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March 22, 1990

To: Members of the Executive Board  
From: The Acting Secretary  
Subject: World Economic Outlook - Supplementary Notes

The attached supplementary notes provide background material for the Executive Board discussion on Wednesday, April 11, 1990 of the paper on prospects and policy issues related to the world economic outlook (EBS/90/53, 3/21/90).

The Eastern European Division I (ext. 8671), the Eastern European Division II (ext. 8850), or the Central European Division (ext. 8866) is available to answer questions relating to Supplementary Note 1; Mr. von Post (ext. 4526) questions relating to Supplementary Note 2 and Mr. Masson (ext. 7483) to Supplementary Note 3.

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INTERNATIONAL MONETARY FUND

World Economic Outlook: Supplementary Notes

Prepared by the Staff

Approved by Jacob A. Frenkel

March 21, 1990

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1. Recent Developments in Eastern Europe and the U.S.S.R.
2. World Oil Situation: Recent Developments and Prospects
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Macroeconomic Effects



Recent Developments in Eastern Europe and the U.S.S.R. 1/

The following background notes for Chapter V of the main text, "Economic Reform in Eastern Europe and the U.S.S.R.," provide country-specific details on recent developments and economic policy reforms and reform proposals. 2/ Of the seven countries covered in this supplement, three (Hungary, Romania, and Poland) are members of the Fund, and two others (Bulgaria and Czechoslovakia) have applied for Fund membership; the remaining countries are the German Democratic Republic (G.D.R.), and the Union of Soviet Socialist Republics (U.S.S.R.).

I. Hungary

1. Recent developments

Hungary introduced the first major market-oriented reform in a centrally planned economy, the New Economic Mechanism (NEM), in 1968. Major elements of the NEM included the freeing of enterprises from mandatory plan directives and a relaxation of controls to permit a revival of small-scale cooperatives and private activities. There were, however, contradictions between the requirements of the plan and the role of markets, as well as opposition to the decentralization of decision making. The next two decades witnessed several attempts to improve the NEM and to rejuvenate the reform process.

During the 1970s, demand-management policies were sufficiently balanced to prevent the recurrence of chronic shortages and inflationary pressures in consumer markets. Partly as a result of the delayed response to the large increases in world prices for oil and other imported raw materials, however, Hungary's convertible-currency trade deficit widened steadily in the 1970s, resulting in the gradual buildup of a substantial external debt. From the late 1970s to the mid- to late 1980s, the stance of economic policies has been reversed frequently, shifting between expansion and restraint, in an attempt to narrow the external imbalance.

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1/ Prepared by the staff of the Eastern and Central European Divisions of the European Department.

2/ It should be noted that the Fund's data base for several of the countries concerned is still inadequate. Consequently, in the preparation of Chapter V of the main text and the background notes on individual countries the staff has relied on various other sources of economic data. For this reason, differences may exist in the figures cited in some of the country sections and those contained in Chapter V.

Against this background, the government adopted in mid-1987 a medium-term program of economic stabilization and structural reform to address the weak supply performance of the economy that persisted despite relatively high levels of investment. The authorities conceived the adjustment program for 1988 as the first stage toward achievement of sustained medium-term economic growth in the context of internal and external financial stability. 1/ Pending the benefits from implementation of comprehensive structural reform, a substantial share of the initial adjustment was borne by demand restraint, in particular through a reduction in the budget deficit and curtailment of excess liquidity. This resulted in sluggish GDP growth of 1/2 percent in 1988 and a fall in domestic demand by 2 percent--the largest decline recorded in the 1980s. Consumer price inflation rose to 15 percent, mainly because of the introduction of a value added tax on January 1, 1988.

The convertible current account deficit, which had reached 6.3 percent of GDP in 1986, was gradually narrowed to 2.9 percent in 1988. This reduction was impressive in light of increased interest obligations as well as a substantial increase in travel expenditures by Hungarian residents taking advantage of relaxed travel and foreign exchange regulations. The external adjustment slowed the growth of external convertible debt, which had been rapid in preceding years.

The adjustment program faltered in 1989. Real output declined for the first time since 1985 as lower industrial production outweighed slow growth in trade and agriculture. 2/ Consumer price inflation increased to 19 percent, reflecting, in part, accommodating financial policies. Wages also increased faster than planned, particularly in the early part of the year, as a result of large wage awards granted by enterprises enjoying greater freedom over wage determination and high liquidity due to a much weaker than planned fiscal policy and a large ruble trade surplus.

The provision of excess liquidity resulted in a widening of the convertible current account deficit to US\$1.4 billion (5 percent of GDP) from US\$0.8 billion the previous year. A small improvement of the trade balance, reflecting an increase in the terms of trade, was more than offset by a large deterioration of the service account. The latter was due primarily to large travel outflows, but also reflected larger debt service payments and--probably increasingly during the course of the year--capital flight.

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1/ Fund support for Hungary's program of stabilization and economic reform was provided through stand-by arrangements approved in May 1988 and March 1990.

2/ Based on reports from large enterprises only, real GDP is estimated on a preliminary basis to have fallen by 2 percent; this estimate may overstate the actual decline since it excludes small businesses and services.

In response to the resulting convertible currency drain, the Hungarian authorities adopted policies in late 1989 to achieve domestic and external adjustment. Exchange rate action taken in late 1989 and tightened household access to foreign currency are to be supported by a planned tightening of fiscal and monetary policies, including higher interest rates. Administrative measures have also been introduced to curtail exports to the member countries of the Council for Mutual Economic Assistance (CMEA), thereby preventing a further large payments surplus in nonconvertible currencies from adding to domestic liquidity. Hungary continues to have a unified exchange rate vis-à-vis nonsocialist countries. Its currency, the forint, is pegged to a basket of convertible currencies and adjusted intermittently based on differential inflation developments.

## 2. Recent structural reform policies

Several market-oriented measures have been introduced since mid-1987 to increase the efficiency and flexibility of the Hungarian economy. Structural reform in this period has focused primarily on wages and prices, the tax system, the trade regime, and the banking system.

Reform of the wage determination process, aimed at widening the scope for pay differentiation according to performance while containing the risk of wage overruns, has been a key element of the structural reform program. Starting in 1989, there has been annual collective bargaining in state-owned enterprises, safeguarded by taxation of excessive wage increases. Administrative controls had been maintained over a broad range of prices reflecting concern over inflation as well as insufficient financial discipline on enterprises and domestic competition. In recent years, however, significant moves toward the liberalization of prices have been initiated. The share of consumer prices free of direct and indirect controls was raised to 53 percent in 1988, to 63 percent in early 1989, and to 77 percent in early 1990. Steps have also been taken to improve the structure of relative prices with the introduction of a value added tax concurrent with reductions in producer and consumer subsidies.

A major tax reform, aimed at lessening distortions in the economy, was started in 1988. The initial reform measures introduced a value added tax and a personal income tax, while they eliminated or replaced various sector- and group-specific taxes. From January 1, 1989, the previous profit tax system was replaced by a uniform corporate income tax, which differentiated between state enterprises, cooperatives, nonsocialist enterprises, and joint ventures. Since the initial reforms in 1988, there has been a general move toward lower tax rates. The top marginal tax rate under the personal income tax was reduced from 60 percent to 50 percent in 1990, while the corporate income tax was lowered from 54 percent to 40 percent. The latter reduction was partly offset by the introduction of mandatory dividend payments by state enterprises, equivalent to 18 percent of after-tax profits; this was aimed at subjecting state-owned

enterprises to a total dividend and tax burden comparable to that of the private sector.

Significant steps have also been taken to open the economy to foreign competition. Licensing requirements and quota restrictions on the equivalent of 40 percent of the value of non-ruble imports were eliminated on January 1, 1989. This proportion was increased to 65 percent of 1988 non-ruble imports on January 1, 1990.

With a view to enhancing the efficiency of financial intermediation, a two-tier banking system was introduced in January 1987, after almost four decades of rigid segmentation between a few large specialized institutions. The establishment of competing commercial banks was accompanied by increasingly flexible interest rates, especially in the enterprise sector where both deposit and lending rates were freed in 1987. Subsequently, steps have been taken toward integration of the market for financial services which, in the wake of the initial banking reform, remained divided into separate enterprise and household spheres. All remaining regulatory barriers to integration were eliminated on January 1, 1990. Interest rates have also been raised over time to levels that are now positive in real terms.

Reform measures have been implemented or are under preparation in other areas. Most important, a legislative framework has been established ensuring uniform conditions for businesses in all sectors of the economy and widening the scope for entry and expansion of small enterprises. Programs are under preparation to accelerate the privatization of state enterprises and to reduce the scope of state intervention in the economy, including a revision of the social security system. A law setting the framework for the establishment of a stock market was also adopted in January 1990. In addition, all existing regulations are to be reviewed and justified by a Deregulation Board by March 1990, or be terminated.

While little progress has been made so far in industrial restructuring, some initial steps were taken in late 1989 and early 1990. In 1989, commercial banks started, on a selective basis, the withdrawal of credits from less creditworthy borrowers. In the beginning of 1990, the government strengthened this process by foregoing the option of "refloating" targeted loss-making companies and by allowing commercial banks to initiate appropriate procedures against debtors judged not to be creditworthy on commercial criteria.

The Hungarian authorities have supported market-oriented reforms of the CMEA trade arrangements as a means of enhancing the exposure of Hungarian enterprises to international competition. A shift toward settlement in convertible currencies will, however, require enhanced competitiveness and a reorientation of production by enterprises now exporting to relatively undemanding CMEA markets.



## II. Poland

### 1. Recent developments

The economic decline of 1979-82 and attendant labor and social unrest ended with the introduction of an ambitious economic reform program. This program was launched under unpropitious circumstances, however, given the large internal imbalances and growing external debt that Poland had begun to reschedule in 1981; moreover, implementation of the program turned out to be less than complete. Although economic activity revived, with GDP growing at an average annual rate of over 4 percent in 1983-88, by 1988 output was still lower than in 1978 and per capita consumption was just 5 percent higher than in 1980. In 1984-88, the current account deficit in convertible currencies ranged between US\$0.4 billion and US\$0.8 billion, with rising interest obligations on a growing foreign debt, and increasing net transfers more than offsetting a trade surplus in the neighborhood of US\$1 billion. Although the reform had been accompanied by a doubling of the price level and a reduction in real wages by about 25 percent in 1982, market imbalances continued to characterize the Polish economy throughout the 1980s.

In early 1988, the government carried out a so-called price-incomes operation designed to reduce market imbalances and subsidies. The announcement of large impending increases in administered prices and a greater scope for increases in partially liberalized prices led, however, to a jump in wage demands, renewed labor unrest, and the beginning of a wage-price spiral. The annual average rate of inflation more than doubled, to 60 percent in 1988, but real wages increased by 14 percent. With real personal consumption continuing to grow at about 3 percent, the saving rate out of household zloty incomes also more than doubled, to 16.5 percent.

Zloty holdings of the population in real terms declined by about 5 percent in the course of 1988. This was accompanied by a sharp real depreciation of the parallel market exchange rate for the dollar which, together with an increase in household foreign currency deposits in dollar terms, caused the real value of household broad money--with these deposits valued at the parallel rate--to rise by almost 50 percent during 1988. With growing domestic imbalances, the trade surplus in convertible currencies slipped below US\$1.0 billion for the first time since 1983, and the current account deficit deteriorated slightly to US\$0.6 billion (0.8 percent of GDP). By contrast, the trade balance with CMEA partners settled in transferable rubles improved by the equivalent of US\$0.5 billion and the current account was in surplus for the first time since the early 1970s.

The surge in money wages continued in 1989, abetted by the very liberal indexation policy following the social roundtable discussions in the spring of 1989 and a legally mandated increase of wages paid by the government--which had lagged in the past--relative to those paid by socialized enterprises. In the first seven months, real wages were up by

18 percent over the corresponding period of 1988, while prices were up on average by 85 percent. With tax revenues lagging and subsidies soaring--particularly for food and coal--the state budget went deeply into deficit. In order to put a brake on the growth of subsidies and to carry out the decision taken during the roundtable discussions to "marketize" agriculture, the government freed virtually all food prices on August 1, 1989. The monthly rate of inflation, which had averaged 8.5 percent through July, jumped to almost 40 percent in August and 34 percent in September. There was, however, generous compensation for the food price hikes and a continuing lack of wage discipline, and the rate of growth of real income increased in August.

The accelerating wage-price spiral was accompanied by a downturn in industrial output and construction beginning in the second quarter of 1989. This end to the steady growth performance of the 1983-88 period was attributed to several factors, including a decline in material inputs imported from CMEA partners, a fall in coal output associated with the roundtable agreement to make Saturday work in the mines voluntary, declining stocks of inputs, and the growing liquidity problems of some enterprises. Investment activity flagged as the year wore on, and the growth in real consumption also slowed markedly from the very high levels of the first half of 1989. Although the saving rate out of zloty money incomes was one third greater in the first 9 months of 1989 than a year earlier, the real value of the population's holdings of zlotys fell by over 40 percent in the January-September period. With continued real depreciation of the parallel market exchange rate, the percentage of broad money balances held in foreign currency deposits rose to 80 percent at the end of September 1989. Nevertheless, the real value of household broad money declined by 13 percent in the first 9 months of 1989.

The new Solidarity-led coalition government that assumed office in mid-September set about to check any further destabilization of the economy and to lay the groundwork for a radical adjustment cum reform program for 1990. The wage indexation system was tightened by the introduction of an excess-wage tax that penalized wage awards in excess of 80 percent of the contemporaneous increase in the cost of living. Budgetary spending was also tightened, virtually all food subsidies were eliminated on October 1, 1989, and tax payments accelerated, measures which prevented the deficit on general government from exceeding an estimated 8 percent of GDP for the year as a whole. Although interest rates continued to be significantly negative in real terms, credit expansion was severely limited in the latter months of the year. These actions to reduce the underlying rate of inflation were accompanied by other measures to absorb excess demand, including large increases in various administered prices, further price liberalization, and depreciation of the official exchange rate at an accelerated pace.

These policies resulted in a sharp decline in real wages during the final months of 1989, lowering the increase for the year as a whole to about 10 percent. The parallel market exchange rate appreciated sharply in real terms, and with an average monthly rate of inflation in excess of

30 percent in the last quarter, the real value of broad money is estimated to have fallen by roughly two thirds in this period. The deterioration in the convertible currency trade balance was also arrested, although for the year as a whole the surplus fell to about US\$250 million. The current account, affected as well by a larger deficit in nonfactor services, higher interest obligations and lower transfers, deteriorated by US\$1.25 billion to a deficit equivalent to about 3 percent of GDP. The average annual rate of inflation accelerated to 245 percent in 1989, while inflation within the year amounted to 640 percent. Industrial output declined by 3.4 percent for the year as a whole, while investment and possibly consumption stagnated in real terms.

## 2. Institutional reform in the 1980s

From 1982 to 1988 there was a substantial loosening of central controls over economic activity in Poland. Important reform initiatives involved a far-reaching restructuring of the central economic administration, including the elimination of most branch ministries and a reduced role for central planning, a significant reduction in the scope of central allocation of material inputs, and reforms of the foreign exchange system. The latter consisted of unification of the commercial and noncommercial exchange rates for convertible currency transactions, the introduction of partial retention accounts for exporters and the establishment of officially sanctioned auctions for foreign exchange. Much less progress was achieved in other areas, however, including price liberalization and the institutional changes required to establish financial discipline for enterprises at the microeconomic level as a basis for adequate macroeconomic control.

In late 1988 and early 1989 several further reforms were initiated, including passage of a new law on "Undertaking Economic Activity," which placed the private and public sectors on an equal footing and removed all hiring limits on private enterprises. A two-tier banking system was established, and a new foreign exchange law was enacted that allowed the establishment of independent exchange dealerships and relatively unrestricted foreign exchange transactions at freely determined rates between enterprises and between households. A new law on joint ventures with foreign participation was passed that abolished all limits on the ownership share of foreign investors and provided other inducements to attract foreign investment in Poland.

The legal monopoly of state enterprises in procurement for food processing was eliminated at the beginning of 1989, but the government that took office in September found that new legislative initiatives were needed to break up monopolistic market structures in this sector as well as in domestic trade. On August 1, 1989, virtually all administrative limitations on retail food products were abolished--although guaranteed minimum procurement prices remained in force until the end of the year--and most administered prices for agricultural inputs were also eliminated.

In late 1988, legislation was enacted that transformed the Planning Commission into a new Office of Central Planning, which was relieved of most of the operational responsibilities of the former agency. During the latter part of 1989, in a major departure from the system of the previous 40 years, it was also decided not to prepare a Central Annual Plan for the following year. Ceilings on increases in so-called contract prices were abolished in December, and many other price controls were eliminated in January 1990. As a result, no more than 5 percent of output was to be subject to administered prices and the requirement of advance notification of price increases was to apply to no more than an additional 5 percent of production. At the same time, formal central allocation of material inputs was abolished, and the preferential aspects of so-called government orders were eliminated.

3. Stabilization policies and comprehensive market-oriented reforms in the 1990s

The stabilization program introduced by the government on January 1, 1990 was designed above all to bring down the rate of inflation sharply and to eliminate shortages. <sup>1/</sup> The program consisted of five main elements. First, a restrictive tax-based incomes policy was introduced as the major nominal anchor of the anti-inflation program. For the early months of 1990, the increase in enterprises' nominal wage bills in excess of a small fraction of the monthly rate of inflation were to be taxed at highly progressive rates. Second, the foreign exchange market for most current transactions in convertible currencies was liberalized and the exchange rate unified and depreciated by one third on January 1, 1990; management of this rate was intended to serve as a second nominal anchor against inflation. Third, various fiscal measures, including the virtual elimination of tax reliefs and significant subsidy reductions, were to be taken to reduce the overall fiscal deficit to rough balance in 1990. Fourth, credit policy was to continue to be tight, with the authorities undertaking to set the central bank's refinance rate at a level that would induce positive real rates of interest and a reversal of the process of currency substitution. Finally, price controls were further reduced so as to leave virtually 90 percent of prices free, while remaining administered prices--including those for coal, electricity, and public transport--were raised by up to several hundred percent.

The authorities also began to lay the groundwork for further reforms to create the appropriate conditions for the transition to a market economy in Poland. Some of these reforms are to be implemented over a number of years. The new government has undertaken to develop a program for wide-ranging privatization of enterprises, but several complex issues remain to be resolved. One issue concerns the criteria for determining the scope and pace of privatization and the mechanisms--such as public offerings or auctions of assets--by which changes in ownership are to be

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<sup>1/</sup> Fund support for Poland's program of stabilization and economic reform was provided through a stand-by arrangement approved in February 1990.

effected. Far-reaching privatization is likely to take years, however, and in the meantime there is the need to increase the autonomy of state enterprises, to establish a new set of incentives for their efficient operation, and to strengthen financial discipline. Legislation is to be amended to enable more expeditious initiation and completion of bankruptcy proceedings for enterprises that lack viability in the emerging market-oriented environment.

Although some anti-monopoly actions have already been taken, vast segments of the Polish economy remain highly monopolized and act as a barrier to increased competition and industrial restructuring. Draft legislation provides for a new independent Office of Demonopolization to break up existing monopolies and monopolistic associations and to apply stringent sanctions for monopolistic practices. Related to the programs for demonopolization and privatization is the need to establish a regulated securities exchange and efficient capital markets more generally.

Draft changes in the labor code are intended to enhance labor mobility by making it easier for enterprises to adjust the size and structure of their work force to changing conditions. A Labor Fund is being established to provide retraining and unemployment benefits, and the social safety net is being expanded more generally. The housing shortage, however, will likely remain an impediment to expanded labor mobility for some time to come.

The amended banking law enacted in December 1989 established the full independence of the National Bank of Poland (NBP) in respect of credit policy and formally charged the NBP with responsibility for stability of the currency. Beginning in 1991, the NBP will no longer be required to submit to Parliament a quantified annual credit plan, but the elimination of bank-specific credit ceilings will need to be accompanied by the creation of new, indirect instruments of credit control and the development of an integrated money market. It is also necessary to increase the efficiency and speed of the operations of the commercial banks. Regulatory reforms that are envisioned include strengthening competition among the commercial banks, a process that can be fostered through simplifying the procedures for the establishment of new banks, including private banks and banks with foreign participation. Commercial bank accounting practices need to be improved, risk-based capital adequacy standards developed, and bank supervision upgraded.

A comprehensive reform of the budget and tax system is anticipated for 1991-92. Reforms in this area would include the introduction of a uniform corporate income tax for all economic entities, replacement of some 100 differentiated turnover tax rates by a simplified value added tax, establishment of a broad-based personal income tax, elimination of a number of extra-budgetary funds, and an overhaul of the process of budgetary preparation and control.

The authorities also consider that reform of the CMEA trading mechanism is a necessary complement to reform efforts in Poland. As the shift is made to settlements in convertible currencies and world market pricing, however, special attention will need to be given to assisting enterprises heretofore virtually solely dependent on exports to relatively undemanding CMEA markets to reorient their production toward the demand structure and standards of the world market.

### III. Romania

#### 1. Economic developments up to 1990

As in other Eastern European economies and the U.S.S.R., the post-war communist governments in Romania pursued a policy of rapid industrialization under central planning. During the 1970s, the official statistics reported high annual growth rates averaging around 9.5 percent, with the portion of GNP devoted to gross investment expenditure averaging around 40 percent.

The Romanian economy was affected negatively by the oil-price increases of 1979-80, as by that time domestic oil resources had become inadequate to meet the country's needs. As a result, growth slowed substantially and the current account deficit with the convertible currency area widened further to US\$2.4 billion in 1980. This was the largest of a series of deficits since 1971, which by 1981 brought the country's convertible currency debt to US\$10.2 billion.

With foreign exchange reserves at low levels, a large portion of its debt borrowed on short term, and international creditors becoming wary of further exposure in Eastern Europe, the government recognized the need for adjustment. An economic stabilization program was put into effect in 1981, and from 1982 onward, the current account has been in surplus, largely reflecting an extensive compression of imports from the convertible currency area. <sup>1/</sup>

Under the stabilization program, Romania established a unified commercial exchange rate, adjusted domestic prices so as to reflect relative costs more closely, increased interest rates, and depreciated the leu. These measures were considered important elements in a market-oriented reform that would lead to greater efficiency and a viable balance of payments situation in the medium and long term. After January 1984, however, most of the reform measures were reversed. Little can be said with certainty about economic developments after 1984. The availability of data on economic performance became increasingly sparse in the 1985-89 period and official statistics on growth were generally believed to be

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<sup>1/</sup> Since joining the Fund in 1972, Romania has had three stand-by arrangements in support of adjustment programs pursued by the government. The last such arrangement ended in 1984.

significantly overstated; many of the official statistics for this period are now undergoing revision. During that period, Romania registered sizable current account surpluses which allowed the country's foreign debt to be retired but at the expense of declining domestic living standards and investment.

By 1983 Romania had reduced the number of exchange rates used for transactions to two. The more commonly used commercial rate (which was defined vis-à-vis a basket of currencies) had a value of leu 21.3 to the U.S. dollar in 1984. However, during 1985-89 the leu appreciated and in November 1989 it was quoted at leu 14.8 to the dollar. The new government that came to power in late December 1989 unified the exchange rates and as of February 1, 1990 set the exchange rate at leu 21 to the dollar.

## 2. Recent economic developments and economic reform

The disruptions associated with the downfall of the Ceausescu regime and the formation of a provisional government (pending elections tentatively scheduled for May 1990) also led to some disorganization of production as spontaneous elections of new managers took place in most enterprises and the traditional planning and organizational structure was partially dismantled. At the same time, energy output was redirected toward consumption, with adverse effects on industrial production. Industrial output in January 1990 was more than 20 percent below the level of January 1989, while labor productivity fell by about 25 percent.

In an effort to increase output of small-scale industry and the service sector, the new government has passed laws which enhance the role of private economic units in these areas. Since February 1990, four types of private units have been permitted: (1) small enterprises with a maximum of 20 employees; (2) production associations with a maximum of 10 participants; (3) family associations; and (4) activities carried out by persons independently. The financial resources of these units can come from the units' own resources, from domestic banks, or from abroad. Those units having direct relations with foreign partners will be able to retain 50 percent of the foreign currency received from abroad. The provisional government has also taken initial steps toward abandoning the system of strict central planning. In the first quarter of 1990, the state enterprises and cooperatives, which account for more than 90 percent of industrial output, were asked to specify their own production plans which were to be aggregated and to be considered as indicative rather than obligatory targets. During that period, however, the allocation of certain crucial inputs was kept under central control. Furthermore, administrative control over the pricing of industrial products was retained.

With a view to enhancing incentives and output in agriculture, the government has recently taken a number of measures. Effective January 1, 1990, farmers in the private sector and agricultural cooperatives were permitted to charge market prices for their products and to choose where to sell their products. State farms continued to be required to sell to

the state at officially set prices. These prices were raised recently, with increases ranging from 40 percent to more than 100 percent. The new government also passed a law that permits agricultural cooperatives and state farms to distribute to individual members or employees up to 5,000 sq. meters of land. Finally, private sector farmers are now able to have access to credit from the State Bank for Agriculture and Food Industry.

In early 1990, exports declined because of the fall in industrial output, a prohibition on food exports--so as to boost consumption levels on the long-depressed domestic market--and cutbacks in exports of industrial consumer goods and energy products. At the same time, imports were allowed to increase with the intention of raising domestic consumption levels, alleviating the substantial production shortages, and initiating replacement of obsolete equipment. Romanian exports to both the convertible currency area and the socialist clearing area were down by more than 40 percent in January 1990 compared to January 1989. Imports from the convertible currency area in January 1990 were 10 percent higher, but imports from the socialist clearing area were 20 percent below their levels of a year earlier.

In early 1990, the provisional government abrogated certain laws that had hampered Romania's economic relations with the rest of the world in recent years. These included legislation prohibiting the acquisition of foreign credits and the extension of export credits, and closely regulated the terms of imported goods and the conditions under which foreign firms in Romania operated. Furthermore, small enterprises (regardless of ownership) are now permitted to engage in foreign trade whereas before only specialized state foreign trade enterprises carried out foreign trade activities. For the state enterprises engaged in foreign trade there are no longer detailed, obligatory plans; there exist only indicative "global programs". The provisional government has also moved to reactivate relations with various international organizations and to normalize its economic relations with other countries.

#### IV. Czechoslovakia

##### 1. Recent developments

Until the early 1970s, the Czechoslovak authorities were generally able to achieve internal and external in an environment of secularly declining growth. As industrial output was highly energy intensive, however, the first and second oil price increases had a serious impact on economic activity. Initially, the impact was largely accommodated through foreign borrowing, but by the early 1980s mounting balance of payments problems forced a cutback in domestic absorption, resulting in a sharp recession in 1981-82. This, together with tight import restrictions, led to a significant reduction in the trade deficit, and indebtedness to developed countries remains low by comparison with most other Eastern



European countries. While a mild recovery followed in 1983-84, thereafter the trend of declining growth rates resumed.

Against this background, the Czechoslovak authorities have attempted to maintain consumption growth during the 1970s and 1980s. With only moderate increases in real wages, the country's repressed inflation is generally considered to be less pronounced than in some other Eastern European countries. This has, however, come at the cost of declining levels of investment, resulting in an increasingly obsolescent capital stock and severe environmental problems.

According to official data, real net material product grew by an average 2.3 percent in 1986-88. Domestic absorption, particularly consumption, increased more rapidly than output during the same period, resulting in a deterioration in the external trade balance. Finished investment in fixed capital fell significantly, although it was partly offset by increases in inventories and unfinished investments. The declining growth trend appears to have continued in the first 11 months of 1989 when industrial production rose by only 1.7 percent. Most consumer prices are set centrally and measured inflation averaged only 0.3 percent in 1986-88. Abstracting from hidden inflation, real wages increased modestly over the same period.

Just under two thirds of Czechoslovakia's external trade is conducted with socialist countries, of which the U.S.S.R. accounts for over one half, about 30 percent is with industrial countries, and the remainder with developing countries. Although Czechoslovakia exports machinery and equipment to socialist countries, it exports mainly fuels and raw materials to nonsocialist countries, reflecting the limited competitiveness of the Czechoslovak industry on world markets. Since 1986, the trade balance with socialist countries--in particular with the U.S.S.R.--has improved markedly, partly because of a significant improvement in the terms of trade resulting from the decline in the price of imported oil.

The trade balance with nonsocialist countries moved into deficit during the three years up to 1988, despite an improvement in the terms of trade with these countries, reflecting a sharp increase in imports associated with domestic shortages of certain consumer goods and raw materials. The volume of exports fell sharply in 1987 and stagnated in 1988, mainly because exports to developing countries were curtailed following a decision in early 1987 by the Czechoslovak authorities to cut the financing facilities for the sale of equipment and arms. Exports to industrial countries, on the other hand, grew during this period. The trade balance improved substantially in 1989 as a result of strong growth of exports and stagnating imports. Exports to nonsocialist countries are estimated to have increased substantially in 1989, primarily because of improved export incentives in the form of foreign exchange retention quotas for exporters.

Reflecting these developments, the convertible current account balance is estimated to have been in deficit since 1987, following several years of sizable surpluses. Gross external debt in convertible currencies is estimated to have increased significantly in recent years, reaching more than US\$8 billion by the end of 1989. Gold and foreign exchange holdings of the banking system were on the order of US\$2.4 billion at the end of 1989. Czechoslovakia also has sizable claims on developing countries, arising from trade credits which are on the order of US\$2-3 billion. Debt service payments in convertible currencies are estimated to be just over 15 percent of exports of goods and services in such currencies.

On January 1, 1989, a new commercial exchange rate for all trade with nonsocialist countries was introduced and set at Kcs 14.3 to the U.S. dollar. This represented a marked devaluation compared with the previous official rate of Kcs 5.35 to the U.S. dollar although the effective devaluation was much less, given the complex system of subsidies in effect prior to this action. On January 8, 1990 the new government devalued the commercial rate to Kcs 17 to the U.S. dollar, unified the noncommercial rate with the commercial rate, and introduced a tourist rate of Kcs 38 to the U.S. dollar. The tourist rate is applicable to foreign tourists after they have converted the equivalent of DM 30 a day at the commercial rate and to inward transfers. Further, to curtail the incentive to export to the U.S.S.R., the commercial rate against the ruble was increased by 10 percent, and the noncommercial ruble rate by 20 percent.

## 2. Recent reforms and the new government's program

In 1987, the Central Committee adopted a reform program to be introduced in stages in advance of the Ninth Five Year Plan (1991-95). While the program attempted to increase the role of the market in the economy, it was also stated that "it is essential not only to preserve, but even to enhance, the role of the centre." Over the past two years, some of the measures envisaged in the program were adopted, but implementation has been generally weak.

New regulations were put in place in 1988 which were intended to break up a number of large enterprises into smaller firms that were to be granted more autonomy. At the same time, incentive pay and rewards for meeting final demand rather than plan targets were increasingly stressed. A modest increase in the role of small-scale businesses--based more on cooperatives than on private initiative and ownership--was also permitted. This legislation was followed in June 1989 by a new planning law which abolished the traditional annual directive plans. Five-year plans were to be the key element in planning, thereby leaving to enterprises many detailed decisions previously contained in the annual plans. Subsequently, a series of laws taking effect from January 1990 were introduced with the intention of increasing the self-financing of enterprises. With regard to price determination, a new law effective on January 1, 1989 allowed wholesale prices to be determined to that price at which enterprises could, on average, earn a rate of return on their

invested capital of 4.5 percent. Retail prices were not adjusted to take account of this change, necessitating increased subsidies.

The state monopoly of foreign trade has been gradually weakened. To encourage exports to the convertible currency area, enterprises were permitted in 1989 to retain a certain share of their convertible export earnings and, as discussed above, there were a number of changes in exchange rate policy. On January 1, 1989, a new joint venture law went into effect which allowed foreign majority holdings in joint enterprises operating in Czechoslovakia. The new law permits repatriation of profits in convertible currencies, and joint venture enterprises are exempt from the surrender requirement on their convertible currency earnings.

Financial sector reform, including the introduction of a two-tier banking system, began in early 1990. The role of the State Bank has been limited to that of a central bank, while its former commercial activities have been taken over by two new commercial banks, which will operate throughout Czechoslovakia. The law provides for the possibility of establishing further new banks, including joint venture banks. All the new banks will be operated as self-financing enterprises. At the same time, the range of activities of the existing specialized banks (the two savings banks, the foreign trade bank, and the investment bank) has been expanded. The foreign currency deposit rules for individuals were liberalized in 1989 so that depositors no longer have to identify the sources of funds placed in these accounts.

The new Government of Czechoslovakia, which took office in December 1989 in advance of elections scheduled for June 1990, has placed renewed emphasis on economic reform. A substantial body of legislation is either before Parliament or under preparation that, inter alia, is intended to remove restrictions on private economic activity, provide for the creation of joint stock companies and the denationalization of existing state enterprises. It also aims at establishing procedures to be followed in cases of bankruptcy, and to break up, and limit the market power of monopolies. This legislation is intended to provide a more competitive and flexible economy capable of rapid adjustment to the price reform and liberalization of wages that the authorities intend to take in due course. Stress has also been laid on the need for tight fiscal and monetary policies, and exchange rate policy is to be conducted with the eventual aim of full convertibility. Foreign capital is seen as having an important role in the restructuring of industry, although the present cautious debt policies are to be maintained.

V. Bulgaria

1. Recent developments 1/

According to official information, the growth of real net material product has been 5 percent to 6 percent over the 1986-88 period, and the plan for 1989 envisaged a growth rate of 6.5 percent. The high reported growth rate since 1985, and particularly, the rapid growth of industrial production reported for 1988, partly reflect investments in energy and high technology sectors. Following a drought and poor harvest in 1987, agricultural production fell marginally in 1988 because of continued unfavorable weather conditions. For 1989, target rates of growth of 5.0 percent and 8.9 percent were established for industry and agriculture, respectively, but neither is believed to have been met. Thus, industrial output for the first nine months of 1989 was only 3.5 percent, and agricultural output 6.4 percent, higher than in the same period of 1988. With the political upheaval and the emigration of a large number of the Turkish minority, economic performance in the last quarter of the year is expected to have been poor.

In nominal terms, retail sales are reported to have increased by 3.5 percent to 4 percent over the past few years, although there have been reports of widespread shortages of essential goods and services, reflecting in part, poor distribution facilities. 2/ Large increases in nominal investment have been recorded in recent years, reflecting the restructuring toward energy and high technology sectors of industry.

Real wage increases have exceeded labor productivity growth in the past few years, and money incomes have significantly exceeded the availability of goods, leading to a sizable buildup of savings deposits with the banking system. Prices remain strictly controlled and only small increases have been permitted.

About three fourths of Bulgaria's foreign trade is carried out with other CMEA countries, with the U.S.S.R. accounting for about 60 percent of the total. Of the trade with nonsocialist countries, about two thirds is with the developed market economies and the remaining one third with the developing countries, principally in the Middle East. After an extended period of sizable trade surpluses with non-CMEA countries, deficits have been recorded since 1985, mainly because of significant increases in imports and stagnating or falling exports while the terms of trade have

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1/ There are a number of concerns about the validity of the Bulgarian official statistics, especially as regards growth rates, which are generally believed to be inflated.

2/ Information on domestic absorption is poor. The index of retail trade turnover serves as a proxy for private consumption. Investment figures have for many years been published only in current prices and the interpretation of the figures is complicated by major residual items related to unfinished projects.

improved recently. Trade with the CMEA, on the other hand, has tended to show increasing surpluses, mainly as a result of pressure on Bulgaria to reduce its debt to these countries, particularly the U.S.S.R.

In 1986, the trade balance with nonsocialist countries recorded a deficit of about US\$1 billion and the hard currency current account moved into a deficit of more than US\$0.4 billion. After some improvement in 1987, the trade deficit rose further in 1988 and the current account deficit expanded to US\$0.7 billion. Further sizable deficits on both the trade and the current accounts are believed to have been recorded in 1989, though mainly with developing countries as a result of reduced credit facilities.

These developments resulted in a sharp increase in Bulgaria's hard currency debt, which is estimated to have risen from about US\$2 billion in 1984 to US\$7.8 billion at the end of 1988, and perhaps to US\$9-10 billion by the end of 1989. Part of this borrowing has coincided with a sizable buildup of Bulgarian assets in developing countries, while some of the borrowing in 1988 was used to increase reserves. Bulgarian assets vis-à-vis BIS banks, which fell dramatically between 1985 and 1987, were partly replenished during 1988, reaching US\$1.8 billion by end of year, but fell back to US\$1.2 billion by mid-1989.

An official exchange rate for the Bulgarian leva is quoted together with a tourist rate, which since 1987 has been double the official rate. Since April 1988, the authorities have operated an auction system whereby limited amounts of convertible currencies are sold to enterprises. The rates at the auctions have been well above the tourist rate.

## 2. Structural reform

Bulgaria has in place several pieces of legislation on economic reform intended to move the economic system toward greater market orientation. Some market principles were introduced under the New Economic Mechanism (NEM) in the late 1970s and early 1980s. The main aim of these reforms was to reduce central control over enterprises by reducing the number of centrally planned targets and emphasizing financial criteria. Enterprises were supposed to be self-supporting and their production closely linked to market demand. Little progress was made in implementing these measures until 1987, however, when the reform process was intensified and new "regulations on economic activity" came into force. These regulations were intended to stimulate competition by allowing enterprises to control a larger portion of their profits. Moreover, with the introduction in 1987 of a two-tier banking system that limited the role of the Bulgarian State Bank to that of a central bank, enterprises had to compete for investment capital from the commercial banks.

The reform effort was taken a step further with the adoption in December 1988 of a new reform program. It established "the firm" as the main unit of economic management and allowed private "citizens' firms"

employing no more than 10 people. As of May 1989, citizens' firms could be formed in the agricultural sector as well. The decree puts all firms on a profit and loss accounting basis, and firms may issue stocks for purchase by Bulgarian or foreign investors. Binding central plan targets were no longer issued to the production units. Finally, foreign trade was also liberalized, with every firm authorized, in principle, to conduct its own import and export transactions.

Additional reforms of the banking system are scheduled for 1990, including an expansion of the number of commercial banks to 60 and an increase in their role in investment and other economic decisions of enterprises. Also, from January 1, 1990, new economic incentives, including hard currency payments, have been introduced for livestock and dairy farmers.

In spite of the considerable amount of new legislation since the late 1970s, economic reforms have been implemented very slowly, and in its statement on the economy in late 1989 the new leadership painted a bleak picture of the economic situation. Nearly half of production capacity is deemed to be obsolete and labor productivity is low. This has necessitated subsidies from the state budget of more than one quarter of expenditures. The gap between the cash income of the population and the available goods and services has widened markedly in recent years, and budget deficits have increased significantly. As a result, inflationary pressures have increased although it has not yet been reflected in measured prices.

In the assessment of leadership, the efficiency and competitiveness of the Bulgarian economy have been eroded significantly over the last 20 years, mainly as a result of mistakes in the investment policy pursued during that period. To maintain growth, it is estimated that Bulgaria now has to import raw materials and spare parts on the order of US\$2.4-2.6 billion per year. With external hard currency debt now estimated at nearly US\$10 billion, annual debt service payments have risen to a level equal to annual exports to the nonsocialist countries.

## VI. German Democratic Republic

### 1. The economic situation

According to recent official statistics of the German Democratic Republic (G.D.R.), the average annual real growth of net material product from 1980 to 1988 was 4 percent; over this same period investment grew by 2 percent and real monthly gross wage incomes by 2 3/4 percent. Prices were literally stable, the external accounts mostly in surplus, unemployment nonexistent, and the government accounts in balance (Table 1.1).

Table 1.1. Federal Republic of Germany and German Democratic Republic:  
Selected Economic and Social Indicators in 1988

Indicator	Unit	German Democratic Republic	Federal Republic of Germany
<u>Area and population</u>			
Area	1,000 sq. km.	108	249
Population	millions	16.7	61.7
Of working age (15-65 years)	millions	11.2	42.8 <u>1/</u>
Pensioners (65 years and over)	millions	2.2	9.4 <u>1/</u>
	in percent of population	13.2	15.2 <u>1/</u>
<u>Employment, prices and productivity</u>			
Total employed	millions	8.6	27.3
	in percent of population	51.6	44.4
Female employment	in percent of population	48.9	39.3 <u>1/</u>
Employment by sectors			
Agriculture and forestry	in percent of total	10.8	4.7
Mining, manufacturing and construction	in percent of total	47.1	40.5
Unemployment	percent of labor force	--	7.7
Productivity in manufacturing, mining and construction	FRG = 100	50	100
Consumer price inflation,		--	1.3
<u>Household income, consumption and savings</u>			
National income/GNP	billions M/DM	268.4	2,121.8
Private disposable income of households	billions M/DM	162.6	1,343.1
Household savings	billions M/DM	11.5	186.3
	in percent of income	7.1	13.9
Consumption	billions M/DM	151.1	1,156.8
Per head	M/DM	9,061	18,744
Average monthly gross earnings in industry	M/DM	1,290	3,876
Households with:			
Automobiles	in percent of total	52	97
Color TV	in percent of total	52	94
telephone	in percent of total	7	98

Sources: Statistisches Jahrbuch der Bundesrepublik Deutschland, 1989; Statistisches Jahrbuch der DDR, 1989; Handelsblatt, December 12, and 20, 1989, and staff estimates.

1/ Estimated.

There are numerous indications of important structural problems in the G.D.R. economy, and it seems likely that actual developments in recent years were much worse than officially reported. First, there has been a greater emphasis on central planning since the early 1970s that has made the economy more inflexible in terms of its capacity to adjust to new technologies and to changes in demand. 1/ Second, isolation from the world economy has deprived the G.D.R. economy of the benefits from international competition. Third, the concentration of investment in a few technology-intensive areas, such as microelectronics, has led to a deterioration of the capital stock in other areas, most notably in the consumer durables industry and the public sector. 2/ Fourth, the decision to increase reliance on lignite coal for energy production was not accompanied by measures to improve efficiency in the use of energy and has contributed to severe air pollution. Fifth, the labor market has been highly regulated, the wage structure distorted, and sectoral and regional labor mobility low. Finally, the rising gap in living standards between the G.D.R. and the Federal Republic of Germany (F.R.G.), as well as the lack of reforms, has contributed to declining morale of the work force. Labor productivity and net wages (evaluated at parity) in the G.D.R. are currently about half of those in the Federal Republic. Although the supply of basic consumer goods is satisfactory and housing cheap, 3/ the supply of consumer durables is very limited.

The official price statistics may also be misleading. This is because the basket used to compute the consumer price index includes many low-priced goods that are out of use, and companies often raise prices by declaring minor product alterations as quality improvements (which do not enter the inflation calculations). In fact, there is considerable evidence of suppressed inflation. The price structure is also distorted, with very low prices for basic consumer goods and very high prices for "luxury" goods. Government subsidies to maintain low prices for basic consumer goods amounted to about M 50 billion, equivalent to 18.5 percent of NMP in 1988. Given the differences in relative prices, comparisons of purchasing power of the mark and the F.R.G.'s deutsche mark heavily depend on which goods are included in the basket. The more the basket is tilted toward basic products, the more favorable is the purchasing power of the

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1/ In 1981, centralization was increased further as industrial companies were reorganized into 132 conglomerates (Kombinate) which received their instructions directly from the 11 industry ministries.

2/ For example, in the automotive sector, machines often date from the pre-World War II period, the infrastructure and the transport systems have deteriorated, and the telecommunications system is outdated. Overall, the capital-output ratio, according to official data, has exceeded 4.5, a value much higher than in the F.R.G. or other western industrial countries.

3/ Rents have been kept low but the housing stock is old and deteriorating. More than three quarters of the population live in apartments built before 1945, and about half of those apartments were built before 1914.



mark compared with that of the deutsche mark. 1/ Until recently, the official exchange rate for tourists was parity, while for external trade, it was estimated at M 4.4 per DM. 2/ As of the beginning of 1990, the tourist rate was devalued to M 3 per DM. Secondary market rates fluctuated between M 10.40 and M 13.50 per DM before the opening of the borders, and fell to M 20 per DM shortly thereafter. More recently, the secondary market rate has appreciated considerably.

Contrary to official statistics, the general government budget has been in sizable deficit for a number of years. This was confirmed by the Finance Minister in mid-November 1989 when the public debt was revealed to be M 130 billion, or 48 percent of net material product. Since capital markets do not exist in the G.D.R., the bulk of this debt has probably been created through central bank financing of budgetary deficits; the rest might reflect the net external indebtedness. At the end of 1988, gross external debt in convertible currencies was reported to be about \$20 billion; external assets in convertible currencies amounted to about \$9 billion. Net external indebtedness in convertible currencies, at a little more than 7 percent of net material product, appears to be moderate by comparison with the external debt of other Eastern European countries.

The relatively favorable external debt situation of the G.D.R. reflects moderate external surpluses through most of the early to mid-1980s. In more recent years, the external accounts have been in deficit, perhaps reflecting the considerable competitive pressure facing G.D.R. exports to third markets from the newly industrialized Asian countries.

## 2. The need for reform

The prime objective of future economic policy in the G.D.R. as well as in the F.G.R. is to narrow the gap in living standards between the two countries. This is needed to help stem the continuing flow of emigration, which totaled 344,000 in 1989--177,000 in November and December after the opening of the border--and has remained at 1,500-3,000 people per day in 1990. 3/ Emigration of this order of magnitude is unsustainable for the G.D.R. economy, which has a labor force of less than 8 1/2 million, and its reduction is also important for the F.R.G. whose capacity to absorb immigrants has become strained.

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1/ Thus, computed purchasing power parities range from M 1 : DM 1.45 for a two person pensioner household with a G.D.R. consumption pattern, to M 1 : DM 0.89 for a four person wage earner household with a West German consumption pattern.

2/ The East German mark is only valid for domestic transactions and cannot legally be exported or imported. External trade is valued in valuta mark at various conversion rates to the mark which have not been made public.

3/ A reduction in the special social benefits presently granted new arrivals in the Federal Republic may also reduce incentives for migration.

Experience with partial reform in other centrally planned economies suggests that comprehensive economic reform is needed to achieve an improvement in productivity and living standards. Comprehensive economic reform would make the G.D.R. an attractive location for direct investment, particularly from the F.R.G., which is essential for the modernization and expansion of the capital stock. Currency union with the F.R.G. would be important as it would eliminate exchange risks and facilitate private capital flows into the G.D.R. thereby promoting investment and growth. Clearly, currency union is a complement to, not a substitute for, comprehensive economic reform in the G.D.R.

The process leading to unification of the two German states has gained momentum. Economic and monetary unification raises a number of issues with regard to the conduct of fiscal and monetary policies. The rate at which G.D.R. marks are converted into deutsche marks, for example, will affect the rate of migration from the G.D.R.; have inflation implications depending, in part, on the size of any monetary overhang in the G.D.R. and the way it is dealt with; affect the valuation of existing debt as well as financial assets; and have an initial impact on the external competitiveness of G.D.R. enterprises. Ideally the issue of the conversion rate--or conversion rates--used for various types of financial instruments should be treated separately from those of competitiveness and incentives for workers to stay in the G.D.R. There is likely to be increased demand, in part from higher government expenditures, with the possibility of pressures on interest rates and perhaps prices, but prudent monetary and fiscal policy should be able to contain the inflation consequences of unification.

## VII. The Union of Soviet Socialist Republics

### 1. Recent developments

Soviet economic growth slowed significantly from annual GNP growth rates of 5 percent in the late 1960s to less than 2 percent in the early 1980s. The slowdown reflects, primarily, the exhaustion of reserves as fuels and raw materials had to be extracted under increasingly difficult conditions, labor force participation rates neared a demographic maximum, and postwar reconstruction was completed. With large capital stocks already accumulated in industry and basic industrial skills in place, the failure to introduce advanced technology, conservation, and improved management and labor incentives resulted in a sharp slowdown in productivity growth. Total factor productivity is estimated to have declined from 1975 to 1985.

As the world's largest oil and natural gas producer, the Soviet Union reaped windfall gains from the oil price increases in the 1970s. But the long-term benefits were mixed, insofar as the windfall encouraged costly investments in energy production at the expense of industrial modernization. The drop in energy prices in the 1980s laid bare the structural weaknesses.

By the mid-1980s, the Soviet authorities realized the need for a new growth strategy. The post-1985 leadership initially emphasized investment in new machinery, stricter labor and managerial discipline, and quality control. GNP growth was 4 percent in 1986, but fell back again to 1 percent in 1987. Dissatisfaction with these results prompted a turn toward economic reform. An increasingly open debate ensued with economic reform quickly overshadowing the investment and discipline campaigns.

Thus far, however, actual progress toward reform has been uneven. Steps taken to promote private enterprise and cooperatives and the autonomy provided to state enterprises have been vitiated by other restrictions or were subsequently reversed. Meanwhile, weakened financial policies prompted increasingly open inflation. Living standards continued to stagnate, queues grew longer, and investment plans were unfulfilled.

In 1989 growth continued at a slow pace, with net material product (NMP), as reported by the authorities, increasing by 2.4 percent in 1989, a marked decline from the 4.4 percent increase in 1988. Taking unrecorded inflation into account, real GDP probably declined. Coal strikes in the early summer, ethnic strife in the Caucasus, and severe bottlenecks in rail transport contributed to the poor performance. Hopes for recovery in the last quarter of 1989 were dashed by further strikes, by Azeri blockades of Armenia--which not only crippled the Armenian economy but also tied up tens of thousands of railroad cars needed for transport further north--and by echoing supply disruptions from the summer. <sup>1/</sup> Rail tonnage declined 2 percent over 1989, and severe bottlenecks persisted into 1990. Backlogs of imported goods were reported to be piled up at Soviet-East European borders.

Construction backlogs also continue to accumulate. Planners had called for a 13 percent increase in finished construction projects in the first three quarters of 1989 compared with the first three quarters of 1988. Instead, finished construction declined. Compared with 1988, agricultural output rose by 1 percent in 1989, after two years of disappointing growth. Aggregate energy output fell slightly. Even the modest increase in natural gas production was disappointing compared with a 6.1 percent average growth rate for the 1981-88 period.

With fuel exports stagnant and imports of consumer goods rising, the Soviet hard currency trade balance appears to have deteriorated in 1989. Although gross Soviet hard currency debt is estimated to be about 34 billion rubles (US\$57 billion), this is offset to some extent by substantial assets such as gold holdings and deposits in BIS banks.

Recent output growth has been highest in the cooperative sector, which includes small-scale family enterprises. From a negligible base two years ago, cooperatives now employ about 3 percent of the work force. But

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<sup>1/</sup> The rail system operates at close to capacity, so delays cannot easily be rectified by extra loads at a later time.

the development of the cooperative sector is hampered by price controls, exclusion from potentially lucrative activities like printing and medical care, and uncertain legal protection.

Despite retail price inflation on official markets of 3-5 percent, shortages are becoming increasingly severe, as evidenced both by the expanding categories of deficit goods (e.g., soap and laundry detergent) and by the widening gap between official and black market retail prices. The black market rate for the dollar, a crude indicator of shortages, has more than doubled over the past three years to a level of 12-15 rubles per U.S. dollar compared to the official commercial and noncommercial rates of, respectively, 0.64 and 6.26 rubles per dollar.

Shortages have worsened because the authorities tried to maintain price controls in the face of a loose fiscal policy and greater autonomy for state enterprises. With little fear of bankruptcy and little positive incentive for investment, enterprises converted a portion of profits, and even some funds intended for capital repair and inventory replacement, into higher wages and bonuses. Despite a reduction in industrial employment, the national wage fund, which had grown by 3.4 percent in 1987, rose 6 percent in 1988 and 9 percent in 1989; total income was 12.9 percent higher in 1989 than in 1988. The erosion of fiscal discipline over the last four years is reflected in the increase in the budget deficit from an estimated 2-3 percent of GDP to almost 10 percent of GDP. Virtually the entire deficit is financed by expansion of reserve money.

The main single contributor to the budget deficit is agricultural subsidies, chiefly for milk and meat, which have grown to 95 billion rubles, about 20 percent of total government expenditure. Other contributing factors have been reduced revenues related to the anti-alcohol campaign, the decline in world prices for Soviet oil exports, and the cleanup bills from Chernobyl and from the Armenian earthquake. Moreover, in 1985-87 the authorities launched an ambitious industrial modernization program, increased housing construction, restricted tariff-generating consumer good imports, and effected only modest changes in military spending.

## 2. Economic policy and reform

The main priority of the authorities for 1990 is macroeconomic stabilization, including a reduction of inflation and inflationary pressures. Under new regulations, wage bill increases up to 3 percent will not be taxed, increases of 3-5 percent will be taxed at a marginal rate of 100 percent, and increases over 5 percent will be taxed at a marginal rate of 200 percent. Despite these taxes, Soviet officials expect money income to rise by 9 percent in 1990. The 1990 fiscal deficit is to be cut from 92 billion to 60 billion rubles. This improvement is to be achieved through increased revenues and a small decline in expenditures. Cuts in defense and investment outlays would be largely

offset by higher food subsidies and higher spending for social programs and for research and development.

An emergency program announced in December 1989 aims to redirect resources from producer to consumer goods production, recentralize state procurement, cut back new construction, and sell more capital assets to the population. Production of consumer goods is slated to rise 7.6 percent, while that of producer goods would rise only 0.8 percent, for a total industrial growth of 2.6 percent. Mandatory state procurement orders will cover virtually all consumer goods and their inputs.

Self-financed construction projects of more than 2 years' duration have been banned, while a 25-30 percent tax will be levied on projects of shorter duration, unless the enterprise produces consumer goods. Interest rates on State Bank loans to enterprises will be raised to 6-8 percent on short-term loans and 7-9 percent on long-term loans. Houses and enterprise shares (which are more like corporate bonds) will be sold on a wider scale, no-interest bonds redeemable in specific durable goods will be issued, and interest rates on savings deposits will be raised. Although price reform is officially postponed, the government plans to establish "a network of commercial shops and auctions" to sell imported and Soviet luxury goods at market-clearing prices.

Price reform is to start with wholesale prices in 1991, including agricultural procurement prices that were previously scheduled to be raised in 1990, and extend to retail prices in 1992. A uniform enterprise taxation system will be introduced in 1991. To improve the hard currency trade balance, imports of goods that can be produced domestically will be cut in half over the next few years and machinery exports will be encouraged. Industrial programs will emphasize advanced machinery, conservation, and conversion from military to civilian production. The budget deficit is planned to decline to 2-2.5 percent of GNP by 1993. It is also intended to lease state enterprises to workers and to widen the scope and improve the legal protection of non-state ownership. It is hoped that the restructuring of property rights will provide a firm foundation for reform.

The outlook for this stabilization-cum-reform program is uncertain, for several reasons. First, fulfillment of the real sales targets is unlikely because the existing capital structure is heavily weighted toward producer goods and because the Soviet supply system is rigid. Second, forecasts of a 9 percent rise in money income in the face of high excess wage taxes suggest that enterprise financial discipline remains weak. Monetary financing of the planned budget deficit, equivalent to 6 percent of GDP, will also increase inflationary pressures and exacerbate shortages. Third, the renewed emphasis on mandatory state orders is at odds with the weakening of the lines of command. Finally, to restore a rough balance between supply and demand, large price hikes seem unavoidable. These price increases could provoke new wage demands and strikes, with the danger that an intended one-shot price increase could

touch off an inflationary spiral, particularly since the existing banking system tends to respond passively to credit demands.

The stabilization program will have an important effect on CMEA trade, as the Soviets curb their imports of Eastern European machinery and marshal their dwindling fuel surpluses for hard currency export. Cutbacks in energy sector investments could immediately reduce fuel production and exports through slower repair of oil pumps and gas lines and delayed activation of new capacity. The impact of such changes on Eastern Europe could be harsh, although in the longer run it should facilitate the normalization, i.e., the transformation to a hard currency basis of foreign trade.

World Oil Situation:  
Recent Developments and Prospects 1/

1. Introduction

The volatility of oil prices during the past four years has tended to obscure the substantial changes in the world oil supply and demand situation that have taken place in the period. These have involved a sustained recovery in oil consumption and a sharp slowdown in the growth of non-OPEC supplies which, in combination, contributed to a rise in net exports of about 40 percent from 1985 to 1989 from the major oil exporting countries, or the members of OPEC (Table 2.1). 2/ A major reason for these changes was the sharply reduced oil price level since 1986, which has provided a stimulus to oil consumption and had an adverse impact on exploration efforts as well as the development of productive capacity. The marked slowing of the growth in non-OPEC production was also a reflection of longer-term trends in crude oil reserves and, more recently, the result of supply interruptions in some areas.

The world oil market firmed considerably in 1989, reflecting mainly a continuing rise in oil consumption and a decline in non-OPEC supplies. The annual average spot market price increased by 21½ percent to about \$17.20 a barrel, reversing most of the decline that occurred in 1988 (see Chart 10 in Chapter I of the main text). 3/ Oil market conditions are expected to be somewhat less buoyant in 1990. In the absence of any new supply interruptions, total non-OPEC supplies are estimated to recover and the growth in world oil consumption is projected to slow marginally. As a result, the rise in world demand for OPEC oil is likely to be considerably smaller this year than in 1989. Over the medium to longer term, the oil market is expected to firm gradually in response mainly to developments on the supply side. While oil prices may remain volatile for some time, the annual average price is assumed to remain constant in real terms through 1995, as indicated in Chapter I. 4/

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1/ Mr. von Post (ext. 4526) was mainly responsible for the preparation of this note.

2/ The aggregate net oil balance for the members of OPEC is virtually identical to that of the 12 major oil exporting developing countries shown in Table 1.

3/ The average spot market price of Brent, Dubai, and Alaskan North Slope, representing light, medium, and heavier crude oils in three different regions.

4/ In nominal (U.S. dollar) terms, the average spot market price would increase by 2.7 percent in 1990 (to about \$17.65 a barrel), by 3.5 percent in 1991, and by 4 percent a year thereafter.

Table 2.1. World Oil Balances, 1973-89 <sup>1/</sup>

(In millions of barrels per day)

	1973	1979	1985	1986	1987	1988	1989
<u>Industrial countries</u>							
Production <sup>2/</sup>	13.8	14.7	16.8	16.7	16.7	16.5	15.9
Consumption <sup>3/</sup>	40.0	41.2	34.0	35.0	35.6	36.5	37.0
Adjustments <sup>4/</sup>	-0.3	-0.1	-1.3	-0.8	-1.2	-1.2	-1.0
Net imports	25.9	26.4	15.8	17.5	17.7	18.8	20.1
Net oil importers	(23.8)	(25.7)	(17.7)	(19.4)	(19.7)	(20.7)	(21.8)
Net oil exporters <sup>5/</sup>	(2.1)	(0.7)	(-1.9)	(-1.9)	(-2.0)	(-1.9)	(-1.7)
<u>Developing countries</u>							
Major oil exporters <sup>6/</sup>							
Production <sup>2/</sup>	31.1	31.5	17.3	19.8	19.5	21.6	23.6
Consumption <sup>3/</sup>	1.0	2.3	3.5	3.5	3.6	3.8	3.9
Adjustments <sup>4/</sup>	0.5	0.7	0.1	0.4	0.4	0.5	0.5
Net exports	29.6	28.5	13.7	15.9	15.5	17.3	19.2
Other net oil exporters <sup>7/</sup>							
Production <sup>2/</sup>	3.0	5.9	8.5	8.6	8.8	9.0	9.2
Consumption <sup>3/</sup>	2.3	3.7	4.4	4.6	4.9	5.1	5.2
Adjustments <sup>4/</sup>	0.1	0.1	0.1	0.2	--	0.1	0.1
Net exports	0.6	2.1	4.0	3.8	3.9	3.8	3.9
Net oil importers							
Production <sup>2/</sup>	1.4	1.4	2.2	2.2	2.2	2.3	2.4
Consumption <sup>3/</sup>	5.5	7.3	6.9	7.2	7.6	8.0	8.4
Adjustments <sup>4/</sup>	0.1	0.1	-0.1	0.1	--	0.1	0.1
Net imports	4.2	6.0	4.6	5.1	5.4	5.8	6.1
<u>Other countries <sup>8/</sup></u>							
Production <sup>2/</sup>	9.0	12.2	12.4	12.9	13.2	13.3	13.0
Consumption <sup>3/</sup>	7.7	10.0	10.2	10.3	10.2	10.2	10.2
Adjustments <sup>4/</sup>	--	--	--	--	--	--	-0.1
Net exports	1.3	2.2	2.2	2.6	3.0	3.1	2.9
Net oil exporters	(2.4)	(3.5)	(3.4)	(3.8)	(4.2)	(4.3)	(4.1)
Net oil importers	(-1.1)	(-1.3)	(-1.2)	(-1.2)	(-1.2)	(-1.2)	(-1.2)
<u>Memorandum items:</u>							
Total consumption	56.5	64.5	59.0	60.6	61.9	63.6	64.7
(Change in percent)			(-0.6)	(2.7)	(2.2)	(2.7)	(1.7)
Total production	58.3	65.7	57.3	60.2	60.4	62.7	64.1
(Change in percent)			(-0.7)	(5.0)	(0.3)	(3.8)	(2.2)
Aggregate oil trade balance	1.4	0.4	-0.5	-0.3	-0.7	-0.4	-0.2
Asymmetry attributable to:							
Estimated transit lag		(--)	(0.1)	(--)	(-0.1)	(0.2)	(0.1)
Other <sup>9/</sup>		(0.4)	(-0.6)	(-0.3)	(-0.6)	(-0.6)	(-0.3)

<sup>1/</sup> For classification of countries in groups shown here, see the Introduction to the Statistical Appendix and footnotes 5-8 below.

<sup>2/</sup> Includes crude oil production and output of condensates and natural gas liquids (wherever data are available).

<sup>3/</sup> Data for industrial countries include use of oil in refineries and bunker fuel. Data for several other countries are derived from statistics on production and trade in oil and group totals should be regarded as orders of magnitude only.

<sup>4/</sup> Includes changes in inventories, processing gains (in industrial countries), bunker sales (in some cases), and statistical discrepancies.

<sup>5/</sup> Canada, Norway, and the United Kingdom.

<sup>6/</sup> The 12 countries classified as "oil exporting countries" according to former analytical criteria, i.e., Algeria, Indonesia, Islamic Republic of Iran, Iraq, Kuwait, Libyan Arab Jamahiriya, Nigeria, Oman, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela. The aggregate data for these countries shown here are virtually identical with those of the members of the Organization of Petroleum Exporting Countries (OPEC).

<sup>7/</sup> Bahrain, Bolivia, Cameroon, Colombia, China, Congo, Ecuador, Egypt, Gabon, Malaysia, Mexico, Peru, Syria, Trinidad and Tobago, and Tunisia.

<sup>8/</sup> Includes the U.S.S.R., nonmember countries in Eastern Europe, Democratic People's Republic of Korea, Cuba, Angola, and Brunei.

<sup>9/</sup> In addition to statistical discrepancies, reflects changes in stocks afloat (not included in normal transit lag), inclusion of bunkers in export data for some countries, and transit losses.



## 2. Recent developments in demand and supply

### a. Oil consumption

World oil consumption peaked in 1979 at 64½ million barrels a day (mbd) and declined in the following six years by 8½ percent to 59 mbd in 1985 (Table 2.1). There was a particularly pronounced fall (17½ percent) in consumption of the industrial world which was offset partly by a substantial rise in the use of oil in the net oil exporting developing countries; consumption in the net oil importing developing countries declined moderately from 1979 to 1985. The 1986-89 period, by contrast, witnessed a recovery in total consumption of about 9½ percent with the result that the use of oil reached a new peak in 1989. While consumption in the industrial countries rose by about 9 percent, total demand for oil in the developing countries showed a considerably larger increase (about 18 percent) in the period. Consumption in "other countries" (mainly the U.S.S.R.) is estimated to have remained stagnant during the past four years.

Although oil demand in individual countries and regions has been affected by a variety of factors, there can be little doubt that a major reason for the trend reversal since 1986 has been the large downward adjustment of the price of oil. The relationship between international oil prices and final consumption of oil is, however, affected by two main factors stemming from the particular characteristics of oil and its pricing in major consumer markets. One factor is the relatively low short-term price elasticity of demand for oil which means, *inter alia*, that changes in oil prices affect consumption with considerable lags. 1/ The second factor is the strong wedge between international oil prices and end-user prices that is imposed by the high levels of taxation on petroleum products in many countries. 2/

As shown in Table 2.2, from 1978 to 1981 real end-user prices for oil products in the OECD area increased much less than the real price of oil in international trade. During the 1982-85 period of moderately falling world market prices, end-user prices fell by about the same extent, reflecting partly the more rapid pass-through of international oil price changes in this period. In contrast, during the past four years real end-user prices declined by a much smaller extent than the world market price, in part because some importing countries acted to reduce the pass-through effect by raising taxes on petroleum products. During the whole period from 1978 to 1989 real end-user prices for oil products declined by about 3½ percent, whereas the international price of oil in real terms fell by 13 percent. Price movements of non-oil energy products have

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1/ This is explained mainly by the lack of readily available substitutes for oil in some uses, e.g., as a transportation fuel, and the long time periods required to replace the existing capital stock.

2/ In the case of motor gasoline, for instance, the tax element exceeds 70 percent of the final consumer price in some European countries.

Table 2.2. Constant Oil and Energy Prices

(Cumulative percentage changes)

	1979-81	1982-85	1986-89	1979-89
OECD end-user prices				
Energy products 1/	34	-4½	-24	-3
Oil products 1/	53½	-12½	-28	-3½
World oil price 2/	109½	-12½	-52½	-13
<u>Memorandum</u>				
OECD oil consumption	-12½	-6	9	-10
Nominal world oil price 2/	162	-22	-37½	28

Sources: Energy Prices and Taxes, various issues (International Energy Agency, O.E.C.D., Paris); national authorities; and staff estimates.

1/ Nominal end-user prices (including taxes) deflated by producer prices for industry sectors and by consumer prices for household sectors.

2/ The nominal world oil price is the average oil export price of the twelve major oil exporting countries in U.S. dollars per barrel. The constant world oil price is that price deflated by the estimated import prices of the major oil exporters (also in U.S. dollar terms). This definition provides an approximate measure of the constant price of oil in international trade. However, it is not strictly comparable to the OECD constant end-user prices shown above because of the different deflators.

followed the oil price changes, although with varying lags. The closer correlation between changes in end-user prices for oil and other energy products during the past four years, indicated in Table 2.2, reflected in part the increased inter-fuels competition in this period. <sup>1/</sup>

Despite the moderate decline in real end-user prices and the increase in real GNP of more than 30 percent during the past decade, total oil consumption in the industrial countries was in 1989 some 10 percent below the level ten years earlier. This can be attributed in large measure to the effects of official policies aimed at promoting energy conservation and encouraging the use of non-oil forms of energy. Such policies were implemented mainly in the second half of the 1970s and the early 1980s and were supplemented by voluntary measures. Although there has been some slackening of conservation efforts during the more recent period of declining energy prices, previous measures have remained largely intact and have continued to affect oil consumption throughout the 1980s. In the 1986-89 period, the average annual rate of growth in oil consumption of the industrial countries was about three fifths of the corresponding real GNP growth.

As noted earlier, the rise in oil consumption of the developing countries was considerably faster than in the industrial countries from 1985 to 1989 and was also more rapid than overall economic growth of developing countries during the period. The relative strength of oil demand in the developing world reflected a number of factors, including increasing urbanization and higher demand for transportation fuels, comparatively low domestic prices in some cases (particularly in oil exporting countries), limited substitution possibilities because of the high capital requirements for investments in alternative sources of energy, and increasing industrialization in several countries. The increase in oil consumption of the developing countries was, however, unevenly distributed with a large portion accounted for by the rapidly growing economies in Southeast Asia. While total consumption in the net oil importing countries rose by about 22 percent during the 1986-89 period, the use of oil in the major oil exporting countries grew at a considerably slower pace than in the first half of the 1980s as economic activity in these countries was affected by the reduced level of oil incomes.

The growth in world oil consumption is estimated to have slowed from an average of about 2½ percent a year during 1986-88 to about 1½-2 percent in 1989, in response partly to the reduced rate of economic expansion. The slowdown was particularly pronounced in the industrial countries, where oil consumption rose at about half the rate experienced in 1988. Among the major consuming areas, consumption increased only slightly in North America but continued to increase considerably in the

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<sup>1/</sup> It may be noted that non-oil energy products (which are mainly of domestic origin) are generally taxed to a much lesser extent than oil products and are, in some cases, subsidized.

Pacific region. 1/ In the developing countries, the growth in oil consumption is estimated to have slowed only moderately in 1989 despite the lower rate of economic growth of these countries.

b. Non-OPEC production

During the 12 years from 1973 to 1985, total crude oil production from sources other than the members of OPEC increased by almost one half, or by an annual average of more than 1 mbd. To a considerable extent, this increase resulted from stepped-up drilling and development activities spurred by the large oil price increases in 1973-74 and in 1979-81. During the past four years, however, total non-OPEC supplies rose by only about 1 percent, or by an annual average of about 0.1 mbd. This sharp slowdown reflected partly a gradual depletion of older maturing oil fields and the lack of large new discoveries since the 1970s as the search for oil has increasingly moved into more marginal areas. In addition, the reduced oil price level since 1986 tended to discourage drilling activities in several areas, limited the incentives for investments in enhanced recovery methods, and rendered the operation of a number of smaller oil wells uneconomic. These tendencies were offset, to some extent, by efforts by the oil industry to reduce costs and improve efficiency, for example, through the introduction of improved drilling techniques, the use of new information methods, as well as labor force reductions. 2/

The fall in non-OPEC production has been particularly noticeable in the United States where annual crude oil output fell by about 15 percent during the past four years, with a particularly large drop in 1989. Although this decline was offset partly by a significant rise in output of Norway, total production in the industrial countries fell by about 1 mbd from 1985 to 1989. In the non-OPEC developing countries, total output has continued to rise, partly as a result of new oil fields coming into operation in several countries, for example, Colombia, Syria, and the Yemen Arab Republic. The net production gain was, however, considerably smaller than in the first half of the 1980s.

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1/ The lower growth in oil consumption of the industrial countries in 1989 reflected in part the relatively high level of oil use in the latter part of 1988 caused by temporary fuel switching, stock building by retailers and final consumers, and other transitory factors.

2/ It may be noted that the variable cost of production has, with few exceptions, been considerably below the price of oil, even after the sharp downward price adjustment in 1986. With many oil production facilities in non-OPEC areas being of small to moderate size and often privately-owned, installed capacity has been almost fully utilized in most countries during the past few years. However, total non-OPEC production has been affected, to a limited extent, by intermittent output restraint by some oil exporters in support of OPEC efforts to stabilize the price of oil.

In 1989 total non-OPEC supplies declined (by about 1½ percent) for the first time in several years. While the fall in output represented partly a continuation of the trends discussed above, it was also the result of significant supply interruptions in some areas--for example, in the U.K. sector of the North Sea--caused by accidents and other factors. Crude oil production in the U.S.S.R., the world's largest producer, also declined (by an estimated 2½ percent) in 1989 following a sizable expansion over the three preceding years.

c. OPEC production and policies

The rise in world oil consumption since 1985, coupled with the more limited growth in non-OPEC supplies, resulted in a considerable recovery in production and exports from the members of OPEC during the past four years. 1/ Total crude oil production of these countries increased from a low of about 15½ mbd in 1985 to an estimated 21½ mbd in 1989. 2/ The members of OPEC decided to raise the total crude oil production quotas from 18.5 mbd in the first half of 1989 to 19.5 mbd in the third quarter and to 20.5 mbd in the fourth quarter of the year. However, partly because demand exceeded expectations, the production quotas were exceeded by significant amounts and became effectively inoperative during part of the year; total OPEC crude oil output is estimated to have reached about 23½ mbd in the fourth quarter of 1989.

The increase in world demand for OPEC oil during the past four years, particularly in 1989, has tended to facilitate the efforts by the members of OPEC to reach agreement on the distribution of production quotas and to resolve other outstanding issues, for example, on the definition of condensates (which are excluded from the quotas). A major contributing factor in the recent past has been that some OPEC members are beginning to face capacity constraints. This was reflected in the decision at the most recent OPEC meeting in November 1989 when the total production quotas (or "allowable output") were raised to about 22 mbd for the first half of 1990. Although one member country did not agree to its proposed quota, another member decided to forego any quota increase and a few others may not be able to produce at their full quotas in 1990 or increase output significantly from the 1989 levels.

3. Outlook for 1990 and the medium term

Oil demand is expected to increase further in 1990 with continued relatively rapid growth in a number of developing countries. Because of the projected further slowdown in economic activity of the industrial

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1/ Mainly because of the tendency of most non-OPEC producers to produce at capacity limits, the members of OPEC have, by and large, continued to be the residual suppliers in the world oil market.

2/ These data exclude output of condensates and natural gas liquids which are included in "production" in the table of World Oil Balances (Table 2.1).

countries, however, world consumption is expected to rise at a slightly lower rate than in 1989. In contrast to the decline last year, total non-OPEC supplies are estimated to increase moderately in 1990, as production recovers in areas affected by supply interruptions in 1989. Further production increases in Norway and a number of developing countries are expected to more than offset the continuing fall in output of the United States and a few other countries. While the supply and demand outlook for the U.S.S.R. and Eastern Europe is subject to major uncertainty--both for 1990 and over the medium term (discussed below)--it is currently expected that crude oil output of the U.S.S.R. will show a moderate further decline in 1990. On the basis of these expectations, and on the assumption that world oil inventories will not change significantly from their end-1989 levels, the volume of exports from the members of OPEC is estimated to increase by about 3-4 percent in 1990, following the 11 percent growth experienced in 1989.

This assessment would imply a reduction in total OPEC crude oil production from the high level in the latter part of 1989 to not much more than the current overall quota level of 22 mbd. While such a reduction appears feasible, given the recent indications of enhanced cooperation among OPEC members, the extent and timing of any supply cutbacks are likely to depend partly on the movements in oil prices. With the onset of warmer weather in North America and only a moderate reduction in total OPEC production, the average spot market price declined from a peak of almost \$21 a barrel in the first week of 1990 to approximately the level of the OPEC reference price of \$18 a barrel <sup>1/</sup> in early March 1990. Apart from the uncertainty attached to output policies of individual OPEC members, developments during the remainder of the year will depend importantly on the evolution of demand in the industrial countries and on the level of oil production and net exports from the U.S.S.R.

While oil prices are likely to remain volatile in the near future, market conditions are expected to firm gradually over the medium term, i.e., in the period through 1995. This would result mainly from supply side developments as world oil consumption is expected to expand at a somewhat slower pace (about 1½-2 percent a year) than in the second half of the 1980s. The modest growth in oil demand in relation to estimated output growth would reflect mainly the continued impact of conservation measures (associated in part with recent and anticipated price increases), some further replacement of oil by other sources of energy, and the increasing emphasis on protecting the environment. <sup>2/</sup> As these factors will affect oil demand mainly in the industrial world, the share of developing countries in total consumption is expected to continue to increase in the medium term.

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<sup>1/</sup> This price was referred to as the "minimum reference price" in the November 1989 OPEC agreement.

<sup>2/</sup> Although it is somewhat uncertain how the relative share of oil in total energy use will be affected by this latter factor, the growth in total energy consumption is likely to be reduced.

On the supply side, it is expected that total non-OPEC production will tend to level off in the next few years and subsequently begin to decline gradually. While a recent step-up of exploration activity in some areas and advances in technology (in exploration, drilling, and recovery methods) offer the prospect of extending the reserve base, current information indicates that further production increases in a number of countries will be of limited magnitude. It is expected that output will continue to decline in the United States (in both the lower 48 states and Alaska) as well as in other regions with older maturing oil fields. Prospects for crude oil production in the U.S.S.R. are particularly difficult to assess at the present time. It is generally believed, however, that output in the U.S.S.R. will continue to decline--reflecting mainly the depletion of major oil fields and reduced investments in the oil sector--with the possibility that the U.S.S.R. will turn from a net oil exporter to a net oil importer before the end of the decade.

The prospects for world oil consumption and non-OPEC supplies just discussed indicate that the volume of oil exports from the members of OPEC will continue to rise in the 1991-95 period, although at a slower pace than in the second half of the 1980s, with OPEC crude oil production possibly reaching some 26-27 mbd by 1995. While some OPEC members are beginning to face capacity constraints, as noted earlier, a few others still have considerable unused production capacity. In view of the longer-term outlook for a tightening of supplies, output capacity in these countries is now being increased further through the activation of previously mothballed facilities and through increased emphasis on exploration, which has already resulted in some very promising new finds during the past year. Although the expansion of productive capacity will entail substantial costs, the projected growth in demand through 1995 is therefore likely to be accommodated by increased output.

The increasing concentration of the available unused production capacity in only a few countries has tended to focus attention on the oil policy objectives of these countries. Their general policy stance has been to consolidate the gains derived from the growth in demand during the past few years and to promote stability in the oil market, for example, by attempting to moderate changes in the price of oil. In view of their large crude oil reserves, and on the basis of official policy pronouncements, it is expected that this policy stance will be maintained in the medium term.





Population Aging:  
An Attempt to Quantify the Long-Term Macroeconomic Effects 1/

I. Introduction

In the October 1989 World Economic Outlook, some of the long-run effects of projected aging of the populations of industrial countries were considered. In particular, with the aid of simulations of the Fund's MULTIMOD model, it was argued that an increase in the proportion of the elderly in the population, which is projected to occur in the first few decades of the next century, would lead to an increase in aggregate consumption and a general rise in real interest rates. However, the fact that aging occurred more quickly and to a greater extent in Japan and the Federal Republic of Germany than in other industrial countries would likely lead to smaller current account surpluses--or larger deficits--in those countries. Conversely, the United States and Canada, which until 2020 will have relatively small increases in their dependency ratio (i.e. the young and elderly relative to those of working age), would tend to have reduced current account deficits--or larger surpluses.

The previous WEO discussion considered only one of the effects of aging, namely the effects of dependency ratios on private consumption. Several other effects can be distinguished: (1) an older population includes fewer members of the labor force, hence is associated with lower potential output; (2) an older population will typically involve lower government expenditures on education, but higher medical expenditures; and (3) government transfer payments in the form of pensions will rise with the number of retirees. In what follows, we examine the effects of aging through these channels, as well as the private consumption channel already considered, again with the help of MULTIMOD simulations, over the period 1996-2025.

We then proceed to examine a policy issue that is raised by these macroeconomic effects. If a greater fraction of a country's population is retired, then aggregate demand for goods and services must be satisfied by output produced by a smaller working population. Moreover, demand for government services is likely to rise when there are a larger number of elderly people. For this not to involve a fall in people's standards of living, either workers must be made more productive through capital accumulation or investment abroad in productive assets has to occur. Either way, it is necessary for saving to be sustained, so wealth can be accumulated during the years when a high proportion of the population is employed.

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1/ Mr. Masson (Ext. 7483) was mainly responsible for the preparation of this note.

The paper considers how aggregate tax policy may aid in the process of capital accumulation. The first scenario assumes unchanged tax rates and leads to large debt accumulation in Japan, Germany, and several other industrial countries. As a result, by the year 2025 real interest rates have increased dramatically relative to baseline in all countries. An alternative tax policy, consistent with broad historical experience, in which tax rates increase gradually in response to higher deficits and debt accumulation, was also simulated. In this scenario real interest rates increase considerably less than under the first one and the capital stock per worker is higher. This suggests that a policy of timely tax increases would lessen problems of adjusting to projected increases in the number of dependents. However, not considered further here are the related questions of whether the level of pension benefits might be changed, whether public pensions should be funded, as many private plans are, or what the optimal path of taxes might be. 1/

Several caveats should be noted at the outset. First, overall government deficits, and other macroeconomic variables in general, have not been projected beyond 1995; figures in the baseline are merely extrapolations of current trends. An assessment of whether further debt accumulation was desirable or not would have to depend on such projections. Second, by stopping in the year 2025, we ignore further demographic changes that are projected to occur beyond 2025, in particular in North America, where increases in dependency ratios are projected to occur later than in Europe and Japan. Subsequent increases in government expenditures in the United States in particular can be expected to be large. 2/ Third, population migration and variations in birth and mortality rates make the demographic projections extremely tentative. We have ignored changes in population size, and only considered variations in age structure. Even age structure may be considerably affected by migration, for instance within Europe (see Supplementary Note 1), and North America. Finally, and more generally, the effects of demographic changes themselves should be associated with wide confidence intervals. Not only are our estimates of consumption effects not very well determined, but other effects--on participation and retirement decisions and on the distribution of income--have not been taken into account.

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1/ Some of these questions are considered for the United States by Aaron, Bosworth and Burtless (1989), who also argue that the key question is whether national saving in all its forms is high enough to lead to adequate capital accumulation. See also Halter and Hemming (1987), Hagemann and Nicoletti (1989), and Auerbach, Kotlikoff and others (1989).

2/ See Aaron, Bosworth and Burtless (1989), who make projections to 2060.

## II. Macroeconomic Effects of Aging 1/

### 1. Consumption effects

There have been numerous studies concerned with the motivation for saving behavior, that is, the determinants of consumption. 2/ The empirical evidence suggests that both current income and a longer-term measure of "permanent income," or wealth, tend to influence consumption. 3/ Current income impacts on consumption because at least some households face liquidity constraints that result from inability to borrow on their expected future earnings. The "life cycle" view of saving suggests a role for longer-term variables, if wage earners save for their retirement years. 4/ In particular, that model implies that demographic factors should be important in aggregate saving: as life expectancy declines, so does the need for further saving; retired people may even dissave. Therefore, an increase in the proportion of elderly should boost aggregate consumption relative to current income.

Empirical studies of the effects of demographic variables on saving have typically had mixed success in isolating significant effects, however. 5/ To some extent, this may reflect the difficulty in constructing "permanent income" or "human wealth" (i.e., the discounted present value of future labor income) variables that properly reflect age structure and retirement decisions. It is also likely that many other factors--for instance, precautionary saving or saving for the purpose of bequests--complicate the relationship. In our estimation of a consumption equation, we have not attempted to adjust income or wealth variables for demographic changes, but have simply added a variable--the dependency ratio, measured as the ratio of those under 15 and those 65 and over, to those between 15 and 64--to a simple error correction relationship 6/ linking consumption expenditure to wealth, disposable income, and the real interest rate. In simulation, however (see below), consumers are assumed to have rational expectations of future variables--including demographic changes, interest rates and future income.

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1/ The discussion in this section and the following one is based on Masson and Tryon (1990).

2/ For a survey and discussion of some of the issues involved, see "The Role of National Saving in the World Economy," SM/89/172. See also Dean, Durand, and others (1989), Hall (1987), and Blinder and Deaton (1985).

3/ Carroll and Summers (1989) find that "permanent" income may however reflect a rather short horizon, and not full lifetime consumption planning.

4/ Ando and Modigliani (1965).

5/ See, for instance, Graham (1987, 1989) and Koskela and Viren (1989) for a debate about the cross country evidence concerning demographic effects on saving.

6/ For a discussion of error correction models of consumption, see Davidson, Hendry, and others (1978) and Hendry and von Ungern-Sternberg (1981).

The equation was estimated using annual data over the period 1969-87 for the Group of Seven countries individually, plus the smaller industrial countries aggregated together. The data were pooled, and common coefficients for all countries (except for constant terms) were accepted by the data. The resulting equation was the following (t-ratios in parentheses):

$$\begin{aligned} \Delta \log(C) = & \text{const} + .113 \log(W/C)_{-1} - .473 \text{RLR} + .408 \Delta \log(YD) \\ & (3.5) \qquad \qquad (4.0) \qquad \qquad (5.5) \\ & + .124 \text{DEM3} + .032 \text{DUM80} * \text{DEM3}, \quad R^2 = .641 \quad \text{SER} = .026 \\ & (1.5) \qquad \qquad (2.2) \end{aligned}$$

where C is real consumption expenditure; W is the sum of financial wealth and the discounted present value of extrapolated income, in real terms; RLR is the real long-term interest rate; YD is real net domestic product minus taxes, the latter divided by the absorption deflator; DEM3 is the dependency ratio defined above; and DUM80 is a dummy variable that is zero before 1980, and unity thereafter. The latter variable is included because visual examination of the data suggested that there might be a break in the 1980 data for some countries, perhaps resulting from imperfect splicing of census data with earlier estimates.

The error correction model implies that consumption adjusts gradually to a long-run level that is proportional to wealth, with the proportion depending on both the real interest rate and the dependency ratio. In the short run, it is also affected by disposable income. The estimates suggest that the dependency ratio alone has an effect that is not significant at usual significance levels; but that taken together with the dummy variable, the dependency ratio does seem to be significant. Some other evidence, reported in Heller (1989), indicates that the size of our joint estimate is within the range of other studies that have included such a variable. 1/ Nevertheless, it is clear that historical data do not give well-determined estimates of this effect; 2/ moreover, the extent of

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1/ The earlier studies typically included separately youth and elderly dependency ratios. Our estimates could not distinguish the effects of the two when we included them separately, so they were added together. Our estimates imply that in the long run, consumption rises ceteris paribus by 1.4 percent in response to a 1 percent increase in the dependency ratio. It also rises one-for-one with wealth, and declines by 4.2 percent for each one percentage point increase in the real interest rate.

2/ Aaron, Bosworth and Burtless (1989) and Auerbach and Kotlikoff (1989) in particular argue that U.S. saving behavior cannot primarily be explained by demographic factors. However, Bovenberg and Evans (1989), using quarterly data for the United States in an error-correction equation that is similar to ours, find a strong and significant effect of dependency ratios.

aging projected to occur in the future is quite outside the historical experience used in these estimated equations. Therefore, the simulation results discussed in what follows should be considered as merely indicative of possible trends, rather than precise estimates.

Table 3.1 summarizes some of the demographic changes that are projected to occur by the Organization for Economic Co-operation and Development. <sup>1/</sup> It can be seen that the increase in dependency ratios by the year 2025 from their current levels (which are close to the 1995 figures given in the table) are largest for Japan (15 percent) and Germany (13 percent), and smallest for the United States (7 percent), whose dependency ratio in fact is projected to decline in the first two decades of the projection period, and the United Kingdom (5 percent). The estimated equation implies a roughly 1 percentage point decline in private saving rates in the long run in response to a 1 percentage point increase in the dependency ratio, other things being equal. Therefore, in the absence of other changes--in particular, increases in real interest rates which would tend to offset to some extent the decline in saving--this would imply very substantial declines in the private saving rate in Japan (from its current 25 percent to about 10 percent) and in Germany (from about 22 percent to 9 percent). Smaller declines are implied for other countries, at least by 2025; the large increase in dependency ratio for Canada occurs close enough to the end of the period that it does not have its full effect on saving.

## 2. Effects on labor force and aggregate supply

In addition to the above demand effects, aging of the population would also increase the proportion that was not in the labor force, and hence not available to produce output. As a result, potential output would be lower; this would tend to lower actual output as well, through mechanisms, such as excess demand pressures on wages and prices, which force actual and potential output together. In MULTIMOD, the labor force is set equal to the (exogenous) participation rate multiplied by the population between the ages of 15 and 64. Therefore, increases in the dependency ratio are translated into proportionate declines in the labor force. A Cobb-Douglas production function that depends on the actual capital stock and the labor force defines potential output in the model.

Starting from an initial steady-state equilibrium, a fall in the labor force would yield a higher capital/labor ratio, which will be associated with a higher marginal product of labor. Conversely, the marginal product of capital would be lower, and changes in relative factor prices will lead to a gradual reduction of the capital stock relative to what it would otherwise have been. Lower investment would therefore compensate to some extent in aggregate demand for the higher consumption.

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<sup>1/</sup> These are roughly the same as those presented in Table 9 of World Economic Outlook, October 1989, but they embody some minor revisions and are extended to the year 2025.

Table 3.1. Major Industrial Countries: Selected  
Demographic Variables; 1965-2025

(In percent)

	1965	1975	1985	<u>Projections</u>			
				1995	2005	2015	2025
<hr/>							
	<u>(Population under 15/Population 15-64)</u>						
United States	51	39	33	34	29	29	30
Japan	38	36	32	25	28	28	27
Germany, Fed. Rep. of	35	34	22	23	22	19	23
France	41	38	32	31	28	26	28
Italy	--	--	--	25	25	22	24
United Kingdom	36	37	29	31	31	31	31
Canada	57	41	32	30	27	25	28
	<u>(Population 65 and over/Population 15-64)</u>						
United States	16	16	18	19	18	21	29
Japan	9	12	15	19	26	33	32
Germany, Fed. Rep. of	18	23	21	24	29	31	37
France	19	22	20	22	24	27	33
Italy	--	--	--	22	25	28	32
United Kingdom	19	22	23	23	22	24	28
Canada	13	13	15	18	19	25	34
	<u>(Overall Dependency Ratio)</u>						
United States	67	55	51	52	47	50	59
Japan	48	48	47	44	54	61	59
Germany, Fed. Rep. of	54	56	43	47	51	51	60
France	61	60	52	53	52	53	61
Italy 1/	52	54	45	47	50	50	55
United Kingdom	55	59	52	54	53	55	59
Canada	70	54	48	48	46	50	61

Source: OECD Labour Force Statistics, 1964-84 and 1967-87, and Demographic Databank projections, Social Affairs, Manpower and Education Directorate, OECD.

<sup>1/</sup> Fund staff estimates for 1965-85.

This factor is embodied in the simulations discussed below. A further factor that is however not taken into account is the effect of population aging on participation and retirement decisions. Higher real wages may lead some to postpone retirement. In addition, families who support aged relatives may increase their labor supply--for instance, by having both husband and wife work. It is possible that these modifications of behavior may substantially change the results discussed below.

### 3. Government provision of education and medical services

Most governments provide for medical care that is only partially covered by user fees, the rest being raised by social security taxes and general taxation. Since health problems typically increase with age, an older population will involve greater expenditure on medical services by the government. 1/ In some countries, moreover, medical expenditure is provided free to the aged. An offsetting factor is decreased government expenditure on education of the young.

Heller and others (1986) have made projections of various components of government social expenditures, which are summarized in Table 3.2 in the form of increases in government expenditure as a share of GNP in 2000-25 relative to 1980 (a more recent year of historical data was not available in their study). It can be seen that the increases due to demographic changes in government expenditure on medical care are for most countries of the order of 1 percent of GNP by 2025. 2/ Only in the case of Japan, the Federal Republic of Germany, and Canada, do they substantially exceed that figure. The decline in expenditures on education is also of the order of 1 percent of GNP, so that the net effect of the two on government expenditures is close to zero, except in Japan and Germany, where expenditure increases by 0.8-0.9 percent of GNP, and the United Kingdom, where it declines by 0.5 percent of GNP.

### 4. Government pensions

Table 3.2 also presents projections of increased government transfer payments in the form of pensions. Here the increases are much more dramatic, especially for Japan, Italy, and Germany, where they account for 7-9 percent of GNP, and to a somewhat lesser extent, for France and the United Kingdom. The table does not specify whether the pensions are

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1/ As well as higher private expenditure; however, we do not explicitly include in our simulations estimates of the amount private consumption might increase as a result.

2/ These estimates may understate future medical expenditures for two reasons. First, health costs have already risen substantially in the period since the study by Heller and others was completed. Second, the estimates hold constant the relative price of medical services in the future, whereas an extrapolation of recent trends would suggest an increase. See Ebrill (1990).

Table 3.2. Major Industrial Countries: Changes in Government  
Expenditures due to Demographic Changes, 2000-2025

(In percent of GDP)

	(1) Medical Expenditures			(2) Education			(3) Pension Expenditures			(4) Combined Effects of (1)-(3)		
	2000	2010	2025	2000	2010	2025	2000	2010	2025	2000	2010	2025
United States	0.01	0.15	1.06	-0.92	-1.14	-1.29	-0.50	-0.60	0.60	-1.41	-1.59	0.37
Japan	0.67	1.25	1.63	-1.00	-0.50	-0.70	5.41	8.69	9.20	5.08	9.44	10.13
Germany, Fed. Rep. of	0.43	0.92	1.59	-0.63	-0.88	-0.81	3.80	5.30	7.20	3.60	5.34	7.98
France	0.34	0.40	0.80	-0.46	-0.54	-0.51	1.00	1.50	3.00	0.88	1.36	3.29
Italy	0.20	0.49	0.88	-0.80	-0.90	-1.00	2.50	4.60	8.60	1.90	4.19	8.48
United Kingdom	0.05	--	0.66	-1.00	-1.00	-1.10	0.85	1.42	2.56	-0.10	0.42	2.12
Canada	-0.06	0.18	1.45	-1.91	-2.15	-1.87	-0.40	-0.40	0.80	-2.37	-2.37	0.38

Source: Heller and others (1986), Table 14. "Baseline Economic and Demographic Scenario" relative to 1980 actual expenditures, as ratios to GDP. For medical expenditures, figures were obtained directly from Peter Heller.



funded or not, and specific provisions may differ considerably across countries.

The effects of different funding arrangements on private saving have been the subject of an extensive literature, largely as a result of a seminal article by Feldstein (1974), who argued that the existence of an unfunded social security plan would tend to decrease private (and national) saving. We do not examine the impact of funding future social security expenditures. In the model simulations, taxation is assumed not to be linked to social security benefits, and pension benefits are treated as any other transfer payment: they are modeled as being non-distortionary, negative taxes (which are correctly anticipated in advance). The model is not sufficiently rich to treat distributional questions, so that a transfer that was financed through raising contemporaneous non-distortionary taxes would have no effect. In the scenarios discussed below, however, increased government spending has to be financed through distortionary taxes (in MULTIMOD, it is assumed that taxes are proportional to income) or borrowing. The fact that taxes are distortionary argues for tax smoothing in order to minimize those distortions.

Whether government borrowing will have real effects (even in the absence of distortionary taxes) has itself been the subject of an extensive literature, associated with Barro (1974) and more recent authors. The issue revolves around the following question: if, instead of raising taxes today in order to finance expenditure, the government borrows and raises taxes later, does this cause private agents to change their saving behavior in an offsetting way? It seems unlikely that the perfectly offsetting case--often referred to as Barro-Ricardian equivalence--is empirically relevant. MULTIMOD incorporates a model of consumption in which the calculation of the present value of future disposable income discounts the future taxes needed to service government debt at a rate that exceeds the borrowing cost by about 1 percentage point, so that increased government deficits are not completely offset by a rise in private saving. <sup>1/</sup> Therefore, in the absence of tax increases, an increase in payments of government pensions will tend to decrease national saving.

An important assumption that has been implicit in the discussion so far is that governments are not able to borrow in an unlimited fashion; borrowing is the postponement of taxes, not their elimination. Governments cannot indefinitely borrow in order to service their debts, leading to an unbounded accumulation of debt relative to GNP. The latter would occur unless the economy's growth rate is higher than the interest rate. Another way of describing this intertemporal constraint on government borrowing is that today's government debt must be equal to the present value of future taxes less government spending, so that an increase in the latter involves an increase in taxes at some point. In

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<sup>1/</sup> See Blanchard (1985), Frenkel and Razin (1987), and Buiter (1988).

doing our simulations of MULTIMOD, we usually include a tax rule that raises the tax rate in a gradual fashion in response to increases in deficits and in cumulated deficits (i.e., the debt itself); this rule ensures that government debt does not become unbounded, while not producing sharp changes in rates. 1/ In the following section, we however first simulate the demographic effects discussed above assuming unchanged tax rates; then we use the standard version of the model that includes the tax rule. 2/

### III. Simulation of Demographic Changes

Table 3.3 presents the result of simulating in MULTIMOD the changes in dependency ratios and the projected changes in government expenditures due to demographic changes, discussed above. The results are given as deviations from a smooth baseline that extrapolates the WEO medium-term scenarios out to 2040. 3/ In the baseline, output is assumed to grow at its potential growth rate (assumed to be equal to current estimates), government fiscal positions to move toward balance so that government debt settles down to a constant ratio of GNP, and inflation to remain close to zero in the major industrial countries. No account is taken in the baseline of demographic changes beyond the medium-term projection horizon, 1995.

The simulation results are of interest as they relate to what would otherwise have occurred; unfortunately, we are not in a position to make projections of all the necessary variables that far in the future, given the extent of the uncertainties concerning the structure of economies and such variables as productivity growth and underlying monetary and fiscal policies--not to mention uncertainty concerning the demographic projections themselves. Our discussion will be limited to considering the partial effect of aging of the population, leaving aside other factors that may be at work. It should be noted that the size of the population is not altered in these simulations, just its age structure. Therefore, the figures for changes in aggregate variables (for example, GNP, and absorption) are the same as those for changes in per capita variables. In addition we present results for GDP and the capital stock per worker, because they are relevant for the ability of the economy to support the greater number of dependents.

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1/ Kremers (1989) provides empirical support for such a rule.

2/ The simulations reported in the October 1989 World Economic Outlook allow tax rates to change in the manner described above.

3/ We report results only to the year 2025; the extra years are needed so that the simulation is not dependent on arbitrary terminal conditions, which are used to anchor expectations variables.

Table 3.3. Demographic Shift: No Tax Rate Change  
(Deviations from baseline)

	2000	2005	2010	2015	2020	2025
<hr/>						
United States	(In percent)					
Real GNP per capita	-1.0	3.0	5.3	5.6	4.1	2.5
Real domestic demand per capita	-5.3	-4.9	-4.0	-3.6	-4.7	-6.1
Real interest rate	1.2	-0.6	-1.1	0.0	1.9	3.7
Real effective exchange rate	-15.6	-24.6	-25.4	-22.0	-17.1	-11.7
GDP per worker	-2.6	-1.9	-0.7	0.9	1.5	1.7
Capital stock per worker	-2.8	-4.1	-2.7	0.1	2.4	2.7
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	(As a percent of GNP)					
Current account balance	2.0	4.3	5.2	5.4	5.9	6.6
General govt. financial balance	0.5	1.8	2.8	2.4	1.6	0.8
Private saving	1.8	3.0	3.0	3.2	3.6	4.1
Gross private investment	0.3	0.5	0.6	0.2	-0.7	-1.8
Net foreign assets	5.2	18.8	35.0	48.5	59.4	69.8
Government debt	-0.6	-5.9	-14.9	-22.1	-24.5	-22.5
Tax rate	0.0	0.0	0.0	0.0	0.0	0.0
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Japan	(In percent)					
Real GNP per capita	2.1	-3.3	-7.2	-11.2	-14.6	-17.3
Real domestic demand per capita	12.0	12.0	10.0	5.7	1.3	-2.3
Real interest rate	-3.5	0.0	1.9	3.8	5.3	5.9
Real effective exchange rate	30.1	55.9	65.8	62.3	50.0	36.2
GDP per worker	6.2	5.4	4.6	2.5	0.4	-1.4
Capital stock per worker	6.0	9.5	9.7	7.1	2.5	-2.6
<hr/>						
	(As a percent of GNP)					
Current account balance	-3.5	-5.0	-5.7	-6.2	-7.3	-8.8
General govt. financial balance	-3.5	-6.6	-10.6	-15.2	-22.3	-31.2
Private saving	-0.7	-0.2	2.6	6.5	12.7	20.5
Gross private investment	-0.7	-1.8	-2.4	-2.6	-2.4	-2.0
Net foreign assets	-19.4	-36.2	-51.9	-67.1	-83.4	-102.0
Government debt	9.5	29.3	59.0	98.9	154.8	234.8
Tax rate	0.0	0.0	0.0	0.0	0.0	0.0
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Germany, Federal Republic of	(In percent)					
Real GNP per capita	0.8	-2.3	-4.3	-5.5	-7.0	-9.2
Real domestic demand per capita	3.6	4.3	3.9	2.0	-0.5	-3.2
Real interest rate	-0.8	-0.4	0.1	1.2	2.9	4.8
Real effective exchange rate	2.7	6.0	6.9	5.8	4.7	5.0
GDP per worker	1.8	1.6	0.3	-0.3	0.6	1.9
Capital stock per worker	1.6	3.3	2.8	2.1	2.6	2.6
<hr/>						
	(As a percent of GNP)					
Current account balance	-1.2	-3.3	-4.7	-4.9	-4.8	-4.7
General govt. financial balance	-3.1	-5.1	-7.6	-10.8	-15.6	-22.0
Private saving	1.9	1.8	2.9	5.8	10.3	15.8
Gross private investment	-0.0	-0.1	-0.0	-0.1	-0.5	-1.5
Net foreign assets	-8.1	-17.9	-30.6	-42.2	-51.1	-57.4
Government debt	8.4	24.9	46.8	74.5	111.5	162.5
Tax rate	0.0	0.0	0.0	0.0	0.0	0.0

Table 3.3 (continued). Demographic Shift: No Tax Rate Change

(Deviations from baseline)

	2000	2005	2010	2015	2020	2025
<hr/>						
France	(In percent)					
Real GNP per capita	-0.6	1.0	1.8	0.9	-0.3	-0.6
Real domestic demand per capita	-1.4	-0.7	-0.6	-1.9	-3.7	-4.9
Real interest rate	0.5	-0.4	-0.5	0.9	2.7	3.9
Real effective exchange rate	-1.1	-5.2	-6.6	-6.4	-6.2	-5.5
GDP per worker	-1.1	-0.4	-0.3	0.0	0.6	1.6
Capital stock per worker	-1.2	-1.5	-0.9	0.9	1.7	1.2
(As a percent of GNP)						
Current account balance	1.0	1.4	1.6	1.8	2.2	3.0
General govt. financial balance	-1.0	-1.5	-1.9	-3.3	-5.4	-7.7
Private saving	1.7	3.0	3.8	5.0	7.0	9.4
Gross private investment	-0.3	0.1	0.3	-0.1	-0.6	-1.3
Net foreign assets	3.7	8.5	13.1	17.4	21.7	27.2
Government debt	4.0	9.3	13.5	19.9	32.6	50.7
Tax rate	0.0	0.0	-0.0	-0.0	-0.0	-0.0
Italy	(In percent)					
Real GNP per capita	1.8	-1.4	-2.5	-0.8	-4.2	-6.9
Real domestic demand per capita	4.6	1.8	0.2	1.4	-2.3	-5.1
Real interest rate	-1.5	1.2	0.9	0.7	3.4	4.5
Real effective exchange rate	4.6	10.2	5.7	1.0	1.6	-0.5
GDP per worker	2.9	0.5	-1.4	1.4	-0.3	-0.3
Capital stock per worker	2.7	2.9	0.2	1.1	0.4	-1.1
(As a percent of GNP)						
Current account balance	-0.8	0.5	0.2	-0.7	-0.6	-1.3
General govt. financial balance	-0.1	-1.8	-5.4	-9.0	-15.4	-24.9
Private saving	-0.6	1.2	4.8	8.0	13.6	22.3
Gross private investment	0.2	-1.1	-0.7	-0.3	-1.1	-1.3
Net foreign assets	-1.6	-0.1	0.2	-3.0	-5.4	-9.2
Government debt	-6.0	-3.9	23.2	49.6	85.2	157.0
Tax rate	0.0	0.0	0.0	-0.0	-0.0	-0.0
United Kingdom	(In percent)					
Real GNP per capita	-0.1	0.7	1.1	0.5	-1.3	-2.2
Real domestic demand per capita	-1.3	-1.7	-2.1	-3.1	-5.6	-7.3
Real interest rate	-0.1	-0.3	-0.3	1.1	3.0	4.0
Real effective exchange rate	-2.5	-4.7	-6.3	-6.7	-7.6	-8.8
GDP per worker	-0.3	-0.7	-0.8	-0.0	-0.6	0.4
Capital stock per worker	-0.2	-0.8	-0.7	0.7	0.4	-0.4
(As a percent of GNP)						
Current account balance	0.7	1.7	1.7	1.5	1.1	0.7
General govt. financial balance	-0.1	-0.2	-0.7	-1.8	-3.8	-6.1
Private saving	0.9	2.1	2.7	3.3	4.6	6.2
Gross private investment	0.1	0.1	0.3	0.0	-0.3	-0.6
Net foreign assets	2.3	8.4	13.7	16.8	17.4	16.0
Government debt	0.5	1.1	3.0	7.8	18.6	36.4
Tax rate	0.0	0.0	0.0	0.0	0.0	0.0

Table 3.3 (concluded). Demographic Shift: No Tax Rate Change  
(Deviations from baseline)

	2000	2005	2010	2015	2020	2025
<hr/>						
Canada	(In percent)					
Real GNP per capita	-0.3	2.8	3.9	3.7	2.1	0.1
Real domestic demand per capita	-3.4	-1.7	-1.3	-1.7	-3.3	-5.1
Real interest rate	0.4	-1.0	-1.1	0.2	1.9	4.2
Real effective exchange rate	-10.1	-14.2	-13.8	-11.5	-8.0	-3.5
GDP per worker	-0.6	-0.5	0.0	1.3	2.0	2.4
Capital stock per worker	-0.9	-1.5	-0.0	2.4	3.9	3.9
<hr/>						
	(As a percent of GNP)					
Current account balance	2.6	5.0	5.9	5.9	6.0	6.3
General govt. financial balance	2.3	4.2	5.0	4.5	3.8	3.0
Private saving	0.4	0.7	0.4	0.1	-0.4	-0.9
Gross private investment	-0.0	-0.1	-0.4	-1.3	-2.6	-4.2
Net foreign assets	8.5	24.9	42.8	56.8	66.6	74.4
Government debt	-5.7	-19.4	-34.9	-46.0	-50.6	-50.1
Tax rate	0.0	0.0	0.0	0.0	0.0	0.0
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Smaller Industrial Countries	(In percent)					
Real GNP per capita	-0.1	0.7	0.0	-1.4	-4.0	-6.8
Real domestic demand per capita	0.5	1.4	1.0	-0.1	-2.3	-4.4
Real interest rate	-0.3	-0.4	0.0	1.2	3.0	4.4
Real effective exchange rate	0.0	-1.0	-1.0	-1.3	-1.8	-2.0
GDP per worker	0.0	0.6	0.2	0.8	1.0	1.2
Capital stock per worker	-0.1	0.5	1.2	2.3	2.5	1.5
<hr/>						
	(As a percent of GNP)					
Current account balance	-0.3	-0.0	-0.3	-0.8	-1.5	-2.3
General govt. financial balance	-1.1	-1.9	-3.1	-5.1	-8.5	-13.0
Private saving	0.9	2.0	2.9	4.1	6.3	9.4
Gross private investment	0.1	0.1	0.0	-0.2	-0.7	-1.3
Net foreign assets	1.4	1.7	0.0	-3.8	-9.2	-16.4
Government debt	3.7	9.1	17.4	30.3	52.0	85.7
Tax rate	0.0	0.0	0.0	0.0	-0.0	0.0

Source: IMF staff projections

As described in the October 1989 World Economic Outlook, increases in dependency ratios due to aging of the population can be expected to have far-reaching effects. <sup>1/</sup> In particular, potential (and actual) output will be lower in those countries--especially Japan and the Federal Republic of Germany--where there is a large increase in the elderly as a proportion of the population. Moreover, these two countries, because the extent of aging is greater than elsewhere, will have large increases in consumption relative to output, which will tend to lower current account surpluses (or produce larger deficits). Over the three decades (1996-2025) that we consider, effects on current accounts cumulate into large changes in net foreign asset and liability positions. As a result, the United States and Canada, where the aging of the population occurs much later than in the other large industrial countries, have net foreign asset positions that are higher than in the baseline by about 70 percent of GNP by 2025, while Japanese and German net positions are lower by 100 percent of GNP and 60 percent of GNP, respectively.

The effects of projected demographic changes on current account positions therefore tend to reverse recent trends among the three largest industrial countries. For instance, the WEO medium-term projections to 1995 imply a net debtor position for the United States equal to more than 20 percent of GNP, and net creditor positions for Japan and the Federal Republic of Germany of about 25 percent and 40 percent of GNP, respectively. It should be emphasized, however, that extending the horizon further would make demographic developments in the United States and Canada more similar to those in other countries, and would probably reverse some of the net foreign asset accumulation over the period 1996-2025.

The figures in Table 3.3 indicate a fall in GNP per capita for all countries except the United States and Canada, where the increase is due to the very large increase in net foreign assets. In most countries, there are large declines in GNP per capita, which is one measure--admittedly a crude one--of standard of living. The fall in this ratio occurs despite increases in GDP per worker and in capital per worker in most countries, because the ratio of those working to the total population has declined even more. The capital stock is importantly affected by the level of real interest rates, and in all countries, real interest rates rise substantially, by 4-6 percentage points by the year 2025 relative to baseline.

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<sup>1/</sup> Effects are larger than in the earlier WEO primarily because production and government spending effects are included here in addition to consumption effects, and because tax rates are not allowed to change.

#### IV. Alternative Tax Policies

A closer examination of Table 3.3 makes clear that keeping tax rates unchanged in the face of such massive demographic changes would not be desirable, or feasible, because of effects on debt accumulation. The absence of increases in tax rates in Japan and Germany accompanied by large increases in government expenditures leads to very large increases in debt/GNP ratios--by over 200 percentage and 150 percentage points, respectively. This contributes to crowding out the capital stock through increases in interest rates.

The level of the capital stock is an important factor in the ability of the economy to support the nonworking population. With the projected increase in the dependency ratio, those working would have to be more productive in order for the average level of consumption per head not to decrease. In the absence of technological progress, higher productivity will occur mainly as a result of capital accumulation. 1/ Clearly, in the face of such large demographic shifts, unchanged tax rates are not a desirable policy; moreover, since government debt ratios have not stabilized relative to baseline in Japan and Germany, leaving tax rates unchanged forever is not feasible, and they would eventually have to rise.

As an alternative to the scenario of Table 3.3, we also simulate the demographic changes with a tax rate rule. It is assumed in all countries that tax rates rise in response to an increase in deficits and debt relative to baseline (and decline in the opposite case); however, the increase is very gradual. 2/ Since increases in dependency ratios occur mainly toward the end of the 1996-2025 period, those tax increases do not fully offset the debt buildup, but reduce a good part of it.

Table 3.4 reports the effect of such a tax rate rule, reported as a deviation from the first scenario. In other words, Table 3.4 calculates the differential effects of tax policy, given the demographic changes. Average tax rates rise markedly by the year 2025 in Japan, Italy, and Germany (by 14, 12, and 9 percentage points, respectively), and by 3-6 percentage points in the remaining countries, except Canada and the

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1/ Higher income (GNP) may also result from higher net claims on foreigners; however, for the global economy, physical capital must be higher if standards of living are to be maintained.

2/ Specifically, a tax rate reaction function was specified to take the following form:

$$\Delta \text{TRATE} = .01 * (\text{B}_1 / \text{YGNP}_1 - \text{BRATIO}) + .3 * \Delta (\text{B} / \text{YGNP}),$$

where TRATE is the average tax rate, B is government debt outstanding, YGNP is nominal GNP, and BRATIO is an exogenous target for the debt/GNP ratio. The coefficients were chosen with the object of producing a smooth, stable adjustment of B/YGNP to BRATIO.

Table 3.4. Demographic Shift with Endogenous Tax Rates

(Deviations from scenario with no tax rate change)

	2000	2005	2010	2015	2020	2025
<hr/>						
United States	(In percent)					
Real GNP per capita	0.9	0.2	-0.4	-0.9	-1.6	-2.6
Real domestic demand per capita	2.7	3.3	3.1	2.8	2.7	2.5
Real interest rate	-1.1	-0.5	-0.4	-0.5	-0.8	-0.8
Real effective exchange rate	7.7	12.1	11.8	10.4	8.7	7.2
GDP per worker	0.7	0.5	0.3	0.3	0.4	0.5
Capital stock per worker	0.6	1.0	1.1	1.1	1.3	1.6
(As a percent of GNP)						
Current account balance	-0.9	-1.8	-2.1	-2.4	-3.0	-3.9
General govt. financial balance	0.3	-0.9	-2.1	-2.6	-2.6	-2.1
Private saving	-1.1	-0.9	-0.0	0.4	0.0	-1.1
Gross private investment	0.0	-0.1	-0.0	0.2	0.5	0.7
Net foreign assets	-2.5	-8.4	-15.1	-20.6	-26.3	-33.6
Government debt	-0.9	1.2	8.4	16.9	23.2	26.1
Tax rate	-0.5	-1.6	-2.4	-2.3	-1.3	0.1
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Japan	(In percent)					
Real GNP per capita	-1.6	0.1	0.9	1.9	3.2	5.0
Real domestic demand per capita	-4.6	-4.3	-3.8	-3.1	-2.6	-2.4
Real interest rate	0.2	-1.2	-1.3	-1.3	-1.2	-1.0
Real effective exchange rate	-8.7	-13.4	-13.8	-12.9	-11.5	-10.8
GDP per worker	-1.8	-0.3	0.2	0.7	0.8	0.9
Capital stock per worker	-0.9	-0.4	0.4	1.2	1.7	2.1
(As a percent of GNP)						
Current account balance	1.0	1.2	1.3	1.7	2.9	4.7
General govt. financial balance	1.0	4.0	7.9	13.1	20.4	29.6
Private saving	0.8	-1.5	-5.3	-10.3	-16.9	-24.7
Gross private investment	0.8	1.3	1.3	1.1	0.7	0.1
Net foreign assets	6.1	9.5	13.4	19.1	28.4	42.9
Government debt	-1.9	-13.1	-36.0	-72.8	-127.9	-207.5
Tax rate	2.4	5.6	8.5	10.7	12.3	13.7
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Germany, Federal Republic of	(In percent)					
Real GNP per capita	-1.0	-0.0	0.8	1.6	2.6	3.8
Real domestic demand per capita	-2.6	-3.2	-3.0	-2.4	-1.6	-0.8
Real interest rate	-0.3	-0.6	-0.7	-0.9	-1.1	-1.2
Real effective exchange rate	-1.7	-3.1	-3.6	-3.4	-2.7	-1.8
GDP per worker	-0.9	-0.2	0.2	0.4	0.6	0.7
Capital stock per worker	-0.3	-0.1	0.2	0.6	1.0	1.6
(As a percent of GNP)						
Current account balance	0.7	1.5	2.0	2.4	3.0	3.8
General govt. financial balance	1.2	3.6	6.1	9.3	14.0	20.5
Private saving	-0.2	-1.7	-3.7	-6.5	-10.8	-16.7
Gross private investment	0.3	0.5	0.4	0.3	0.2	0.0
Net foreign assets	4.8	9.8	15.6	21.3	27.1	33.9
Government debt	-2.3	-13.5	-32.2	-57.9	-93.4	-143.5
Tax rate	1.9	3.9	5.5	6.9	8.2	9.4



Table 3.4 (continued). Demographic Shift with Endogenous Tax Rates

(Deviations from scenario with no tax rate change)

	2000	2005	2010	2015	2020	2025
<b>France</b>						
	(In percent)					
Real GNP per capita	0.2	0.0	-0.3	0.1	-0.1	-1.0
Real domestic demand per capita	0.4	0.6	0.5	1.1	1.5	1.2
Real interest rate	-0.7	-0.6	-0.5	-0.9	-1.1	-0.9
Real effective exchange rate	-0.1	1.1	1.3	1.0	1.5	2.3
GDP per worker	0.3	0.3	0.0	0.7	1.0	0.5
Capital stock per worker	0.4	0.8	0.8	1.1	1.7	2.0
	(As a percent of GNP)					
Current account balance	-0.5	-0.7	-0.8	-1.0	-1.3	-1.7
General govt. financial balance	0.7	1.3	1.6	2.5	4.3	6.5
Private saving	-0.8	-1.8	-2.2	-3.1	-5.2	-7.8
Gross private investment	0.3	0.2	0.2	0.4	0.4	0.4
Net foreign assets	-1.6	-4.2	-6.6	-9.0	-11.9	-15.4
Government debt	-1.8	-6.5	-10.6	-15.9	-26.1	-41.7
Tax rate	0.7	1.0	1.2	1.7	2.7	3.8
<b>Italy</b>						
	(In percent)					
Real GNP per capita	-1.0	1.2	0.6	-0.8	-0.2	3.8
Real domestic demand per capita	-2.4	-0.6	-1.7	-3.2	-3.7	-0.1
Real interest rate	0.2	-1.3	-0.9	-0.3	-0.6	-2.5
Real effective exchange rate	-2.7	-5.6	-4.1	-3.3	-5.2	-7.0
GDP per worker	-1.1	1.1	0.5	-1.1	-1.1	2.1
Capital stock per worker	-0.9	0.2	1.1	0.7	0.1	1.8
	(As a percent of GNP)					
Current account balance	0.5	-0.1	0.5	1.2	1.8	1.6
General govt. financial balance	-0.6	0.6	4.5	7.3	12.6	22.4
Private saving	1.1	-0.0	-3.4	-5.9	-10.4	-19.7
Gross private investment	0.1	0.7	0.5	0.2	0.4	1.2
Net foreign assets	1.0	0.3	1.8	5.8	11.0	16.6
Government debt	6.3	6.2	-11.2	-34.0	-62.3	-128.0
Tax rate	0.1	0.7	3.9	5.7	8.8	12.0
<b>United Kingdom</b>						
	(In percent)					
Real GNP per capita	0.2	0.1	0.1	0.1	-0.1	-0.2
Real domestic demand per capita	0.5	1.0	1.1	1.2	1.4	1.6
Real interest rate	-0.6	-0.6	-0.6	-0.8	-1.0	-1.1
Real effective exchange rate	0.5	1.4	1.5	1.7	1.9	2.0
GDP per worker	0.1	0.2	0.3	0.4	0.5	0.6
Capital stock per worker	0.1	0.5	0.7	0.9	1.2	1.7
	(As a percent of GNP)					
Current account balance	-0.3	-0.6	-0.7	-0.6	-0.8	-0.9
General govt. financial balance	0.1	0.1	0.4	1.1	2.7	5.0
Private saving	-0.3	-0.6	-0.9	-1.6	-3.2	-5.5
Gross private investment	0.2	0.2	0.2	0.2	0.3	0.4
Net foreign assets	-1.4	-3.6	-6.0	-7.4	-8.5	-9.7
Government debt	-0.3	-0.9	-2.0	-5.0	-12.5	-26.9
Tax rate	0.1	0.1	0.3	0.9	2.1	3.5

Table 3.4 (concluded). Demographic Shift with Endogenous Tax Rates

(Deviations from scenario with no tax rate change)

	2000	2005	2010	2015	2020	2025
<hr/>						
Canada	(In percent)					
Real GNP per capita	0.5	0.0	-0.4	-1.2	-2.2	-3.4
Real domestic demand per capita	2.3	3.0	3.0	2.8	2.6	2.3
Real interest rate	-0.9	-0.4	-0.4	-0.6	-0.8	-0.9
Real effective exchange rate	5.2	7.7	7.8	7.5	6.8	6.0
GDP per worker	0.3	0.5	0.5	0.4	0.5	0.6
Capital stock per worker	0.6	0.9	1.1	1.2	1.5	1.8
(As a percent of GNP)						
Current account balance	-1.4	-2.6	-2.9	-3.1	-3.9	-4.8
General govt. financial balance	-0.7	-2.8	-4.3	-5.0	-5.1	-4.8
Private saving	-0.4	0.6	1.8	2.4	2.2	1.3
Gross private investment	0.3	0.3	0.4	0.6	1.0	1.3
Net foreign assets	-4.3	-12.7	-21.6	-28.6	-35.6	-44.2
Government debt	1.7	10.2	24.1	38.0	48.6	54.9
Tax rate	-1.3	-3.1	-4.1	-3.8	-2.3	-0.2
<hr/>						
Smaller Industrial Countries	(In percent)					
Real GNP per capita	-0.1	0.1	0.2	0.6	1.0	1.5
Real domestic demand per capita	-0.5	-0.5	-0.5	-0.2	0.0	0.2
Real interest rate	-0.5	-0.6	-0.7	-0.9	-1.1	-1.1
Real effective exchange rate	-0.2	-0.0	-0.0	0.1	0.5	0.9
GDP per worker	-0.2	0.0	0.2	0.4	0.4	0.5
Capital stock per worker	0.2	0.4	0.5	0.8	1.1	1.5
(As a percent of GNP)						
Current account balance	0.3	0.2	0.3	0.5	0.8	1.2
General govt. financial balance	0.6	1.3	2.4	4.0	7.0	11.5
Private saving	-0.2	-0.9	-1.8	-3.3	-6.0	-10.0
Gross private investment	0.2	0.2	0.2	0.3	0.2	0.2
Net foreign assets	-0.3	-0.1	1.1	3.1	5.8	9.5
Government debt	-1.6	-5.8	-12.3	-23.0	-41.2	-71.2
Tax rate	0.7	1.2	1.9	2.9	4.3	6.1

Source: IMF staff projections

United States, where they are virtually equal to their baseline levels in 2025 (but were lower in the years 2000-2020). 1/

In this scenario, for all countries real interest rates are lower than in the case where tax rates are unchanged--by about 1 percentage point in the year 2025, causing the capital stock per worker and GDP per worker to be higher in all countries. Industrial countries in aggregate are better able to meet the pension and other requirements of an older population as a result. GNP per capita does not rise in all countries, however, since lower net foreign assets (relative to the previous scenario) mean lower net foreign investment income in the United States and Canada.

Table 3.5 reports the combined effects of the demographic shifts and the tax rate rule we have just discussed. In this table, the scenario is compared to the baseline, not to the scenario of Table 3.3. It can be seen that even with the tax rate adjustments, projected demographic changes have substantial effects. The United States and Canada have net foreign asset positions that are higher than in the baseline by over 30 percent of GNP by 2025; in Japan, the net position is lower by 60 percent of GNP, and in Germany, by 25 percent of GNP. As a result of the rise in dependency ratios, whose effects are mitigated, but not completely eliminated, by the tax adjustments, real interest rates increase by 3-5 percentage points relative to baseline levels which are about 3 percent, and in all countries real GNP per capita is lower by 2025.

The tax rate function that we have assumed, though plausible, is rather arbitrary. Two alternative tax policies might involve either increases in tax rates to match increases in government expenditures when they occur--a sort of pay-as-you-go policy--or anticipatory tax increases. The former would tend to produce large tax increases in the years when the demographic changes were largest. Sharp tax increases may have undesirable effects on labor supply (Barro (1979)). To the extent that the demographic changes can be foreseen, tax smoothing would suggest that tax rates should increase gradually before the increases in government expenditure actually occurred: in effect, establishing a sort of "trust fund." 2/ Moreover, earlier increases in tax rates would prevent rates from having to increase as much later (because the debt ratio would never rise to as high a level), and this would be desirable

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1/ Tax rate decreases in the United States and Canada are in fact unlikely to be desirable in the intervening years because of low initial saving rates in these countries and the fact that beyond 2025, government expenditures are projected to rise further.

2/ It is not necessary to assume that there would actually be a separate fund for demographic-induced expenditures. Indeed, excess revenues in early years might just serve to pay down existing government debt, or lead to a smaller increase in debt than would otherwise have occurred. The important thing is that increased government revenues would not be offset by other forms of government spending.

Table 3.5. Demographic Shift with Endogenous Tax Rates

(Deviations from baseline)

	2000	2005	2010	2015	2020	2025
<b>United States</b>						
	(In percent)					
Real GNP per capita	-0.1	3.2	4.9	4.7	2.5	-0.1
Real domestic demand per capita	-2.7	-1.7	-1.0	-1.0	-2.2	-3.8
Real interest rate	0.1	-1.1	-1.4	-0.5	1.1	2.9
Real effective exchange rate	-9.1	-15.5	-16.6	-14.0	-9.9	-5.3
GDP per worker	-2.0	-1.4	-0.4	1.1	2.0	2.2
Capital stock per worker	-2.2	-3.1	-1.7	1.2	3.7	4.3
	(As a percent of GNP)					
Current account balance	1.1	2.5	3.1	3.0	2.8	2.7
General govt. financial balance	0.8	0.9	0.7	-0.3	-1.0	-1.3
Private saving	0.7	2.1	3.0	3.6	3.6	3.0
Gross private investment	0.3	0.5	0.6	0.3	-0.2	-1.0
Net foreign assets	2.7	10.4	19.9	27.9	33.1	36.2
Government debt	-1.5	-4.7	-6.5	-5.3	-1.3	3.5
Tax rate	-0.5	-1.6	-2.4	-2.3	-1.3	0.1
<b>Japan</b>						
	(In percent)					
Real GNP per capita	0.4	-3.1	-6.4	-9.5	-11.8	-13.2
Real domestic demand per capita	6.8	7.2	5.8	2.4	-1.3	-4.7
Real interest rate	-3.3	-1.2	0.6	2.5	4.1	4.8
Real effective exchange rate	18.8	35.0	43.0	41.4	32.7	21.5
GDP per worker	4.4	5.1	4.8	3.2	1.2	-0.5
Capital stock per worker	5.1	9.1	10.2	8.3	4.3	-0.5
	(As a percent of GNP)					
Current account balance	-2.5	-3.8	-4.4	-4.5	-4.4	-4.0
General govt. financial balance	-2.5	-2.6	-2.8	-2.1	-1.9	-1.6
Private saving	0.1	-1.7	-2.7	-3.8	-4.2	-4.3
Gross private investment	0.0	-0.5	-1.1	-1.5	-1.7	-1.8
Net foreign assets	-13.4	-26.7	-38.5	-48.0	-55.0	-59.0
Government debt	7.5	16.3	23.0	26.1	26.9	27.3
Tax rate	2.4	5.6	8.5	10.7	12.3	13.7
<b>Germany, Federal Republic of</b>						
	(In percent)					
Real GNP per capita	-0.2	-2.3	-3.6	-4.0	-4.6	-5.8
Real domestic demand per capita	0.8	1.0	0.8	-0.4	-2.1	-3.9
Real interest rate	-1.1	-1.0	-0.7	0.3	1.7	3.6
Real effective exchange rate	1.0	2.7	3.0	2.3	1.9	3.2
GDP per worker	1.0	1.3	0.5	0.1	1.2	2.6
Capital stock per worker	1.3	3.2	3.0	2.7	3.6	4.2
	(As a percent of GNP)					
Current account balance	-0.5	-1.8	-2.7	-2.5	-1.8	-0.9
General govt. financial balance	-1.9	-1.5	-1.5	-1.5	-1.6	-1.5
Private saving	1.7	0.1	-0.8	-0.7	-0.5	-0.9
Gross private investment	0.3	0.4	0.4	0.2	-0.3	-1.5
Net foreign assets	-3.3	-8.1	-15.0	-20.9	-24.0	-23.5
Government debt	6.1	11.4	14.6	16.6	18.1	19.0
Tax rate	1.9	3.9	5.5	6.9	8.2	9.4

Table 3.5 (continued). Demographic Shift with Endogenous Tax Rates  
(Deviations from baseline)

	2000	2005	2010	2015	2020	2025
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France	(In percent)					
Real GNP per capita	-0.4	1.1	1.5	1.0	-0.3	-1.6
Real domestic demand per capita	-0.9	-0.1	-0.1	-0.9	-2.2	-3.7
Real interest rate	-0.3	-1.0	-1.0	0.0	1.5	3.0
Real effective exchange rate	-1.2	-4.1	-5.4	-5.5	-4.8	-3.3
GDP per worker	-0.8	-0.2	-0.3	0.7	1.6	2.1
Capital stock per worker	-0.7	-0.7	-0.1	1.9	3.4	3.2
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	(As a percent of GNP)					
Current account balance	0.5	0.7	0.8	0.8	0.9	1.3
General govt. financial balance	-0.3	-0.2	-0.4	-0.8	-1.1	-1.2
Private saving	0.9	1.2	1.6	1.9	1.8	1.6
Gross private investment	0.0	0.4	0.5	0.2	-0.2	-0.9
Net foreign assets	2.1	4.3	6.5	8.5	9.8	11.8
Government debt	2.2	2.9	2.9	4.1	6.6	9.0
Tax rate	0.7	1.0	1.2	1.7	2.7	3.8
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Italy	(In percent)					
Real GNP per capita	0.8	-0.2	-2.0	-1.6	-4.4	-3.3
Real domestic demand per capita	2.1	1.1	-1.4	-1.9	-6.0	-5.2
Real interest rate	-1.4	-0.1	-0.0	0.3	2.8	2.0
Real effective exchange rate	1.8	4.1	1.3	-2.3	-3.7	-7.6
GDP per worker	1.7	1.6	-0.9	0.3	-1.5	1.8
Capital stock per worker	1.8	3.0	1.3	1.8	0.5	0.7
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	(As a percent of GNP)					
Current account balance	-0.4	0.4	0.7	0.5	1.2	0.2
General govt. financial balance	-0.7	-1.2	-0.9	-1.7	-2.8	-2.5
Private saving	0.6	1.1	1.4	2.1	3.2	2.6
Gross private investment	0.3	-0.4	-0.1	-0.1	-0.7	-0.1
Net foreign assets	-0.6	0.1	1.9	2.7	5.6	7.4
Government debt	0.3	2.2	12.0	15.6	22.9	29.0
Tax rate	0.1	0.7	3.9	5.7	8.8	12.0
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United Kingdom	(In percent)					
Real GNP per capita	0.0	0.8	1.2	0.6	-1.4	-2.3
Real domestic demand per capita	-0.8	-0.8	-1.1	-1.9	-4.3	-5.8
Real interest rate	-0.7	-0.9	-0.9	0.3	2.0	2.9
Real effective exchange rate	-2.0	-3.3	-4.9	-5.1	-5.9	-7.0
GDP per worker	-0.1	-0.4	-0.5	0.4	-0.1	1.0
Capital stock per worker	-0.1	-0.3	0.0	1.6	1.7	1.3
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	(As a percent of GNP)					
Current account balance	0.4	1.1	1.0	0.9	0.3	-0.1
General govt. financial balance	0.0	-0.1	-0.3	-0.6	-1.1	-1.1
Private saving	0.7	1.4	1.8	1.8	1.4	0.7
Gross private investment	0.3	0.2	0.5	0.2	-0.0	-0.2
Net foreign assets	0.9	4.8	7.7	9.4	8.9	6.3
Government debt	0.2	0.2	1.0	2.7	6.1	9.5
Tax rate	0.1	0.1	0.3	0.9	2.1	3.5

Table 3.5 (concluded). Demographic Shift with Endogenous Tax Rates

(Deviations from baseline)

	2000	2005	2010	2015	2020	2025
<b>Canada</b>						
	(In percent)					
Real GNP per capita	0.2	2.8	3.5	2.4	-0.2	-3.3
Real domestic demand per capita	-1.1	1.2	1.7	1.0	-0.7	-2.9
Real interest rate	-0.5	-1.4	-1.5	-0.4	1.1	3.3
Real effective exchange rate	-5.5	-7.7	-7.1	-4.9	-1.8	2.4
GDP per worker	-0.3	-0.0	0.5	1.8	2.5	3.0
Capital stock per worker	-0.3	-0.5	1.1	3.7	5.5	5.8
	(As a percent of GNP)					
Current account balance	1.3	2.4	3.0	2.8	2.1	1.5
General govt. financial balance	1.6	1.3	0.8	-0.4	-1.3	-1.9
Private saving	0.0	1.3	2.2	2.5	1.8	0.4
Gross private investment	0.3	0.2	-0.0	-0.7	-1.6	-2.9
Net foreign assets	4.1	12.2	21.3	28.1	31.0	30.2
Government debt	-4.0	-9.2	-10.8	-8.0	-2.0	4.8
Tax rate	-1.3	-3.1	-4.1	-3.8	-2.3	-0.2
<b>Smaller Industrial Countries</b>						
	(In percent)					
Real GNP per capita	-0.2	0.8	0.3	-0.7	-3.1	-5.3
Real domestic demand per capita	-0.1	0.8	0.5	-0.3	-2.3	-4.2
Real interest rate	-0.8	-1.1	-0.7	0.3	1.9	3.3
Real effective exchange rate	-0.2	-1.0	-1.0	-1.3	-1.2	-1.1
GDP per worker	-0.2	0.6	0.4	1.1	1.4	1.7
Capital stock per worker	0.1	0.9	1.7	3.1	3.7	3.0
	(As a percent of GNP)					
Current account balance	-0.0	0.2	0.0	-0.3	-0.8	-1.1
General govt. financial balance	-0.5	-0.5	-0.8	-1.1	-1.5	-1.6
Private saving	0.7	1.0	1.1	0.8	0.3	-0.6
Gross private investment	0.3	0.3	0.3	0.0	-0.4	-1.1
Net foreign assets	1.1	1.6	1.2	-0.7	-3.4	-6.8
Government debt	2.1	3.3	5.0	7.4	10.8	14.5
Tax rate	0.7	1.2	1.9	2.9	4.3	6.1

Source: IMF staff projections

because higher tax rates would be associated with greater distortions. The path for taxes implied by such a policy is in fact not very different from the scenario of Table 3.5, except as regards the United States and Canada, where tax rates would increase gradually starting at the beginning of the simulation period.

Of course, the case for tax smoothing would apply to taxes for all purposes, and we have deliberately not examined other reasons that might cause tax rates to change, for instance, because of the need to reduce existing large deficits. The latter would provide additional reasons in several countries for general tax rate increases. The issue of financing social security expenditures has been discussed by Halter and Hemming (1987) and Aaron, Bosworth and Burtless (1989), among others.

#### V. Concluding Remarks

These scenarios are illustrative of some of the issues. Subject to a number of caveats that are stated in the introduction to this note, there are two conclusions that do emerge from our analysis. First, projected demographic changes may produce substantial changes in macroeconomic variables in industrial countries. In particular, in the next three decades, 1996-2025, they can be expected to narrow present current account imbalances by reducing U.S. deficits and Japanese and German surpluses. Second, tax policies can help to influence the path for capital accumulation needed to attenuate the effects on real per capita income in the face of a reduction in the proportion of the population that is in the labor force. A policy that avoids tax increases and thereby leads to large increases in government indebtedness in response to rising government transfer payments and medical expenditures would crowd out capital formation. Such crowding out can be prevented by tax increases that finance the additional government outlays. Fiscal policy along these lines to deal with the macroeconomic effects of an aging population can raise the capital stock available for the smaller proportion of the population that is working and thereby mitigate the adverse consequence on real income.

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