output over the estimation period to demand- and supply-related effects, although given the large standard errors associated with some of the estimates, such results should be regarded as indicative only. The results are presented in Table 10, where a differentiation is made between the "supply shift" and "supply-side change" (and likewise for demand). The shift refers to the horizontal shift in the supply function arising from changes in the explanatory variables of that equation (energy price, real credit, and lagged employment) over the sample period, which are detailed in the bottom panel. The supply-side change refers to the equilibrium change in output

1/ The apparent reason was multicollinearity arising from the correlation between the fixed-effect coefficients and the employment variable.

2/ See Borensztein and Ostry (1992). A difference with the current estimation, however, was that the longer sample period in the Polish case permitted the estimation of a supply function on a sector-by-sector basis.

Table 8. Romania--Demand and Supply Estimation Results 1/

	Instrument Set 1	Instrument Set 2
<u>Demand 2/</u>		
Relative Price	-2.08 (3.85)	-0.60 (2.29)
Aggregate spending	0.29 (2.10)	0.71 (8.65)
R-squared	0.95	0.99
Durbin-Watson	1.58	1.67
F test (zero slopes)	177.80	933.47
<u>Supply 2/</u>		
Relative Price	0.51 (2.20)	0.38 (1.71)
Energy Price	-0.70 (3.12)	-0.69 (3.05)
Employment (-1)	0.91 (19.73)	0.91 (19.71)
Credit	0.22 (0.80)	0.22 (0.78)
R-squared	0.79	0.79
Durbin-Watson	2.11	2.19
F test (zero slopes)	106.89	105.41

1/ Instrument Set 1 uses broad money in real terms to proxy for aggregate spending. Instrument Set 2 uses aggregate industrial production to proxy for aggregate spending. Note that, from the point of view of an individual sector, this variable is effectively exogenous.

Table 9. Czechoslovakia--Demand and Supply Estimation Results 1/

Demand <u>2/</u>		
Relative Price	-2.56	(1.84)
Aggregate Spending	1.46	(13.33)
R-squared	0.96	
Durbin-Watson	1.99	
F test (zero slopes)	292.5	

Supply <u>2/</u>		
Relative Price	0.82	(0.24)
Energy Price	-0.41	(1.37)
Employment (-1)	1.03	(3.75)
R-squared	0.69	
Durbin-Watson	1.68	
F test (zero slopes)	151.3	

1/ Panel estimation with fixed effects, for 17 industrial sectors on monthly data, December 1990 - November 1991.

2/ Absolute values of t-statistics are given below the corresponding coefficients in parentheses.

Table 10. Decomposition of Output Decline

	Total change	Supply shift	Supply-side change	Demand shift	Demand-side change	Error terms
(In percent)						
<u>Czechoslovakia</u>						
1991	-0.390	-0.358	-0.307	-0.514	-0.116	-0.003
<u>Romania</u>						
1991	-0.181	-0.264	-0.171	-0.132	-0.053	0.0434

Shifts in Explanatory Variables

	<u>Demand function</u>		<u>Supply function</u>	
	Czechoslovakia	Romania	Czechoslovakia	Romania
(In percent)				
Income	-49.4	-22.3		
Energy price			49.4	32.6
Real credit				-36.4
Employment			-17.7	-9.0

resulting from the shift in supply, along the original demand schedule. The amount by which the supply-side change falls short of the supply shift is thus a direct function of the price elasticity of demand. The sum of the demand- and supply-side changes gives the change in output predicted by the regression coefficients, which differs from the actual changes by the combined effect of the error terms, given in the last column of the first panel.

Results indicate significant shifts in both supply and demand functions for both countries. In Czechoslovakia, the computed demand shift is the larger one, whereas in Romania it is the supply shift that is larger. However, because of the inelasticity of the estimated supply curve, the largest contribution to the output decline in Czechoslovakia is also due to supply-side factors. This result is consistent with the price-output correlations reported above.

V. Conclusion

This paper has sought to examine some important issues surrounding the declines in output experienced by Bulgaria, Czechoslovakia, and Romania since the initiation of market-oriented reforms. After reviewing developments in these countries over the past two years, as well as the main features of the reform programs that were put in place, our empirical work focused on two main questions. First, to what extent is the decline in industrial output in each country a general phenomenon, or is there much evidence that a significant reallocation of resources within the industrial sectors of these economies has taken place since the initiation of reforms? Second, to what extent can the decline in output be attributed to shocks that impacted primarily on demand versus those that impacted on supply?

On the issue of supply versus demand shocks, we first looked at disaggregated price and output data for a cross section of industrial subsectors to determine the signs and magnitudes of correlations between price and output changes. Our findings were that in the cases of Bulgaria and Czechoslovakia these correlations were negative throughout 1991, indicating a predominance of supply shocks over demand shocks during this period. In the case of Romania, our results were not as clear-cut, since the correlation between price and output changes seemed to vary quite a bit over time, being negative in the first quarter of the year, positive in the second and third quarters, and close to zero in the last quarter of 1991.

While price-output correlations can provide useful summary information on which shocks (that is, whether to the demand curve or the supply curve) have been quantitatively most important, a more structural approach is necessary in order to investigate the extent to which specific shocks--such as increases in energy prices, or credit policies vis-à-vis state enterprises--have played a role. For this purpose, the paper went on to estimate a simple supply-demand model of industrial output determination. The analysis yielded coefficient estimates for the partial effects of

various macroeconomic variables affecting supply and demand which were, for the most part, consistent with their theoretical counterparts and statistically significant. The results suggested in particular that energy price increases exerted a quantitatively important impact on the supply of industrial goods over the period.

As far as the issue of structural change was concerned, a variety of statistical tests were performed in order to determine the extent to which resources have been reallocated within the industrial sector, as one would have expected once firms began to respond to the new structure of relative prices. Our results here suggested that aggregate or national factors are capable of explaining nearly all the variation in output in the BCR countries during the period since the initiation of reforms, with sector-specific factors playing only a very minor role. The data confirmed this conclusion in other ways, for example via the use of principal components analysis, which revealed that the first few principal components of the time series of industrial output and employment accounted for a similar proportion of the variance of these series as in the case of the benchmark country. Finally, the data did not reveal any strong tendency for resources to be moving towards those sectors with relatively low domestic resource costs (DRCs), as a simple version of comparative advantage theory might predict. The conclusion must therefore be that it is not possible to discern much evidence of structural change within the industrial sectors of these three economies, perhaps because not enough time has elapsed since the initiation of reforms.

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