The Macroeconomic Situation in the Czech Republic

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Abstract

The paper analyses of some important features of the past and present macroeconomic situations in the Czech Republic.

Between 1948 and 1989 the former Czechoslovakia lost its pre-war position among the advanced industrialized countries. The radical economic reform (prepared in 1990 and initiated on January 1, 1991) was successful from the point of view of macroeconomic stability (relatively low inflation, a stable exchange rate, a current account surplus and a nearly balanced state budget). However, it was accompanied by a sharp decline in real GDP which was deepened by the collapse of the CMEA. The split of the Czecho-Slovak Federation in 1993 also negatively affected the expected economic recovery.
Nevertheless, according to international comparison the Czech Republic is now in the best macroeconomic position of all the postcommunist countries. Recent macroeconomic trends and short-terms forecasts are promising.

Individual sections of the paper are documented with analytical tables containing the relevant statistical data and the author's own calculations. The specific models and methods used are described in the Appendix.

Abstrakt

Studie je zaměřena na analýzu některých důležitých charakteristik minulé a současné makroekonomické situace v České republice. V příloze jsou popsány též speciální modely a metody použité k tomuto účelu.

V období let 1948-1989 bývalé Československo ztrácelo své předválečné pozice mezi vyspělými průmyslovými zeměmi. Radikální ekonomická reforma (připravovaná v r. 1990 a odstartovaná 1.1.1991) byla úspěšná z hlediska makroekonomické stabilizace (relativně nízká inflace, stabilní kurs měny, přebytek běžného účtu platební bilance a téměř vyrovnaný státní rozpočet). Byla ovšem doprovázena výrazným poklesem reálného hrubého domácího produktu, který byl ještě prohlouben kolapsem RVHP. Též rozdělení česko-slovenské federace negativně ovlivnilo očekávané oživení ekonomiky v r. 1993.

Nicméně, podle mezinárodního srovnání má nyní Česká republika nejlepší makroekonomickou pozici ze všech postkomunistických zemí. Současné makorekonomické trendy a krátkodobé prognózy jsou slibné.

Jednotlivé části studie jsou dokumentovány analytickými tabulkami, které obsahují relevantní statistická data a vlastní autorovy propočty.

Introduction

As in other post-communist countries, the macroeconomic situation in the Czech Republic has changed dramatically over the last five years, mainly due to the start of economic reform and the split of the former Czechoslovakia. Of all the countries undergoing the change from central planning to a market economy, the Czech Republic has been one of the most successful, and its high level of macroeconomic stabilization is recognized by many international institutions. It may, therefore, be interesting to evaluate some important features of the past and present macroeconomic situations in the Czech Republic. For this purpose, specific econometric methods, whose essential priniciples will be described, have been used.

The paper begins with an evaluation of the Czechoslovak economic performance before the 1989 revolution, with special attention paid to overvaluated growth rates given in the official statistics and to the deformation of the industrial structure.

The next section describes the economic reform scenarios and their implementation. The third section contains an analytical estimation of the macroeconomic impacts of both reform and external factors.

In the forth section, the macroeconomic impacts of the split of Czechoslovakia are discussed and estimated. The predicted impacts on the Czech and Slovak GDPs are compared with the actual data for 1993. The next section provides a comparison of the Czech economy with those of Slovakia, Hungary and Poland.

An evaluation of the recent macroeconomic trends in the Czech Republic as well as short-term forecasts are given in the last section.

The Appendix contains a brief description of specific models and methods used in the presented macroeconomic analysis. Attention is focused on specification of econometric models for Czechoslovakia in the period of transition, the use of a priori information in the estimation of these models, and simulation techniques applied when the models were used to derive quantitative information for analyses and forecasts presented in the paper.

1. The Czechoslovak Economy Before the 1989 Revolution

The pre-war economic level of Czechoslovakia was quite comparable with such countries as Germany, France, Belgium and Austria. According to the statistical

data on industrial production, before World War II Czechoslovakia was one of the ten most industrialized countries in the world.

However, during the post-war period up to 1989, the allocation of resources through central planning rather than the market mechanism resulted in a long-term slowdown in productivity and the standard of living, as well as in the decline of the international competitiveness of Czechoslovak industry. Over the last 20 years of central planning in particular, Czechoslovakia's economic performance has been disappointing.

After the exhaustion of extensive sources of growth, clear tendencies towards stagnation and a decline in production were already appearing. The disintegration of the market of the former CMEA hastened the inevitable collapse of the socialist system. The transition to a market economy has been, given this situation, the only effective way of tackling the problems which have accumulated.

The considerable deterioration of the Czechoslovak economy during the eighties, as compared with the previous decade, is obvious from Table 1. The average annual growth rate of real GDP contracted from 4.8 to 1.5%. A similar slowdown occurred in other macroeconomic indicators including average wages, productivity of labour and productivity of fixed capital. On the other hand, inflation (expressed by the CPI) sped up.

According to many studies (e.g. Marer /6/, Nachtigal /8/), the real macroeconomic growth rate indicators in the CMEA countries given by official statistics were systematically overvaluated as the corresponding deflators were undervaluated. The last six rows in Table 1 contain the growth rates corrected for estimated hidden inflation. In the period 1970 - 1980 they were just about a half of the official estimates and between 1980 - 1990 they were negative or close to zero. The most severe decline occurred in gross fixed investment. Corrected average real wages were in stagnation during the seventies and in decline during the eighties.

Another serious problem was a deformation of the industrial structure of the Czechoslovak economy. According to the author's econometric analysis (covering 20 industries in 10 countries during 20 years, see /13/), the industrial structure in developed market economies depends primarily on the economic level and size of the country. Using estimated parameters from this analysis and actual data on Czechoslovakia's economic level (real GDP per capital) and size (volume of real GDP), the corresponding expected structure for Czechoslovakia was computed (Table 2, second column). But the actual data for Czechoslovakia

differed considerably from the computed data, as well as from the average structure in selected small Western European countries. In Czechoslovakia, the shares of mining, metallurgy, machinery and production of transport equipment in total industrial production were too high, while the shares of the food industry, furniture, printing and the energy industry were too small. These differences cannot be explained by specific natural conditions. They are just deformations following from central planning and the CMEA system.

The loss of a considerable part of the traditional Czechoslovak exports to the former USSR and other socialist and third-world countries (supported by government credits with doubtful returns) and the reduction in arms production combined with out-dated production methods led inevitably to a temporary decline in production. Only in the following phase, with the gradual development of effective and competitive production, is it possible to renew the growth of industrial production.

2. The Economic Reform Scenario

The government's economic reform proposals were summarized in the "Economic Reform Scenario" adopted by Parliament in October 1990. This program emphasized the need for a radical transformation of the economy and the introduction of a market-based economic system at the earliest possible date. In addition to an anti-inflationary economic stabilization policy, it contained a comprehensive set of structural reform proposals. These included measures to liberalize prices and imports, alter ownership and management patterns at the enterprise level, promote the private sector and bring about the "internal" convertibility of the Czechoslovak crown (koruna československá, KČs) by granting domestic enterprises unrestricted access to foreign exchange for current account transactions.

More specifically, the government's economic reform package contained the following crucial reform measures, which were implemented within as short a time as possible after January 1, 1991 (see Klaus /3,4/):

(a) The liberalization of a wide range of domestic prices, including those of all tradeable goods and non-tradeable goods produced under reasonably competitive conditions;

(b) The introduction of the crown's "internal" convertibility and the establishment of a unified exchange rate responsive to supply and demand;

(c) The installation of an adequately financed social net to meet the needs of those individuals becoming unemployed or otherwise suffering losses in income as a result of the adjustment process;

(d) The progressive restructuring and privatization of state-owned enterprises;

(e) The implementation of a restrictive macroeconomic policy to achieve economic stabilization through fiscal and monetary restraints and appropriate exchange rate, price and wage policies.

However, the fiscal and monetary policies of the first half of 1991 were found to be too restrictive. Therefore, in the second half of 1991 the Federal Government adopted several changes in the macroeconomic policy in order to stimulate both domestic and foreign demand.

By applying restrictive macroeconomic policies, the Czechoslovak government succeeded in rapidly extinguishing inflationary pressures brought about by the sudden liberalization of about 85% of all prices on January 1, 1991. The ability to eliminate inflation in 3-6 months and maintain complete price stability while liberalizing an additional 10% of prices was an impressive accomplishment. The economy also adjusted so remarkably that the private sector developed rapidly in response to the removal of administrative restrictions, price liberalization and the provision of bank credit, and exports recovered after an initial period of major decline.

On the negative side, the economy plunged into a much more severe recession than was officially expected. The recession was, to a significant extent, caused by external shocks associated with the disintegration of the CMEA. Nevertheless, the restrictive government policies probably also played a part. In undertaking the tough measures, the government greatly benefitted from the willingness of the population to undergo a painful transition. However, just how great a decline would be tolerated remained a question. In 1992 the government prudently shifted emphasis from stabilization to restructuring and growth.

One of the major problems was the fact that state enterprises avoided the impact of the restrictive policies by relying to an increasing extent on inter-enterprise debt (credit). This debt rose fast and, despite the macroeconomic restrictions, very few enterprises were forced to close down. The impressive stabilization exercise was thus accompanied by only limited enterprise restructuring.

The statistical evaluation of economic development in 1991 and 1992 shows that

the Czechoslovak economy, in spite of worsened external conditions, passed relatively successfully through the first phase of the transformation and had good prospects of completing it. This was also confirmed by the evaluation of several foreign institutions (including the IMF, OECD, UNIDO, etc.) which usually put the CSFR in the first place among the reforming post-socialist economies (see e.g. /2/)

3. Macroeconomic Impacts of the Reform and External Factors

In the first year of the radical economic reform (1991), Czechoslovakia experienced a considerable decline in GDP and its major components, as well as an increase in inflation and unemployment.[1] Similar changes occurred in other transition countries.

However, the unfavourable economic developments in the post-communist countries in the first state of transition were not just an unavoidable result of the economic reform; the collapse of the CMEA and other external shocks also played an important role. The estimated impacts of the external shocks and the economic reform steps on the changes in basic macroeconomic indicators of the CSFR between 1990 and 1991 are shown in Table 3.[2]

According to the author's analysis of the 1990/1991 changes, published in /10/, external shocks (with a predominant role going to the collapse of the CMEA) were responsible for about 5.8 points from the total 15.1% decline in real GDP.[3] This impact was also reflected in the decline in consumption and investment, as well as in the increase in unemployment. External shocks also contributed to inflation.[4] As they led to lower export volumes and higher import prices, they created strong pressure towards a current account deficit.

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[1]On the other hand, the current account balances were surprisingly positive.

[2]These impacts have been estimated according to the author's analysis and similar estimates have been published in some other studies (e.g. Bleaney /1/, Vintrova /14/).

[3]The collapse of the CMEA market reduced the volume of Czechoslovak exports considerably. This decline in exports was reflected (with some multiplier effect) in the decline in aggregate output.

[4]Mainly due to increasing import prices resulting from the shift to world prices and hard currency payments in trade with the former CMEA countries.

The rest of the changes in the macroeconomic indicators might be assessed to the impacts of the main steps of economic reform. From among this group of factors, the massive liberalization of prices since January 1, 1991 was the main source of inflation in 1991. The secondary effects of relatively high inflation were reflected in reduced real demand for consumer goods and investment, which contributed to the contraction of GDP by 5.1 points and which had a corresponding effect on the rise of unemployment.

Another important factor within the reform package was the massive devaluation of CSK (accompanied by some additional steps like the introduction of a temporary import surcharge, "internal convertibility" of CSK, etc.). This factor had a positive impact on exports and a negative impact on imports, which resulted in a highly positive current account balance, as well as in a positive contribution to real GDP (+2.4 points). At the same time it reduced domestic consumption and investment in favour of higher exports. Of course, devaluation contributed significantly to domestic inflation (more than one quarter of total inflation).

Macroeconomic policy (including monetary and fiscal policy as well as wage regulation) in 1991 appeared to be too restrictive, especially in the first half of the year. It reduced inflation by an estimated 12.5 points and contributed to the current account surplus, but at the same time it reduced domestic demand considerably (mainly demand for fixed investment), which resulted in an additional decline in GDP by about 6.6 points, with a corresponding impact on rising unemployment.

It has been argued that such a massive devaluation of currency and such a restrictive macroeconomic policy at the beginning of the radical economic reform were not necessary. However, it is obvious that the possible impacts of the main reform steps which were strengthened by external shocks were very uncertain and their ex-ante estimation was extremely difficult. Moreover, it has also been argued[5] that for the sake of medium-term macroeconomic stability during the period of transition it was desirable to create two buffer-pillows, both in low exchange rates and in a low real wage level.

[5]In recent statements of the Prime Minister of the Czech Republic, Mr Vaclav Klaus, who was the main author of the economic reform scenario.

4. Macroeconomic Impacts of the Split of the CSFR

The Czecho-Slovak Federation ceased to exist on January 1, 1993. It was obvious that the split of the relatively stabilized Czechoslovak economy (showing the first signs of output recovery in the second half of 1992) would have significant effects on the economies of the newly independent Czech and Slovak Republics.

The macroeconomic impacts of the split of the CSFR may be divided into three groups:

1) The direct additional costs connected with the issue of new banknotes, state documents and valuables, etc. In this group, one should also calculate costs connected with the division of the state administration, army, common properties, representative offices abroad, with the renovation of international agreements, with the losses in the international position of the CSFR, and last, but not least, with the slowdown in international capital flows and consequently a reduction in export ability. The latter mentioned influences would be worse for Slovakia, which is considered to be less stable, politically and economically.

   While some of the additional costs may be proportional in both countries (e.g., the cost of issuing new banknotes), some are relatively higher in Slovakia (e.g., the cost of creating a new central bank, as the former Czechoslovak central bank was situated in Prague).

2) The impacts of the inevitable reduction of mutual trade resulting from its change from internal to external trade with more difficult conditions for payments, border crossings, etc. The decline in mutual trade has a negative impact on aggregate demand and consequently on GDP in both countries. However, the same volume of trade reduction has a considerably higher share in the Slovak GDP than in the Czech GDP, and consequently its negative impact is relatively higher in Slovakia.

3) The third group of effects follows from the end of transfers between the two republics. There was a continuous net transfer of resources from the Czech lands to Slovakia during the whole post-war period. These transfers were mostly indirect, like inproportional allocations of tax revenues and budget expenditures in favour of Slovakia, as

well as non-market pricing of some deliveries in favour of the Czech lands. The total net transfers from the Czech Republic to Slovakia in 1992 have been estimated by the Secretariat of the OECD at 25 billion CSK, or 7% of the Slovak GDP. In addition, a considerable refinancing of the Slovak commercial banks through the Czech banks took place. By the end of the former CSFR, all these transfers were stopped. It is clearly a loss for Slovakia and a gain for the Czech Republic, which has been reflected in a considerable deficit in the Slovak government budget and a surplus in the Czech budget in the first three quarters of 1993.

The total summarized impacts of the split of the CSFR are negative in both countries, but they are much worse in Slovakia. The author's ex-ante estimates (published in 1992, see /9/) of the total impacts of the split were -2.1% in the Czech GDP and -5.7% in the Slovak GDP. Actual data so far seems to confirm this prediction, as the Czech GDP declined annually by 2.2% in the first quarter and by 0.9% in the sum of the first three quarters of 1993. The Slovak GDP declined by around 5% of its annual rate in each quarter of 1993. Of course, the development of GDP is also affected by other positive and negative factors, but the split of the former CSFR seems to be one of the crucial factors of the 1993 decline in both countries.

5. The Starting Position of the Independent Czech Economy: An International Comparison

The Czech economy is well behind the developed market economies. It is, however, undoubtedly the best among the post-communist countries. The division of the Czecho-Slovak Federation produced some negative impacts on the Czech economy causing a delay in economic recovery by about one year, but once the Czech Republic has adjusted, it will have even better prospects for macroeconomic stabilization and growth (see /9, 11/).

As a major indicator of economic development, real GDP per capita in USD is commonly used. In the Central European economies the purchasing power parities (PPP's) may be more appropriate convertors than official exchange rates. According to such indicators, the economic level in the Czech Republic in 1992 was 23% higher than in the Slovak Republic, 31% higher than in Hungary and 88% higher than in Poland (see Figure 1). On the other hand, the economic level of the Czech Republic was just 40% of the level of Austria and 35% of West Germany (without the former GDR).

A comparison of basic macroeconomic indicators in four Central European countries in 1992 is shown in Table 4. In 1992, the real GDP declined both in the Czech and Slovak Republics by about 7%. The recession in Hungary was not as deep and Poland even reached a moderate recovery (see Table $). However, Poland and Hungary started the economic transformation earlier, so they experienced a considerable fall in GDP one or two years ago. In the first half of 1993, the Czech GDP declined by just -0.5%, while the Slovak GDP declined by -5.2%. Similar results are also expected for the whole of 1993, along with approximately -1.5% in Hungary and +2.5% in Poland.

While the annual rate of inflation in the Czech and Slovak Republics was within acceptable limits (10 - 11%), it was much higher in Hungary and Poland (23% and 43%, respectively). The growth rates of the PPP's of the US dollar were similar. However, the changes in the official exchange rates were smaller, i.e. all the Central European currencies were really revaluated. The change in the Czechoslovak exchange rate reflected the fluctuations of the value of the dollar against other convertible currencies, while Hungary and especially Poland made some official devaluations of their currencies, but well below the rate of inflation expressed with the consumer price index (see Table 4). The ratio of the official exchange rate to the PPP in Czechoslovakia remained significantly higher than in Hungary and Poland, indicating that the Czechoslovak crown (CSK) was undervalued.

In 1993, inflation in the Czech and Slovak Republics increased by 8-9 points due to the introduction of V.A.T. and consumption taxes. In the first 10 months of 1993, the annual inflation rate was about 21% in the Czech Republic and 23% in Slovakia, where inflation was accelerated by the devaluation of the Slovak crown by 10% from July 10, 1993. Inflation in Hungary and Poland in the first half of 1993 was similar to the previous year (23% and 37%, respectively).

As in 1990 and 1991, the Czech Republic reached a considerable current account surplus in 1992 (about +7.5% of exports). A relatively smaller surplus was reached in Hungary, while in Poland and especially in Slovakia there were current account deficits. In the first half of 1993, the Czech trade balance and current account were in surplus again, while Slovakia had a moderate trade deficit, and in Hungary imports were higher than exports by 54% (1993 foreign trade data for Poland is not available).

The foreign debt of the former Czechoslovakia has been shared by the Czech and Slovak Republics proportionally to their population. In terms of its ratio to annual exports in 1992, it was lower for the Czech Republic (about 74%) than

for the Slovak Republic (about 89%). In Poland the foreign debt per capita in 1992 was lower than in Hungary, but its ratio to annual exports was higher (421% against 213%).

The unemployment rate in the Czech Republic has been surprisingly low (just 2.6% at the end of 1992), lower even than in all the EC countries with the exception of Luxembourg. The rate as of October 31, 1993 was 3.2%. The unemployment rate in Slovakia has been much higher, 10.4% on January 1 and 13.7% on October 31, 1993. The Slovak unemployment rate is similar to those of Hungary or Poland (see Table 4), where unemployment is also rising. The updated rates on June 30, 1993 are 12.6% in Hungary and 14.7% in Poland.

An important indicator of macroeconomic stability is the government budget deficit or surplus. As can be seen in Table 4, the Czech budget deficit in 1992 was very small in comparison with much higher relative deficits in the other Central European countries. This advantage of the Czech economy was even more obvious in the first half of 1993, when the Czech Republic reached a budget surplus +1.3% of GDP, while there were considerable deficits (in percent of GDP): in Slovakia, -9%; in Hungary, -8%; and in Poland, -5%.

In summary, it is obvious that the Czech Republic has the best starting position of the four Central European economies at the beginning of the second stage of transition to a market economy: it has the highest level of per capita GDP and savings, a positive current account balance, a relatively low foreign debt, very low unemployment, a firm exchange rate stable over three years, a balanced government budget, the lowest inflation and still a very low level of wages supporting the competitiveness of Czech products.

6. Recent Macroeconomic Trends in the Czech Republic and a Short-Term Forecast

The satisfactory level of macroeconomic stability reached in the former Czechoslovakia has been maintained in the Czech Republic and even improved during 1993. On the other hand, the recovery of economic growth, which started in the second half of 1992, has been interrupted by the split of the CSFR and postponed until 1994.

The impacts of major positive and negative factors on the Czech GDP in the first half of 1993 (estimated according to the results of the author's analysis) are given in Table 5. The statistical data of GDP components reveals that a moderate decline in GDP in the first half of 1993 did not arise from a lack of

demand. Aggregate demand increased by 14 billion CZK (in constant 1984 prices), i.e. by +4.6%. All components of domestic and foreign demand increased except that of exports to Slovakia. On the other hand, the increase in aggregate demand was fully satisfied with an increase in imports, thus there was no room left for GDP growth. Importantly, imports of investment goods increased very rapidly, which may support the future competitiveness of Czech industry.

As it may be seen in Table 5, the continuing world recession was one of the negative factors pushing the Czech GDP down by -2.1%. The negative impact of the split of the CSFR was similar (-2.2%). Another negative factor was the overly restrictive budget policy (creating unnecessary surplus), which might be responsible for a further -1.8% decline in GDP. On the other hand, the continuing inflow of foreign capital, as well as an expansion of Czech exports (supported significantly by a relatively low exchange rate and a low level of wages) were the major positive factors with +2.7% and +3.1% contributions, respectively. A small negative change in GDP (-0.5%) was the result of the difference between much larger positive and negative impacts.

The latest statistical data reveals a very small (-0.3%) annual decline in the Czech real GDP in 1993 (Table 6). It is interesting that the Slovak real GDP declined in 1993 by 4.1%.

In Table 6 the actual values of other Czech macroeconomic indicators for 1993 are also given. Along with GDP, the most important ones are annual CPI inflation (20.8%), the unemployment rate (3.5%) and the current account surplus including the account with Slovakia (+2.5% of GDP).

Table 6 also contains the author's forecasts of basic macroeconomic indicators for the Czech Republic for 1994 and 1995. The growth in GDP has been estimated at +2.5% in 1994 and +4.2% in 1995 under the following assumptions: (see /5/).

- the world recession will end and recovery will start during the next two years;

- the negative impact of the split of the CSFR will be, step-by-step, exhausted exhausted;

- the inflow of foreign capital will increase, reflecting the remarkable macroeconomic stability of the Czech Republic, its comfortable geographical position, low exchange rate, low wage costs and skilled

labour force;

- the expansion of Czech exports will continue taking advantage of the low exchange rate, low wage costs and the support of foreign capital, including a growing share of machinery equipment imported from advanced countries;

- the macroeconomic policy (including fiscal, monetary and wage policies) will be slightly expansionary.

From among other forecasts of important macroeconomic indicators, CPI inflation is expected to fall to about 9.7% in 1994 and to 7% in 1995. This forecast comprises the "core inflation" of about 6% and the impact of lifting some additional price controls (3% in 1994 and 1% in 1995).

The unemployment rate is expected to increase to about 5.5% and 6.5%, respectively, at the ends of 1994 and 1995. An increase in unemployment, in spite of GDP growth, reflects an expected speeding-up in the industrial restructuring of the Czech economy.

The expansion of exports is necessary for restructuring and creating a raise in the competitiveness of Czech industry, as well as to cover the increase of imports. Under the assumption of a slightly negative trade balance and a continuing highly positive balance of services, the current account is expected to remain in small surplus below 1% of GDP in 1994-1995.

Summarizing the recent macroeconomic trends and short-term forecasts, it can be expected that the Czech Republic is able to reach a level of macroeconomic stability and balanced growth that will be comparable with developed market economies in the near future.

Conclusion

Before the 1989 revolution, the macroeconomic performance of the former Czechoslovakia was disappointing. The country was losing its pre-war position among the advanced industrialized countries. In the past decade there was no real growth in GDP and personal consumption. Industrial structure deteriorated considerably.

The radical economic reform was prepared in 1990 and initiated on January 1, 1991. The implementation of the reform was successful from the point of view

of macroeconomic stability (relatively low inflation, stable exchange rate, current account surplus and a nearly balanced state budget). However, it was accompanied by a sharp decline in real GDP which was further deepened by the collapse of the CMEA.

Another shock came from the split of the Czecho-Slovak Federation, which negatively affected the expected economic recovery in both successor republics. As was expected, the Slovak Republic has suffered much more.

According to international comparisons, the Czech Republic is now in the best macroeconomic position of all the post-communist countries. Recent macroeconomic trends and short-term forecasts are promising. However, some important reform steps have not yet been completed (privatization, restructuring and the start of economic growth). The Czech macroeconomic policy should by careful, as any expansion under imperfect market conditions may bring higher inflation, a current account deficit and other undesirable changes.

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Sources:

Tab. 1 and 3:	Statistical yearbooks for Czechoslovakia and author's own calculations.
Tab. 2:	OECD Paris, Central Institute for Economic Research, Prague, and author's own calculations.
Tab. 4:	Statistical Bulletin of the Czech Republic., Slovakia, Hungary and Poland, No. 3/1993.
Tab. 5 and 6:	Czech Statistical Office and author's own calculations.
Fig. 1:	Statistical Bulletin of the Czech Rep., Slovakia, Hungary and Poland, No. 3/1993, and author's own calculations.

Table 1

Basic macroeconomic indicators of the CSFR

Indicators (in constant prises)	Average annual change, in %	
	1970-1980	1980-1990
Gross domestic product (approximation)	4.77	1.50
Net material product produced	4.66	1.31
Gross material product produced	4.84	1.81
Gross material product distributed	4.30	1.98
Personal consumption	3.22	1.69
Material social consumption	5.52	4.84
Gross fixed investment	5.77	0.89
Consumer price index	1.14	2.17
Average nominal wages	3.13	2.08
Average real wages	1.99	-0.09
Labor productivity in material sector	4.48	1.65
Fixed capital productivity in material sector	-0.95	-2.89
Import intensity of gross material product	-0.37	-0.07
Indicators corrected for hidden inflation:		
Gross domestic product (approximation)	2.7	-0.7
Net material product	2.1	-1.5
Personal consumption	1.5	0.4
Gross fixed investment	3.1	-5.1
Consumer price index	2.8	3.5
Average real wages	0.3	-1.4

Table 2

Industrial structure of production (value added) in %

Industry	Average of 5 small countries*/	Computed data for CSFR	Actual data for CSFR		
	1987	1987	1980	1987	1990
Mining and quarrying	1.5	1.1	7.50	6.30	5.26
Food, beverages, tobacco	13.0	13.8	7.93	7.15	8.22
Textiles	2.7	6.2	5.54	5.24	5.18
Wearing apparel	1.4	2.9	1.36	1.35	1.40
Leather and products	0.2	0.5	0.47	0.44	0.48
Footwear	1.1	1.1	1.51	1.29	1.35
Wood products	2.9	1.5	1.95	1.93	2.31
Furnitures, fixtures	2.4	3.2	1.06	1.02	1.15
Paper and products	5.6	3.4	1.97	2.07	2.27
Printing, publishing	4.9	3.8	0.68	0.68	0.74
Chemical/rubber products	11.9	12.6	11.69	10.77	11.62
Non-metal products	3.5	6.2	6.24	5.66	5.92
Iron, steel, oth. materials	5.0	7.5	10.48	9.23	9.82
Metal products	6.8	6.3	3.99	3.94	3.93
Non-electrical machinery	9.2	7.7	17.39	20.04	17.91
Electrical machinery	7.4	6.4	4.30	6.30	6.49
Transport equipment	7.0	5.1	8.45	9.25	8.31
Professional goods	1.2	0.8	0.47	0.46	0.51
Other manufacturing	1.0	1.1	1.12	1.05	1.15
Electricity, gas, etc.	11.3	8.8	5.90	5.83	5.98

*/ Austria, Belgium, Denmark, Finland and Sweden

Table 3

Impacts of the reform and other factors on the Czecho-Slovak economy in 1991

Indicator	Total changes 1991/1990	Impacts of the collapse of the CMEA*/	Impacts of the economic reform			
			Total	Liberalization of prices	Devaluation of currency**/	Restrictive macroeconomic policy
Annual % changes:						
Gross domestic product, real	-15.1	-5.8	-9.3	-5.1	+2.4	-6.6
Private consumption, real	-23.9	-4.3	-19.6	-10.1	-4.4	-5.1
Gross fixed investment, real	-31.8	-3.9	-27.6	-4.1	-9.8	-13.9
Consumer price index	+57.9	+6.0	+51.9	+49.3	+15.1	-12.5
Annual absolute changes:						
Current account, in billion US$	+1.7	-2.9	+4.6	+0.5	+3.4	+0.7
Unemployment rate, in %	+5.6	+2.2	+3.4	+1.9	-0.9	+2.4

*/ Including other external shocks like the Gulf War and slowdown in world trade

**/ Including other steps enabling liberalization of foreign trade

Table 4

Basic macroeconomic indicators, 1992

Indicator	Czech Rep.	Slovakia	Hungary	Poland
Annual % changes:				
Gross domestic product, real	-7.1	-7.0	-4.5	+1.5
Inflation (consumer price index)	11.1	10.1	23.0	43.0
Exchange rate (national currency for US$)	-4.1	-4.1	5.7	28.8
Level in % of exports:				
Current account surplus	+7.5	-13.1	+3.0	-2.0
Gross foreign debt, end of period	73.8	89.4	213.4	421.3
Level in % of labor supply:				
Unemployment rate, end of period	2.6	10.4	12.3	13.6
Level in % of GDP:				
Government budget deficit	-0.2	-3.3	-7.0	-6.0

Table 5

Impacts of major factors on the Czech GDP in the first half of 1993 (billion CZK, constant 1984 prices)

Indicator	Data for the first halfyear			Contributions of factors to the change					
	I/1992	I/1993	change	world recession	split of the CSFR	inflow of foreign capital	expansion of exports	restrictive budget policy	other factors
Private consumption	98.0	101	+3.5	-1.3	-4.8	+2.8	+3.3	-1.1	+4.6
Government consumption	32.7	34.1	+1.4	-0.4	+1.4	+0.9	+1.1	-3.9	+2.3
Gross capital formation	50.1	57.6	+7.5	-0.7	+0.9	+6.5	+1.6	-0.6	-0.2
Aggregate domestic demand	180.8	193.2	+12.4	-2.4	-2.5	+10.2	+6.0	-5.6	+6.7
Exports excluding the SR[*/]	96.2	107.3	+11.1	-2.9	+4.2	+3.8	+6.0	-	-
Exports to the SR[*/]	30.0	20.5	-9.5	-1.1	-8.4	-	-	-	-
Aggregate demand	307.0	321.0	+14.0	-6.4	-6.7	+14.0	+12.0	-5.6	+6.7
from which:									
Imports including the SR[*/]	113.9	128.9	+15.0	-2.4	-2.5	+8.9	+6.0	-2.1	+7.1
Gross domestic product	193.1	192.1	-1.0	-4.0	-4.2	+5.1	+6.0	-3.5	-0.4
Impact on GDP in %	100	99.5	-0.5	-2.1	-2.2	+2.7	+3.1	-1.8	-0.2

[*/] Exports and imports including services

Table 6

Macroeconomic indicators of the Czech Republic

Indicator	Actual			Forecast	
	1991	1992	1993	1994	1995
Annual percentage changes:					
Gross domestic product, real	-14.2	-6.6	-0.3	+2.5	+4.2
Industrial production, real	-22.8	-11.7	-5.3	0.0	+2.5
Construction works, real	-32.4	+19.9	-7.5	+4.0	+6.4
Retail sales, real	-30.2	+9.3	-2.1	+3.5	+5.0
Gross fixed investment, real	-17.7	+6.3	-7.9	+3.9	+6.0
Exports excluding the SR	-13.5	+6.2	+20.0	+13.5	+11.5
Export to the SR	.	-5.7	-16.0	-4.0	+3.0
Imports excluding the SR	-27.5	+40.5	+2.7	+14.0	+12.5
Imports from the SR	.	-15.7	-14.7	+3.0	+5.0
Consumer price index	+56.6	+11.1	+20.8	+9.7	+7.0
Average nominal wage	+16.4	+22.5	+25.0	+16.4	+14.5
Average real wage	-24.0	+10.1	+3.5	+6.0	+7.0
End of period values:					
Unemployment rate in %	4.1	2.6	3.5	5.5	6.5
Trade balance in % of GDP					
- excluding the SR	3.5	-2.5	-0.4	-0.6	-0.8
- with the SR	0.5	1.6	1.0	0.5	0.3
Current account in % of GDP					
- excluding the SR	4.9	3.0	1.9	0.9	0.3
- with the SR	2.1	2.4	0.6	0.1	0.0

Figure 1. Gross Domestic Product 1992, in 1990 US Dollars[1]

1/ GDP converted into US$ using purchasing power parties.

APPENDIX

Specific Models and Methods Used in the Macroeconomic Analyses and Forecasts of the Czech Republic

A1. Macroeconometric Models for Czechoslovakia in the Period of Transition

During the period of transition to a market economy there is an increasing importance attached to macroeconomic analyses and forecasts. Attention should be paid especially to the possible impacts of external factors, government reform steps and other interventions, as well as the behaviour of households and enterprises. Short and medium-term analyses and forecasts may provide important information for government, banks, enterprises, etc., as well as for the foreign capital investors, trade partners and international institutes.

For given purposes it may be useful to combine proper econometric models with other sources of information. In Czechoslovakia, the following set of models was developed and used between 1990 and 1992 under the author's supervision and the participation of a research team of INFOSTAT Bratislava (Stefan Condik, Michal Olexa, Jan Haluska, Judita Orsagova and Milota Sujanova):

(a) aggregate annual model
(b) quarterly model
(c) annual model with disaggregate foreign trade.

Each of these models is a simultaneous system of dynamic nonlinear regression equations and identities expressing the basic principles of the market economy. The number of equations varies between 40 and 100.

The specification of the market economy models of Czechoslovakia is based on theoretical assumptions following from economic theory and on practical experience with econometric models implemented in market economies. It also takes into consideration specific outlines of the present transition period usually expressed with dummy variables.

The key exogenous variables express primarily the main instruments of macroeconomic policy like exchange rate, target of money supply, government transfers, as well as certain instruments of wage and price regulations. The models also contain some so-called truly exogenous variables like world imports and their price indexes, population, etc.

Individual model equations express the development of main macroeconomic aggregates which are typical for a market economy.

A common basic specification of the core of all the discussed models may be expressed in the following form (expected signs of parameters in the behavioural equations are positive except for variables with a minus sign, index -1 means one-period lag, d means one-period difference):

Real private consumption C is a function of real disposable household income Y_R (with the specification expressing the Houthakker-Taylor model of consumption) and real interest rate (ratio of the nominal rate R_I to increase in the consumer price index P_C):

(1) $C = C (Y_{R,-1} , dY_R , C_{-1} , -R_I/(P_C/P_{C,-1}))$

Real fixed investment I depends primarily on expected real gross domestic product Y, which is approximated with its lagged value and change. It is affected also by lagged investment and real interest rate (expressed in relation to GDP deflator P):

(2) $I = I (Y_{-1} , dY , I_{-1} , R_I/(P/P_{-1}))$

Real exports E and imports M are functions of the corresponding activity variables (real world imports M_W and real GDP, respectively) and relative prices:

(3) $E = E (M_W, - P_E/(P_W.R_E))$

(4) $M = M (Y, - P_M/P)$

where P_E,P_M - exports and imports deflators
P_W - world imports price index
R_E - exchange rate.

Real GDP (Y) is determined from the demand side with the basic macroeconomic identity:

(5) $Y = C + G + I + dJ + E - M$

where G - government consumption
J - stock of inventories.

Demand for labor L is determined with an inverse of the production function,

extended by real wage variable (nominal wage W deflated with consumer price index P_C):

(6) $L = L (Y, Y_{-1}, L_{-1}, - T, - W/P_C)$

where T - time variable.

Rate of unemployment R_U is defined in the usual form as a percentage of labor supply L_S:

(7) $R_U = 100 . (L_S - L)/L_S$

Import and export deflators (P_M,P_E) are derived from world import prices P_W and exchange rate R_E. The export deflator also depends on the GDP deflator P:

(8) $P_M = P_M (P_W, R_E)$

(9) $P_E = P_E (P, (P_W . R_E))$

The consumer price index P_C is a function of its lagged value and the main sources of inflation: import prices P_M, wage bill Y_W (in relation to nominal GDP Y_P), government budget deficit $-S_G$, and interest rate $-R_I$ (a too low R_I may lead to too high a money supply):

(10) $P_C = P_C (P_{C-1}, P_M, Y_W/Y_P, -S_G, -R_I)$

The fixed investment deflator P_I may be expressed as a function of the GDP deflator, imports deflator, and its own lagged value:

(11) $P_I = P_I (P, P_M, P_{I,-1})$

The GDP deflator is defined as a ratio of nominal and real GDP. Nominal GDP is defined as a sum of its real components multiplied by their respective deflators:

(12) $P = Y_P/Y$

(13) $Y_P = C.P_C + G.P_G + I.P_I + dJ.P_J + E.P_E - M.P_M$

where P_G,P_J - deflators of government consumption and inventories.

Nominal average wage is a function of labor productivity (GDP per employee),

consumer prices, lagged wage and unemployment rate (according to the assumption of the Phillips curve):

(14) $W = W (Y/L, P_C, W_{-1}, -R_U)$

Wage bill Y_W is defined as a product of nominal wage W and employment L. Real disposable household income Y_R is then defined as a sum of net wage income (wage bill reduced by wage tax rate R_W) and other household income Y_O, deflated with consumer price index:

(15) $Y_W = W.L$

(16) $Y_R = ((Y_W . (1-R_W) + Y_O)/P_C$

In the above basic specification, the dummy variables and many other less important variables have been omitted. The full specification of the discussed Czechoslovak models also contains many other equations expressing e.g. disaggregation of foreign trade into main commodity groups, conversion of some variables from constant prices to current prices, and derivation of some related variables (retail sales, industrial production, direct foreign investment, etc.).

A2. **Use of the A Priori Information in the Estimation of Econometric Models for Czechoslovakia**

Some macroeconomic relationships may not be influenced very much by changes in the economic system. For example, the consumption function even under central planning may reflect consumers' behavior that is not very different from that in a market economy, provided that demand and supply are not very far from equilibrium. This was the case of Czechoslovakia, where excess demand on the consumer goods market varied between 3 and 6%. Furthermore, almost any component of exports and imports under central planning may reflect some kind of market behavior.

On the other hand, equations explaining many other variables like prices, wages, interest rates, investment, etc., can hardly be estimated using only classical econometrics. When estimating the market-oriented econometric models for Czechoslovakia we used a priori information on key parameters, derived mainly from several econometric models of Austria, Finland and some other small Western European countries. Having imposed values of key parameters, we estimated from historical data the rest of a given equation.

In setting up the aggregate annual model, we used estimates from the previous econometric models of Czechoslovakia whenever it was possible (e.g. in the consumption function, the equations for exports and imports, etc.). We used also a priori information derived from selected Western European models for the rest of the behavioral equations. Parameters derived from the selected models were modified to reflect some technical differences (different units of measure) and specific features of the Czechoslovak economy in the first phase of transition.

Setting up the key parameters of the investment function (2) using a priori information from five Western European models may serve as an example (for a comparison, also the estimated parameters from two later Czechoslovak models are also given):

Parameters of key explanatory variables and their standard errors (in parentheses)[6]

Model	Lagged GDP	Change in GDP	Lagged gross fixed invest.	Real average interest rate
Average from 5 Western European models	0.047 (0.052)	0.31 (0.22)	0.42 (0.31)	-50.2 (0.52)
Aggregate annual model	0.05	0.14	0.60	-50.0
Quarterly model	0.135 (0.066)	0.135 (0.066)	0.386 (0.148)	-50.0
Annual model with disagg. foreign trade	0.297 (0.037)	0.482 (0.054)	0.25	-44.5 (5.5)

In some cases the use of composite variables imposing some a priori relations between parameters may be sufficient. For illustration, in the equation for nominal wage rate W (14) we used the following a priori information derived from the selected Western European models: the elasticity of wages on consumer price index P_C should be about 50% higher than the elasticity on labor productivity Y/L. Thus we used a composite variable P_{CYL} in logarithmic form:

[6]Parameters without standard errors were set up using a priori information

(17) $\ln P_{CYL} = 1.5 \ln P_C + 1.0 \ln Y/L$

Using P_{CYL} along with other explanatory variables, namely lagged wage rate W_{t-1}, unemployment rate R_U and a dummy for wage regulation U_W, we obtained a satisfactory estimation (standard errors are given below parameter values):

(18) $\ln W = 0.203 + \underset{(0.008)}{0.446 \ln P_{CYL}} + \underset{(0.048)}{0.637 \ln W_{t-1}} - \underset{(0.002)}{0.032 R_U} +$

$+ \underset{(0.005)}{0.018 U_W}$

$S_e = 0.51\%, \quad R^2 = 0.9992, \quad DW = 2.11$

According to (17), the component $0.446 \ln P_{CYL}$ in (18) may be substituted with:

(19) $0.446 \ln P_{YCL} = 0.669 \ln P_C + 0.446 \ln Y_L$

In some cases dummy variables may also be used to impose a priori information. As an example, the equation for import prices of fuels P_{M3} from the disaggregated model may be presented. The underlying hypothesis was that P_{M3} depends on the world crude oil prices P_{CO} and exchange rate index R_E. We used dummy variable U_{PM3} with the following a priori information: zero values for 1984-1989, 0.5 for 1990 and 1.0 for 1991, expressing two system changes following from the termination of the CMEA. First, up to 1989 the impact of the Kcs/USD exchange rate on the Czechoslovak import prices of fuels was negligible. Second, in 1990-1991 there was a shift to higher world prices in the Czechoslovak fuel imports. Using this a priori information we obtain the following satisfactory equation for P_{M3}:

(20) $\ln P_{M3} = -0.070 + U_{PM3} \ln R_E + \underset{(0.084)}{0.794 \ln P_{CO}} + \underset{(0.061)}{0.853 U_{PM3}}$

$S_e = 4.99\%, \quad R^2 = 0.9919, \quad DW = 2.28$

A3. **Simulation Techniques Used in Analyses and Forecasts Elaborated with the Czechoslovak Macroeconometric Models**

The developed market-oriented models for Czechoslovakia were used in macroeconomic analyses, policy simulations, short-term predictions and alternative forecasts, providing useful information for the government, the State Bank, the general public and international institutions.

Model simulations and predictions have been computed using the Gauss-Seidel algorithm within the SORITEC program installed on PC. The solution usually converged after 10-30 iterations.

To separate impacts of external shocks and major reform steps on the changes in the key macroeconomic indicators of Czechoslovakia in 1991, a simulation analysis employing the aggregate annual model was elaborated.

First, the external and reform factors were identified and represented with corresponding exogenous variables of the model:

Factors Corresponding variables

	Factors	Corresponding variables
(1)	Collapse of the CMEA	Dummies in the equations for exports volume and import prices (E, P_M)
(2)	Liberalization of prices	Dummy in the consumer prices equation (P_C)
(3)	Devaluation of currency	Exchange rate index R_E
(4)	Restrictive macroeconomic policy	Interset rate R_I, government budget surplus S_G, tax rates (R_W, etc.), dummies in the equations for wages and investment (W,I)

Second, a series of four model simulations was computed, in each of them only the corresponding set of exogenous variables was changed (from 1990 to 1991 values) and the other exogenous variables were left at their 1990 values. The resulting values of the key endogenous variables from each simulation were compared with their initial values, and the differences provided a basis for the estimation of the impacts of respective factors.

Finally, we also computed a control simulation in which all the other exogenous variables were changed to their 1991 values. As their resulting common impacts were negligible, almost all the changes in the key macroeconomic indicators in

1991 were explained by the impacts of four identified external and reform factors.

All the variables of the Czechoslovak models were possible to break down into their Czech and Slovak parts and to compute the shares of the Czech Republic and Slovakia in the values of macroeconomic indicators. The levels and trends in the shares of both republics were examined and extrapolated one or two years ahead (sometimes in different variants taking into account different scenarios). Having employed this technique, it was possible to derive the separate simulations and forecasts for both the Czech Republic and Slovakia from the solution of a common Czechoslovak model. In some special cases (e.g. the analysis of the split of Czechoslovakia), certain calculations were made outside the model and then combined with the model solution and the shares of both republics.

It is obvious that the above described technique may be useful for only one or two years after the split of Czechoslovakia (January 1, 1993). For proper macroeconomic analyses and forecasts, separate econometric models for the Czech Republic and Slovakia are necessary. At the present time, certain experiments in this direction have started.