

FEDERAL RESERVE BANK OF NEW YORK



MONTHLY REVIEW

JUNE 1971

Contents

The Business Situation	122
The Money and Bond Markets in May	126
Pollution and Environmental Control	132

Volume 53

No. 6

The Business Situation

There are increasing signs that the economy is emerging from last year's recession. Restrained inventory spending and gains in sales have substantially improved the balance between stocks and sales, and thus stepped-up inventory spending could soon provide some additional stimulus to the economy. Also, the rebound in residential and public construction appears firmly established, and activity in the industrial sector—while still mixed—seems to have picked up a bit even outside the automobile and steel industries. The indications of an underlying strengthening in economic activity are still limited, however, a fact that is underscored by the softness in personal income and new orders for durable goods in April.

There have been some encouraging developments on the price front, but the pace of inflation remains swift. Thus, while consumer nonfood commodity price increases have moderated significantly over the four months ended in April, a sizable part of the slowing in the overall consumer price index reflects the dramatic fall in home mortgage interest rates. At the same time, industrial wholesale prices rose sharply in April and May. For the first five months of the year these prices advanced at an even higher rate than that experienced in 1970. Moreover, recent announcements of further price advances for a number of metals and metal products underscore the likelihood of continued upward pressure on industrial wholesale prices and, eventually, prices of consumer goods.

PRODUCTION AND ORDERS

Led by a strong increase in iron and steel production, the pace of industrial activity again rose in April, as the Federal Reserve Board's index of industrial production advanced 0.3 percent. By April, the index had risen 2.8 percent from its recent November low but was still 4.9 percent below the July 1969 peak. Close to one third of the recovery in the last five months reflects rising output in the steel industry, where inventory stockpiling as a hedge against a possible July 31 strike has been sizable.

A little better than another third of the advance since November reflects increased automobile output following the end of the strike at General Motors.

Aside from the automotive and steel industries, recent trends in production have been mixed, though output was up on balance in April. Production of consumer goods other than automobiles has moved up rapidly in the last two months. However, the long downtrend in both business and defense equipment production has continued. Moreover, the latest survey of business plans for plant and equipment investment, taken by the Department of Commerce and the Securities and Exchange Commission in late April and May, indicates such spending will rise this year by only 2.7 percent, and that on a real basis spending will decline. Thus, there seems to be little prospect for a pickup in business equipment output in the near future.

The recovery in automobile sales has been less than had been anticipated by many industry observers. Sales of domestic automobiles, which had dropped to a 5.8 million unit seasonally adjusted annual rate during September through December of last year, have fluctuated narrowly around an annual rate of 8.3 million units during the first five months of 1971 (see Chart I). While this was above the pre-strike sales rate which averaged 7.8 million units in the first eight months of 1970, it remained below the 8.5 million unit average of the previous two years. One factor accounting for the relatively modest pace of domestic passenger car sales in recent months may be the strength of imported car sales. Over the October-April period, imported car sales ran at a seasonally adjusted annual rate of 1.5 million units, well above the 1.2 million units averaged in the first nine months of last year.

In contrast to the relatively flat trend that has prevailed in the automotive industry this year, steel output has climbed rapidly in response to inventory stockpiling demand. However, production is expected to fall off sharply after midsummer—whether a strike occurs or not

—as steel users work off their surplus stocks. In the previous two steel contract cycles, when strikes were also feared, the peak in production occurred in May and in the following two months the mills concentrated on finishing and shipping. In both cases, there was no strike but production fell drastically after the new contracts were signed. The current inventory buildup has not been especially large. Indeed, it appears about the same or perhaps even a bit smaller than the 1968 experience. The somewhat smaller inventory buildup, the weak demand by capital goods and commercial building industries, and the only moderate demand by car makers have helped keep production levels down below their 1968 record. In the first five months of 1968, raw steel ingot production averaged 12.3 million tons a month, compared with 12.0 million tons in the same period this year.

The big drop in new orders for durable goods in April underscored the hesitant nature of the recovery in the industrial sector. In that month, total orders fell \$1.2 billion, with volume for transportation equipment plunging \$0.7 billion. A sharp drop in automobile orders

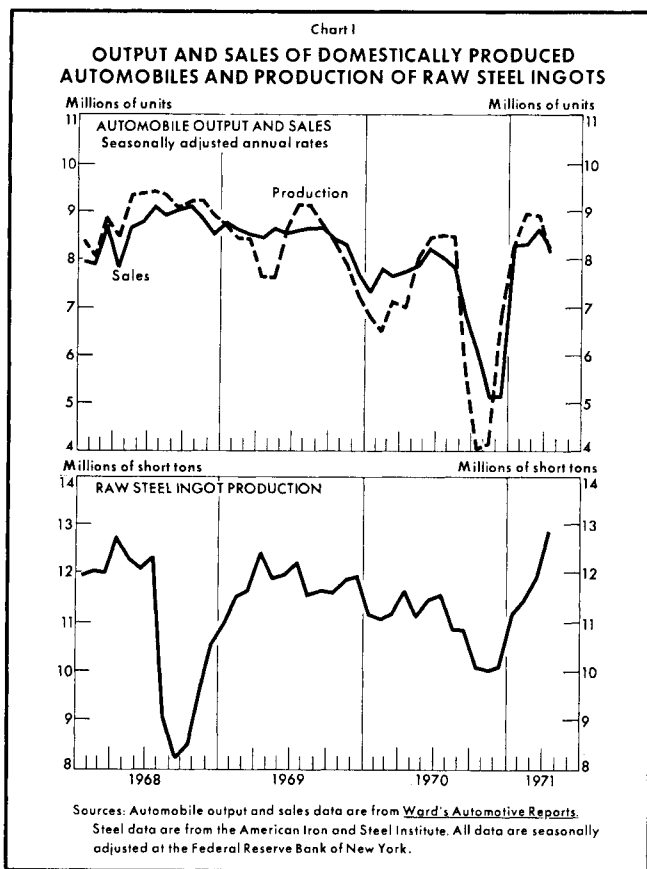
from an abnormally high March level and a decrease in aircraft orders were the major factors in this unusually large transportation equipment decline. Prior to the April performance, the overall orders series had been moving up strongly from its recent October low. Most of this strength was due to the auto recovery, although orders received by other manufacturers also rose.

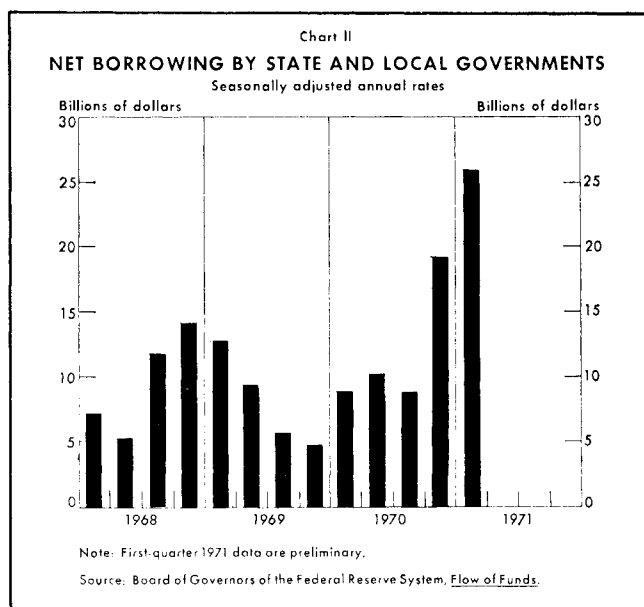
CONSTRUCTION

In contrast to the still somewhat mixed picture in the industrial sector, construction activity has picked up on a broad front. In the first four months of this year, outlays for new construction (seasonally adjusted) have run 11.8 percent above the 1970 average. Private residential housing has accounted for almost two thirds of this gain, but renewed strength in public construction—which includes such projects as roads, schools, and hospitals—also contributed to the overall advance.

The easing in financial conditions since mid-1970 has been a major factor behind the strength in both private residential and public construction. In the public sector, spending had been dampened by the postponement of many state and local bond issues in the past two years, when market interest rates soared to record levels. In many cases these levels exceeded the statutory limits on the rates these borrowers could pay. The subsequent declines in interest rates were accompanied by a phenomenal increase in capital market borrowing by state and local governments (see Chart II). Borrowing surged in the fourth quarter of last year and then climbed by another 35 percent in the first three months of this year. Indeed, state and municipal net borrowing in the credit markets in the first quarter of this year was two and one-half times the year-ago amount. This suggests that further gains in public construction spending are very likely.

The residential mortgage market has also improved markedly. Deposits at savings institutions rose strongly in the second half of 1970 and then in the first quarter jumped by an unprecedented 21 percent (see Chart III). During the same period, mortgage loans held by these institutions rose 8.9 percent. The relatively large spread between the rate of growth of deposits and the growth of mortgage lending reflects several considerations. Part of the huge flow of deposits has been used to rebuild liquidity positions and, in the case of member savings and loan associations, to repay previous borrowings from the Federal Home Loan Banks. In addition, a relatively large volume of the recent deposit flows has been used by mutual savings banks to make investments in high-grade corporate bonds. However, even allowing for these factors, the surge





in deposits at the thrift institutions has been large enough to provide ample funds for further increases in mortgage lending. Underscoring this fact, outstanding mortgage commitments at all savings and loan associations and at New York State mutual savings banks rose to a record total of \$12.5 billion in March. Indeed, for the first quarter as a whole, outstanding commitments averaged \$10.9 billion, up 16.7 percent from the fourth-quarter average. The vigorous tone in residential construction has also been evident in the recent performance of housing starts and, to a lesser extent, of building permits. In March and April, housing starts ran at a seasonally adjusted annual rate of over 1.9 million units, compared with a 1970 total of less than 1.5 million units. Moreover, during these same two months, the volume of building permits issued by local authorities averaged more than 20 percent above the 1970 average.

BUSINESS INVENTORIES AND SALES

Businesses have continued to accumulate inventories at a modest pace and that, together with the recent strengthening in sales activity, has generated a marked improvement in inventory-sales ratios. The lower level of these ratios at the end of the first quarter has possibly paved the way for a more expansionary pace of inventory spending if sales continue to advance. Inventory accumulation, as reported in the gross national product (GNP) accounts,

fell from the relatively moderate seasonally adjusted annual rate of \$5.5 billion in the third quarter of 1970 to \$3.6 billion in the fourth quarter and to \$1.4 billion in the first three months of this year.¹ The first-quarter figure was inflated by the rebuilding of strike-depleted stocks in the auto industry and by strike-hedging gains in steel inventories. Excluding these special factors, inventory accumulation was negative. In April, the book value of inventory spending by manufacturers (the only April component now available) recorded a small increase following two months of decline.

The broad-based improvement in inventory-sales ratios has resulted from a better sales picture as well as from the reduced rate of inventory accumulation. In manufacturing, shipments advanced by a monthly average of \$650 million in the first four months of the year. Excluding shipments of the recovering automotive industry, sales were still up strongly. At retail, there are some indications of a revival in consumer demand. Following the lackluster performance of 1970 that continued into the first two months of this year, sales at retail outlets recorded a big—and broadly based—jump in March, and then advanced further in April.

PERSONAL INCOME AND EMPLOYMENT

A number of special factors have buoyed personal income in recent months. Excluding these factors, however, growth of personal income has been on the weak side. During the first quarter, the strike recovery and the Federal pay raise helped to lift the average monthly income advances to a \$6.4 billion rate, almost twice the 1970 average increase. However, in April, personal income rose only \$4.5 billion despite a \$1.2 billion rise in transfer payments.

Wage and salary disbursements have been held down by the weakness in the labor markets in the last year or so. As is typical in a downturn, employment in the manufacturing sector has been most affected, and has generally been declining since the summer of 1969. In May the total number of persons on the payroll in manufacturing

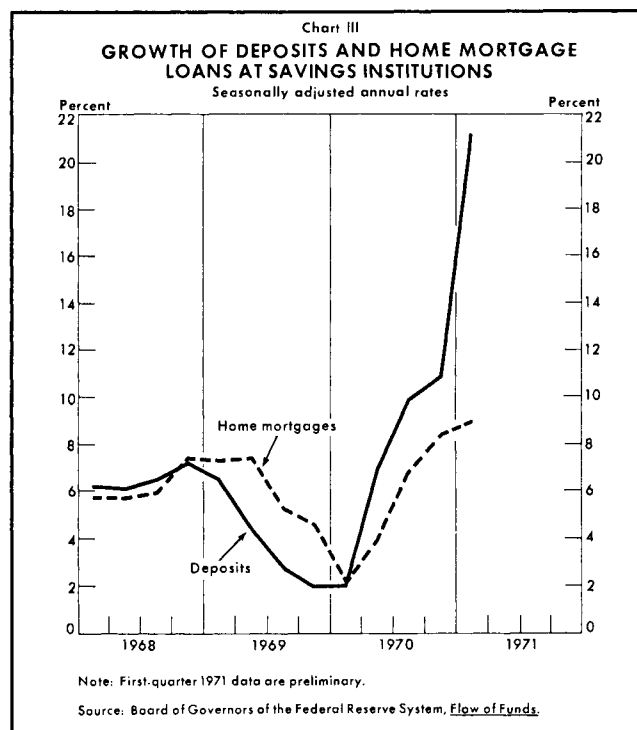
¹ In its revised estimate of first-quarter GNP, the Department of Commerce reduced its estimate of inventory spending by \$1.0 billion to \$1.4 billion. Personal consumption expenditures were revised up by \$1.7 billion. Other components were little changed but, when combined, added another \$1.6 billion. Total GNP was thus revised up by \$2.3 billion to a seasonally adjusted annual rate of \$1,020.7 billion. On a real basis, however, GNP was revised up by only \$1.1 billion to \$732.7 billion. The implicit price deflator is now estimated to have risen by 5.6 percent in the first quarter rather than the 5.2 percent originally estimated

was 1.6 million below the September 1969 peak. Throughout the recession there has been some growth of jobs outside manufacturing, but this has not been large enough to offset the declines in factory payrolls. Thus, total employment is still below its March 1970 peak.

According to the employment series based on a survey of households rather than firms, the unemployment rate rose to 6.2 percent in May, after averaging 5.9 percent in both the final quarter of 1970 and the first three months of 1971. The rise in the unemployment rate was entirely due to a surge in labor force growth in April and May, as employment increases in those two months were relatively good. While civilian labor force growth in the past two months has been strong, the increase over the first five months of 1971 as a whole ran at a moderate 1.6 percent seasonally adjusted annual rate. The rise in the civilian labor force over that period did not exceed employment increases by a wide margin, and the relatively narrow gap between the two prevented the unemployment rate from rising substantially further than it did. During a recession, there is typically a decline in labor force participation rates, which tends to dampen labor force growth. The civilian work force probably would have risen even more slowly this year but for the reductions in armed forces personnel. Military cutbacks also boosted civilian labor force growth in 1969 and 1970. During those two years the civilian labor force grew by a rapid 2½ percent per annum. The number of persons on active military duty in the armed services had peaked at 3.5 million in June 1969, fell to 3.1 million by June 1970, and is estimated to be 2.7 million in June of this year. Based on the Federal budget estimates for fiscal 1972, armed forces personnel on active duty will number 2.5 million in June of next year.

RECENT PRICE DEVELOPMENTS

The rate of increase of the overall consumer price index slowed in the December-April period to a seasonally adjusted annual rate of 2.9 percent, compared with a 5.5 percent rise for all of 1970. All of this slowing resulted from an improvement in nonfood commodity prices and mortgage interest rates. Elsewhere prices have continued to rise sharply, particularly in the food component where the advance in the first four months of the year amounted to a seasonally adjusted annual rate of 7.0 percent. The recent behavior of consumer nonfood commodity prices has been encouraging. These prices have risen at a seasonally adjusted annual rate of 1.3 percent so far this year, down sharply from last year's advance of almost 5 percent. In terms of slowing the overall index, the fall in home-



mortgage interest rates this year was even more important than the easing in the rate of increase of nonfood commodity prices. Excluding this decline in mortgage rates, the overall price index has shown some improvement over last year's performance, but the moderation is not nearly so dramatic as it might otherwise appear.

The recent slower rates of consumer price increases have been cited as evidence of some dampening of inflationary trends. However, the wholesale price situation has remained wholly unsatisfactory and, until there is a clear moderation in the trend of these basic prices, the conclusion that an overall slowing has begun would seem premature. For the first five months of this year, increases in a broad spectrum of industrial goods—such as steel, copper, coal, and lumber—have kept industrial wholesale prices rising at a seasonally adjusted annual rate of 4.0 percent. This rate is even higher than the 3.6 percent increase recorded for all of 1970. Moreover, the stability of agricultural prices which characterized 1970 appears to be over. The wholesale price index for farm products, processed food, and feed rose at a seasonally adjusted annual rate of 7.4 percent over the five months ended in May of this year, compared with a decline of 1.1 percent last year.

The Money and Bond Markets in May

Interest rates continued to climb sharply through the middle of May amid uncertainties that were magnified by the international currency crisis and resultant apprehensions over its possible implications for domestic monetary policy. Another source of concern was the rapid growth in the popular measures of the money supply in recent months, which aroused fears that money market conditions might be tightened sharply further to reduce the rate of increase in those aggregates. (Little attention was paid to the relatively slower growth of a more comprehensive aggregate of member bank liabilities—the adjusted bank credit proxy.) In addition, the continuing large supply of corporate and municipal issues contributed to the heavy tone of the securities markets.

Market sentiment brightened notably on May 19, however, when Chairman Burns of the Board of Governors of the Federal Reserve System, in testimony before the Senate Committee on Banking, Housing, and Urban Affairs, averred that he saw no real conflict between the nation's domestic and balance-of-payments objectives. Enumerating several proposals for improving the international position of the dollar, Chairman Burns added: "The frequently suggested prescription of raising interest rates would not meet our lasting needs at home or abroad." Following this reassurance, the credit markets experienced their first sustained recovery in two months.

At the peaks reached shortly after midmonth, yields on both long- and short-term securities were at their highest levels in recent months. (These yields were still, however, well below the record highs set in 1969-70 when, for example, the effective rate on Federal funds was often between 9½ percent and 10 percent, a corporate bond rated Aaa was priced to yield 9.30 percent, and the average issuing rate on three-month Treasury bills climbed to 8.1 percent.) In the subsequent rally, Treasury coupon issues recovered substantially, closing the month at yields only slightly above those prevailing at the start of the month (see Chart I). Yields on municipal and corporate bonds closed about ¼ to ¼ percentage point higher, and most short-term rates were ¼ to ½ percentage point higher on balance over the month.

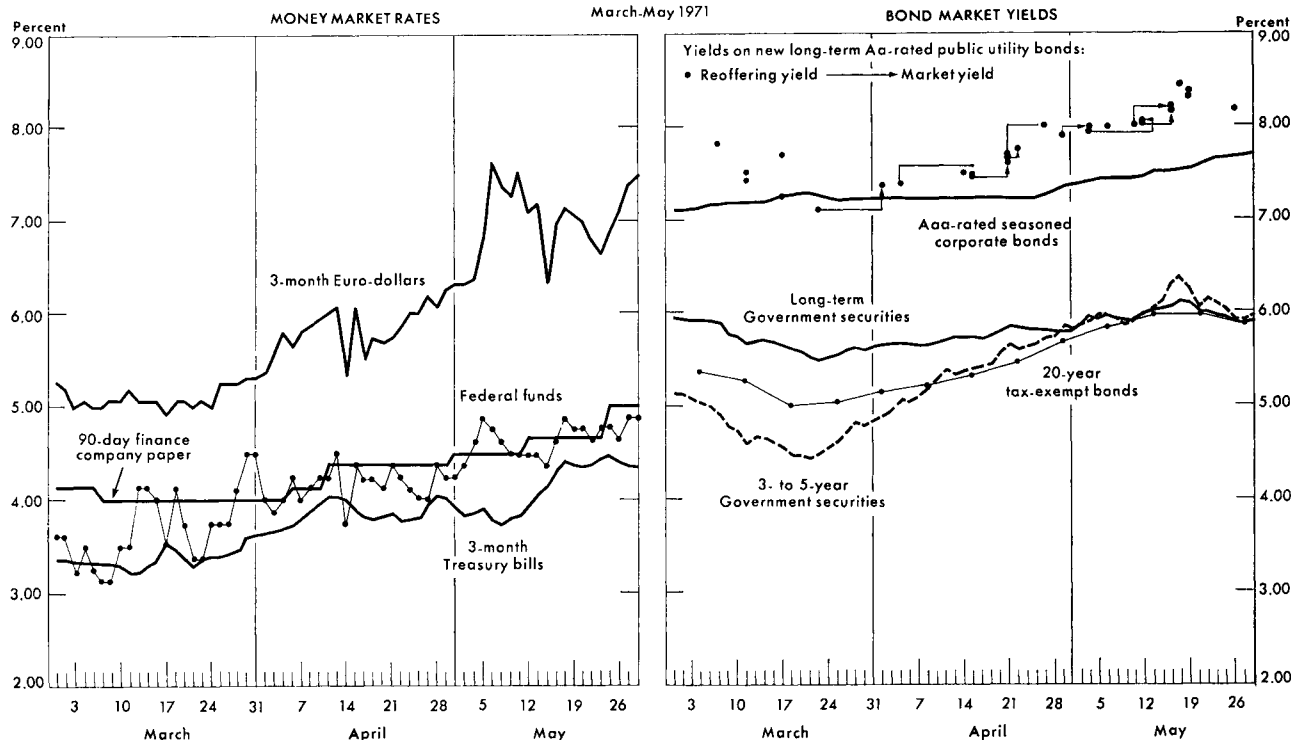
THE MONEY MARKET

Short-term interest rates continued to rise over the first two thirds of May. Then rates generally stabilized and some edged lower. Over the month as a whole, the effective rate on Federal funds averaged 4.63 percent, up 47 basis points from the previous month and the highest monthly average since December 1970. Most other short-term rates climbed back to levels last seen in mid-January 1971. For example, the prevailing rate on ninety-day directly placed finance company paper was raised ½ percentage point to 5 percent. Dealers' offering rates on prime ninety-day bankers' acceptances and four- to six-month commercial paper were increased ¼ percentage point to 5 percent and 5¼ percent, respectively. Major New York City banks raised their offering rates on ninety-day negotiable certificates of deposit (CD's) by ½ to ⅝ percentage point to about 5 to 5⅜ percent, also the highest level since mid-January.

The major commercial banks that had resisted the move during April increased their prime lending rate to 5½ percent from 5¼ percent in response to the continued rise in money market rates and to at least a temporary improvement in loan demand. Among member banks as a whole, excess reserves increased by \$67 million and borrowings from the Federal Reserve Banks by \$61 million to \$221 million and \$213 million, respectively, on average during the four weeks ended May 26 (see Table I). Therefore, for the second consecutive month there was a slight net free reserve position, which averaged \$ million during the four statement weeks in May.

The popular measures of the money supply again rose sharply in May. Over the first five months of 1971, both M_1 and M_2 grew at annual rates about double those achieved during all of 1970. M_1 —currency plus demand deposits held by the public—increased at an annual rate of nearly 11 percent from December 1970 to May 1971 (see Chart II), compared with 5.4 percent during 1970. M_2 —defined as M_1 plus commercial bank savings and time deposits other than large CD's—expanded at an annual rate of over 16 percent during the first five months

Chart I
SELECTED INTEREST RATES
March-May 1971



Note: Data are shown for business days only.

MONEY MARKET RATES QUOTED: Bid rates for three-month Euro-dollars in London; offering rates for directly placed finance company paper; the effective rate on Federal funds (the rate most representative of the transactions executed); closing bid rates (quoted in terms of rate of discount) on newest outstanding three-month Treasury bills.

BOND MARKET YIELDS QUOTED: Yields on new Aa-rated public utility bonds (arrows point from underwriting syndicate reoffering yield on a given issue to market yield on the same issue immediately after it has been released from syndicate restrictions);

daily averages of yields on seasoned Aaa-rated corporate bonds; daily averages of yields on long-term Government securities (bonds due or callable in ten years or more) and on Government securities due in three to five years, computed on the basis of closing bid prices; Thursday averages of yields on twenty seasoned twenty-year tax-exempt bonds (carrying Moody's ratings of Aaa, Aa, A, and Baa).

Sources: Federal Reserve Bank of New York, Board of Governors of the Federal Reserve System, Moody's Investors Service, and The Weekly Bond Buyer.

971, compared with 8.2 percent in 1970.

In contrast to these monetary aggregates, the growth of the adjusted bank credit proxy—member bank deposits subject to reserve requirements and certain nondeposit liabilities—slowed to about a 9 percent annual rate in the first five months of 1971 from 12.9 percent in the second half of last year. Over the entire year 1970 the proxy had grown by 8.3 percent. The slower growth in the adjusted bank credit proxy in relation to M_1 and M_2 in recent months reflects outright reductions in nondeposit liabilities and a marked slowdown in the rate of growth of CD's. Banks were reluctant to bid aggressively for these relatively high cost funds during much of this period in view of weak business loan demand and increasing uncertainties regarding the course of securities prices. In May,

however, there were indications that some banks were beginning to step up their bidding for CD's. Liabilities of weekly reporting banks to their foreign branches declined by \$6.0 billion during the first five months of 1971, and bank-related commercial paper leveled off (see Chart III). CD's peaked at \$28.4 billion on March 17 and then declined to \$27.2 billion at the close of April. By May 26, they had risen again to \$28.0 billion, a gain of \$1.9 billion on balance since the beginning of the year.

THE GOVERNMENT SECURITIES MARKET

Yields on United States Government securities rose during May in the midst of investor uncertainty concerning the outcome of renewed pressure on the dollar

Table 1
FACTORS TENDING TO INCREASE OR DECREASE
MEMBER BANK RESERVES, MAY 1971

In millions of dollars; (+) denotes increase
 (—) decrease in excess reserves

Factors	Changes in daily averages— week ended				Net changes
	May 5	May 12	May 19	May 26	
"Market" factors					
Member bank required reserves	— 306	+ 561	— 416	+ 197	+ 36
Operating transactions (subtotal)	— 182	— 1,008	— 16	+ 7	— 1,199
Federal Reserve float	— 498	— 212	+ 426	— 187	— 471
Treasury operations*	+ 307	— 248	+ 83	+ 218	+ 360
Gold and foreign account	— 14	— 184	— 224	— 25	— 447
Currency outside banks	+ 129	— 351	— 446	+ 58	— 610
Other Federal Reserve liabilities and capital	— 106	— 12	+ 143	— 57	— 32
Total "market" factors	— 488	— 447	— 432	+ 204	— 1,163
Direct Federal Reserve credit transactions					
Open market operations (subtotal)	+ 773	+ 276	+ 296	+ 154	+ 1,499
Outright holdings:					
Treasury securities	+ 384	+ 173	+ 471	+ 312	+ 1,340
Bankers' acceptances	+ 2	+ 4	+ 1	+ 1	+ 8
Repurchase agreements:					
Treasury securities	+ 328	+ 99	— 167	— 168	+ 92
Bankers' acceptances	+ 9	+ 6	— 5	+ 15	+ 25
Federal agency obligations	+ 50	— 6	— 4	— 6	+ 34
Member bank borrowings	— 2	— 75	+ 209	— 39	+ 93
Other Federal Reserve assets†	+ 34	+ 111	— 188	— 258	— 301
Total	+ 805	+ 312	+ 317	— 144	+ 1,290
Excess reserves	+ 317	— 135	— 115	+ 60	+ 127

	Daily average levels				Monthly averages
Member bank:					
Total reserves, including vault cash	30,780	30,084	30,385	30,248	30,374‡
Required reserves	30,415	29,854	30,270	30,073	30,153‡
Excess reserves	365	230	115	175	221‡
Borrowings	174	99	308	269	213‡
Free, or net borrowed (—), reserves	191	131	— 193	— 94	9‡
Nonborrowed reserves	30,606	29,985	30,077	29,979	30,162‡
Net carry-over, excess or deficit (—)§.....	— 1	187	142	65	98‡

Note: Because of rounding, figures do not necessarily add to totals.

* Includes changes in Treasury currency and cash.

† Includes assets denominated in foreign currencies.

‡ Average for four weeks ended May 26.

§ Not reflected in data above.

in foreign exchange markets. Treasury coupon issues experienced an almost steady price erosion over the first two thirds of the month, reflecting concern about the outlook for monetary policy and escalating yields in other debt markets. In contrast, rates on Treasury bills initially declined

amid the uncertainty surrounding foreign exchange relationships because of demand from foreign central banks, which were acquiring dollars, and from others who welcomed such short-term investments as a relative haven during a period of turmoil. The improvement was not sustained, however, and the bill market also came under pressure as this foreign demand subsided and participants became more convinced that higher interest rates were probable in the near term. Discussions in the press about a possible further increase in the commercial bank prime rate added to this conviction.

Participants in both the bill and coupon markets derived encouragement from the statement of Chairman Burns on May 19 in which he proposed methods other than additional increases in domestic interest rates to strengthen the dollar internationally. Bill rates stabilized, and the Treasury coupon market rallied substantially for the first time since the middle of March.

The Treasury conducted its quarterly refinancing in early May at a time when participants in the securities markets were growing increasingly apprehensive about the outlook for interest rates. As the refunding progressed, the massive speculation against the dollar in the foreign exchange markets aggravated market anxieties. In this environment, prices fell in reaction to sizable selling pressure and a lack of demand for the securities offered in the refinancing. Some demand developed at the lower prices, however, and news of the rise in the unemployment rate prompted some reappraisal of expectations of higher interest rates. Moreover, the results of the refinancing, announced on May 7, while not generally favorable, were nevertheless better than some participants had expected. The public exchanged for the new notes \$4.1 billion of its \$5.9 billion holdings of the maturing issues, leaving \$1.8 billion to be redeemed for cash. This represented a 30.7 percent rate of attrition which was not exceptional considering the circumstances. The improved tone of the market was short-lived, however and prices declined sharply until May 19 amid renewed anxieties over the course of interest rates.

The market recovered substantially in the wake of Chairman Burns's remarks and, over the remainder of the month prices recouped a large part of the losses sustained earlier in May. On average, yields on both intermediate- and long term Treasury securities closed about 16 basis point higher for the month.

Dealer positions in Treasury bills were small at the start of May, and bidding in the first weekly auction was fairly aggressive in anticipation of sizable demand from foreign central banks and from investors temporarily wary of the longer term markets. Demand was evident

throughout the first week, and rates on most Treasury bills declined by 4 to 15 basis points between the end of April and May 7. A cautious undertone developed in the following week, when participants became increasingly concerned about international monetary problems subsequent to the floating of the German and Dutch currencies relative to the dollar. Moreover, the reinvestment demand from the maturing Treasury issues which were not exchanged for new notes was less than had been expected, and bill rates began to rise at a fairly steady pace.

On Friday evening, May 14, the Treasury announced that a \$1.6 billion strip of bills would be auctioned on May 19, consisting of additions to eight weekly issues maturing between June 24 and August 12. This meant that, over the two remaining weeks of May, five bill auctions would be held and, with the prospect of such a concentrated supply, bill rates rose sharply on Monday, May 17. The average issuing rates on new three- and six-month bills in the weekly auction were up by 49 and 35 basis points, respectively (see Table II). Rates on outstanding issues adjusted higher after that auction,

Table II
AVERAGE ISSUING RATES*
AT REGULAR TREASURY BILL AUCTIONS

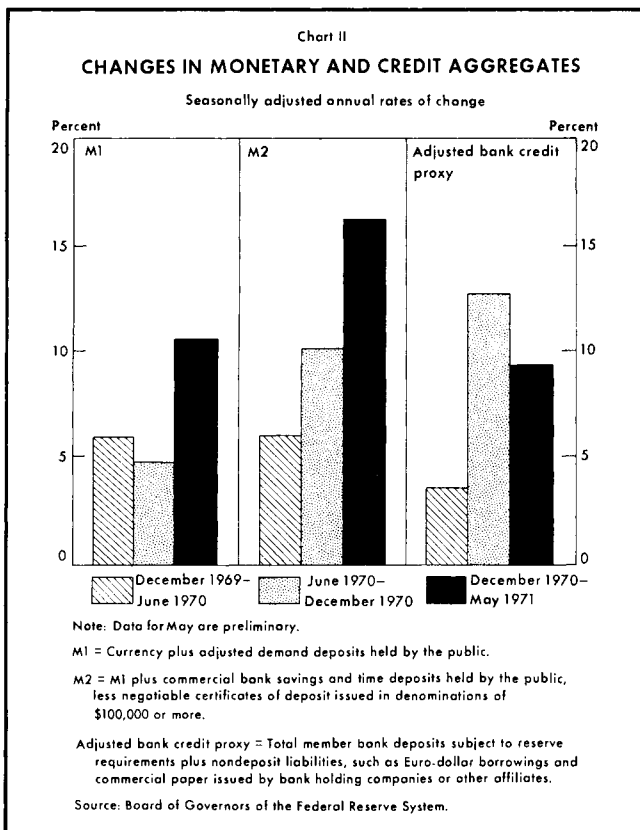
Maturities	In percent				
	Weekly auction dates—May 1971				
	May 3	May 10	May 17	May 24	May 28
Three-month	3.865	3.861	4.352	4.478	4.314
Six-month	4.182	4.178	4.530	4.578	4.508
	Monthly auction dates—March-May 1971				
	March 25	April 27	May 27		
Nine-month	3.507	4.402	4.688		
One year	3.586	4.422	4.790		

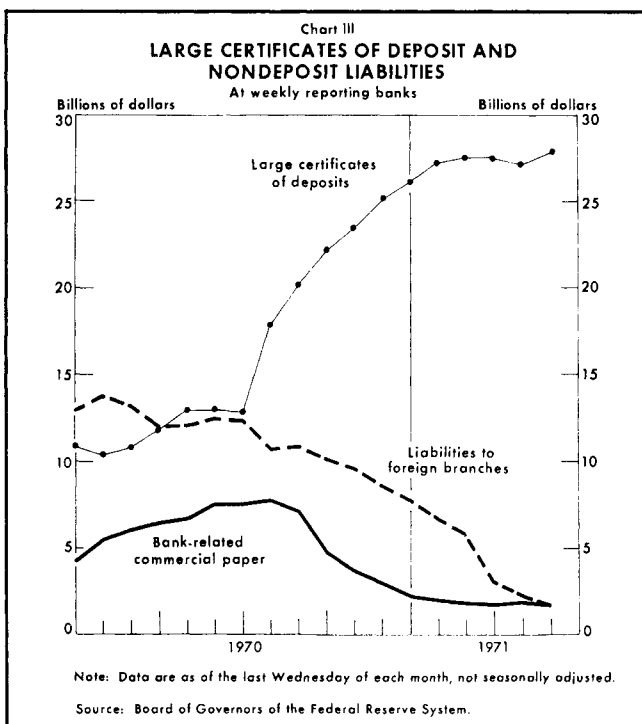
* Interest rates on bills are quoted in terms of a 360-day year, with the discounts from par as the return on the face amount of the bills payable at maturity. Bond yield equivalents, related to the amount actually invested, would be slightly higher.

and a cautious tone was evident as the \$1.6 billion strip auction approached. The atmosphere improved after mid-month, but rate declines were modest in the face of the concentration of auctions. During the month, rates on bills of longer than three months' maturity rose by 16 to 38 basis points, while shorter bill rates generally increased by 37 to 47 basis points.

OTHER SECURITIES MARKETS

Prices of corporate and municipal bonds continued to fall during most of May, largely in response to a further heavy supply of new issues, considerable investor caution brought on by uncertainty concerning the international monetary situation, and the resultant sizable buildup of inventories in the hands of dealers. Several scheduled offerings were temporarily postponed because of unfavorable market conditions, but nonetheless an estimated \$4.3 billion of new corporate and municipal issues was marketed during May. This was some \$0.7 billion higher than the monthly average raised in the peak year of 1970. As a result, yields climbed back to the highest levels since late 1970 before a measure of stability was restored following Chairman Burns's reassurances. *The Weekly Bond Buyer's* index of yields on municipal bonds rose from 5.69 percent on April 29 to 5.96 percent on May 13, where it remained for two weeks before declining to 5.86 percent on May 27. Yields on major new Aa-rated corporate utility bonds rose from 7.95 percent early in May to 8.35





percent on May 19, and then fell to 8.18 percent on May 26.

The pattern of investor selectivity that characterized the month was first evidenced early in the period. On May 4, two major issues were marketed, both of which had been postponed from the preceding week. These were a \$200 million A-rated offering of General Motors Acceptance Corporation debentures, priced to yield 8.10 percent, which was an immediate sellout, and a \$50 million issue of Aa-rated utility bonds which got only a fair reception despite the fact that its yield of 7.95 percent was the highest on such an issue since early December. The response was lukewarm, in part because some investors were waiting to hear the terms on a comparably rated offering of Boston Edison bonds scheduled for two days later. That offering was priced to yield 8 percent and, because of the higher return as well as the fact that bonds from this company had until recently been rated Aaa, the Boston Edison issue was quickly sold to investors.

Following the weekend announcement that the German mark and Dutch guilder were going to float in relation to the dollar while the Austrian and Swiss currencies were being revalued, the corporate bond market weakened somewhat early in the week of May 10, as participants

pondered the possible effects of these developments upon domestic monetary policy and interest rates. In this atmosphere, the Boston Edison bonds moved to a discount in the resale market, and a new issue of \$110 million Aa-rated telephone company debentures, yielding no more than the original return on the Boston Edison bonds, was only about 40 percent sold on its first day. Benefiting from this experience, underwriters increased the yield somewhat on the next similarly rated new issue, and investors responded warmly. At the same time, several bond sales were postponed because of market conditions, and a number of recently marketed issues were freed from price restriction with a resultant increase in return of 8 to 20 basis points.

Prices on corporate bonds dropped sharply at mid-month in response to widespread discussion of an imminent prime rate increase at commercial banks, and yields on issues from disbanded syndicates rose by 16 to 25 basis points. On May 19, two Aa-rated utility issues were reoffered at yields of 8.32 percent and 8.35 percent, respectively, the highest such yields since November 1970. Both issues sold out following Chairman Burns's testimony, when the market began to recover, and the month's final offering of comparable securities was successfully retailed on May 26 at a yield of 8.18 percent.

In the market for tax-exempt securities, the Department of Housing and Urban Development (HUD) announced at the end of April that it would postpone close to one half of an auction of \$357 million of local public housing authority bonds scheduled to be offered in May. While this decision provided some respite, the visible supply of new tax-exempt securities remained quite heavy and prices trended further downward as the month began. On May 4, HUD sold \$342 million of short-term notes to finance urban renewal projects at an average interest cost of almost 3.14 percent—an increase of 57 basis points from its previous sale of such notes on April 13. That same day, prices on the unsold portion of some Aa-rated Austin, Texas, serial bonds were reduced enough to raise yields as much as 50 basis points above the original return. Two attractively priced new issues met with favorable investor reaction at the close of the first week in May, but the tone of the market became somewhat weaker after the European currency changes. As a result, several outstanding bonds were marked down in price, and the yields to be placed on new offerings were adjusted higher. Investors were not overly receptive, however, and some \$43 million of a \$100 million issue of Connecticut's Aaa-rated bonds went unsold when marketed on May 11 even though they provided yields that were about 15 basis points higher than those on Aa-rated bonds sold a week earlier.

Slackened demand on the part of commercial banks continued to concern market participants, and several new issues which elicited strong interest from insurance companies for the longer term bonds ran into difficulty in the shorter maturities which banks typically purchase. Thus, for example, a \$156 million issue of New York State Housing Finance Agency bonds had an unsold balance of \$30 million at the close on May 12, its offering date, and it was reportedly the shorter maturities which lacked retail demand.

There were several voluntary and involuntary post-

ponements of tax-exempt offerings as the month progressed, but the calendar remained heavy, nonetheless, and prices deteriorated further. As was the case in the other securities markets, an improved atmosphere emerged during the last part of May, and investors were quite receptive to the two largest new issues retailed at that time. These were a \$75 million Aaa-rated state of Ohio offering on May 20 and a \$100 million Aa-rated Commonwealth of Pennsylvania bond flotation on May 26. Both issues were attractively priced and sold out completely soon after they were offered.

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Pollution and Environmental Control

By JOSEPH SCHERER*

Pollution of the earth's environment (air, land, and water)—and indeed pollution of man himself—is not new. But the magnitude and intensity of the problems have become so much greater in recent years that they have blossomed into major political issues at the local, state, and national levels. The problems have also generated conflicts penetrating all segments of the economic system. Some students believe that we are rapidly approaching the point of no return, when damage to the environment could become so serious that a marked deterioration in the quality of life could occur, ushering in further deterioration at a rapidly accelerating pace.

The economics of environmental control is rooted mainly in the problem area generally described as the dichotomy between social costs and individual costs. The fundamental economic considerations of this problem area, described later, are relatively straightforward, but the practical solution to specific cases can be quite complex. Moreover, attempts to cope with problems associated with environmental control frequently challenge cherished beliefs held by some to be fundamental to the American way of life. While everyone is in favor of improving the quality of life, the consensus becomes fragmented when specific paths to the goal are proposed. Fortunately, despite all the apparent confusion and conflict, there seems to be some progress by individuals, private groups, business firms, and governments toward reducing the damage being wrought to the environment. Whether the actions taken will be timely enough and substantial enough to cope adequately with the situation is still open to question.

Almost any threat to the environment can be traced back to the way in which goods and services are produced

and used. As so aptly put by Pogo: "We have met the enemy, and he is us." It cannot be overemphasized that the key to the control of pollution involves changes in behavior, ultimately based on changes in the values held by individuals. Behavior may be modified by use of the carrot (subsidies), by the stick (taxation), by the legal system in its full range from proscriptions enforced by fines and prison terms to licensing and regulation, and finally by self-imposed rules of conduct initiated through a change in values. In the long run, some observers forecast that "the chief product of the future society is destined to be not food, not things, but the quality of the society itself. High on the list of what we mean by quality stands the question of how we deal with the material world, related as that is to how we deal with one another."¹

At the present time, efforts to deal with pollution problems place heavy emphasis on governmental action (Federal, state, or local and, in some cases, international agreements) in the form of new "rules of the game" primarily for production and waste disposal. The agent for implementing these new arrangements often will be some governmental agency itself; when standards are set, however, action necessary to meet the standard is likely to fall at the door of the private sector; for some pollution problems, there may be a partnership of different levels of government, together with the private sector.

One of the major uncertainties is how much pollution-control efforts will cost the government (Federal, state, and local) and the private sector (business firms and consumers). As noted in the section on the costs of pollution control, it has been estimated that about \$4 billion per year will be required for new investment and operating expenses in the area of water pollution. While

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¹ Max Ways, "How to Think About the Environment", *Fortune* (February 1970), page 166.

estimates for coping with other forms of pollution (air, solid wastes, noise, pesticides, and radiation) are much less firmly grounded than those for water pollution control, it is not uncommon to find estimates for coping with all forms of pollution problems over the next five years in the range of \$50-70 billion. Of course, these estimates must be viewed as very tentative, since they cannot take into account the new sources of pollution that are being uncovered and the technologies for pollution abatement that are far from fully developed.

Environmental control efforts clearly will have a substantial impact on the product mix and on the standard economic indicators now used to measure the performance of the economy. As a first approximation, these efforts can be expected to make the standard economic indicators look as if the economy is not performing as well as it has in the past. Such apparently unfavorable consequences of environmental control efforts only point up the deficiencies of our current statistics, a problem discussed in the final section.

ANALYTICAL FRAMEWORK

In a free market economy, consumers and producers choose among goods (and services) on the basis of relative prices of the goods and their usefulness. Changes in relative prices, reflecting supply conditions and market demand for goods, serve as signals for producers to increase, maintain, or reduce output, and this promotes an efficient allocation of resources. However, an efficient allocation of the factors of production presupposes that the prices of goods include their full costs of production. In the case of goods produced under conditions giving rise to pollution problems, the market price typically does not reflect the full costs of production to the economy as a whole. Such goods are underpriced in the marketplace relative to other goods not producing pollution. In effect, some industries produce a joint product—a marketable product and a nonmarketable one, i.e., pollution. The pollution product not only has no market price but it is ordinarily bestowed as a “gift” on individuals or businesses other than those buying the marketable product.

The unsought gift of the pollution product is usually discussed in economics as the dichotomy between individual (i.e., private) and social costs.² Individual costs are

those that the firm cannot avoid incurring in producing its product; the social costs are those which are not borne by the producer. Industries giving rise to such dichotomies are those in which at some point in the production process wastes are discharged into the air or a stream. These wastes impose a cost on others, by polluting the air or water supply of persons further downstream or creating additional cleaning and health costs for residents in the neighborhood of the factory.

In the past, environmental damage tended to be local in character and individuals or firms might escape at some reasonable cost. Moreover, the amount of pollution was so small that the recuperative powers of nature could repair much, if not all, of the damage done to the environment. Today, there is a new dimension to the pollution problem; it has been transformed from a local and a regional to a national and even international problem, and in its more extreme forms nature no longer can cope with (neutralize) the volume of the pollutants. Thus, the pollution problem as now constituted ranges from the older form with a more or less local impact to the present form in which there appears to be no escape anywhere on earth.

ALTERNATIVE MECHANISMS FOR COPING WITH ENVIRONMENTAL PROBLEMS

One sign of the coming of age of the pollution problem as a major concern of the nation can be found in the 1971 annual report of the President's Council of Economic Advisers, which devotes nine pages to a review of the problems of safeguarding the environment. The report emphasizes that “a set of rules for the efficient use of air and water should not only permit no more fouling of air and water than we wish to tolerate, but it should also ensure that the tolerated degree of pollution occurs for the most productive reasons. The rules should also encourage the use of resources to limit the damage done by the pollution that is allowed.”³

The question is sometimes raised as to why industry does not voluntarily shoulder more of the burden of pollution control, why it is not more socially responsible. Although some firms have taken important steps involving substantial investment costs for pollution control, such efforts by individual companies are likely to fall short of adequately coping with the pollution problem. The reason for this has been stated forcefully by Professor Milton Friedman: “. . . there is one and only one social respon-

² The dichotomy between individual and social costs is important in the analysis of problems other than pollution. Economists generally use the term “externalities” to identify the underlying analytical characteristics shared by this group of problems.

³ *Economic Report of the President* (February 1971), page 115.

sibility of business—to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud”.⁴ The Friedman position then would place the burden on government to revise the rules of the game, as reflected in the changing public value systems, so that all firms in an industry and all industries would be required to reduce pollution products to tolerable levels.

Friedman's view, however, is being subjected to increasing challenge as too narrow by various groups within the nation, including businessmen. Clearly, attitudes about the appropriate role of corporate social responsibility are in a state of flux. The divergence in views probably would be reduced appreciably if government regulations transform much of what is now a question of corporate social responsibility into a question of corporate legal compliance. In addition, market forces reflecting consumer choices and investor decisions also will participate in determining how business adapts to the outer limits set by government.

Since damage to the environment arises from many different sources and takes many different forms, proposed methods of coping with the problems also vary. In general, the economic approach seeks to transform the social costs of production and marketing to individual (private) costs, so that the price of every marketable product will reflect its full costs of production to the economy. Some of the major suggestions for achieving this objective fall into the following categories.⁵

TAXATION OR IMPOSITION OF EFFLUENCE CHARGES. Firms or industries could be taxed according to the social costs they impose on society, assuming that the pollution damage caused by each firm or industry can be determined accurately. The tax might be levied in the form of an excise tax per unit of output or sales, or it could take the form of a charge on the amount and type of harmful effluence discharged by the firm into the air or waterway.

The goal would be a tax or effluence charge equal to the cost of the damage to the environment, so that the price of a product would reflect all of its costs of production. The higher price should decrease the amount of the prod-

uct demanded. The tax or effluence charge should serve also as an incentive to firms to find methods of production which would reduce pollution damage in an effort to minimize their tax or effluence charge. Thus, the proposed tax on lead in gasoline, even though it was not enacted, together with the standards established for automobile exhaust emissions, has spurred oil companies to speed the introduction of lead-free or low-lead gasoline.

The revenue from the tax or effluence charge could be used to construct facilities to reduce the damage to the environment by the particular industry or firm. In the Ruhr Valley, for example, effluence charges were successfully used to build facilities that upgraded the water quality of the river and that also served as an incentive for individual producers to modify their production methods to lower their charges. Regulation of charges and operation of joint facilities for the water supply in the Ruhr, which is both highly industrialized and heavily populated, is under the jurisdiction of seven large water resources cooperative associations.⁶

SETTING STANDARDS FOR WASTE DISPOSAL. Standards could be set for product performance and also for levels of harmful waste disposal (liquid, solid, or gaseous) which would reduce or eliminate the damage from the waste product. Acceptable levels could be established and a deadline for meeting these standards could be set. If a product could not meet the standard, then its production would be illegal. For example, the Federal Environmental Protection Agency (EPA) announced national air quality standards on April 30, 1971, covering six common classes of pollutants—sulfur oxides, particulate matter, carbon monoxide, photochemical oxidants, hydrocarbons, and nitrogen oxides. The agency indicated that drastic changes may be required in commuting habits and in industrial practices if the standards are to be realized by the deadline on July 1, 1975.

The setting of standards, without prescribing the precise device or machine to be used, would tend to promote individual initiative to find the least-cost solution for meeting the standard. On the other hand, there would appear to be no incentive to develop a device which reduces pollution below the levels of the standard. Of course, over

⁴ Milton Friedman, *Capitalism and Freedom* (Chicago: University of Chicago Press, 1962), page 133.

⁵ Since some Federal, state, and local governmental units also contribute substantially to pollution, many of the suggestions described in this article for coping with the pollution problem also can be applied to these units.

⁶ For further details on the Ruhr Valley water management operation, see Allen V. Kneese, "Water Quality Management by Regional Authorities in the Ruhr Area", in Marshall I. Goldman, *Controlling Pollution* (Englewood Cliffs, New Jersey: Prentice Hall, 1967), pages 109-29.

time, the standards could be changed as new knowledge is acquired.

SUBSIDIES. The introduction of pollution-control devices and techniques could be encouraged by subsidies from government to private firms and other governmental units. Subsidies may take a variety of forms: (1) direct payment of all or part of the cost of control devices or systems; (2) reduction of taxes via tax credit, accelerated amortization, reduced assessment, etc.; and (3) direct loans at preferential interest rates, guarantee of loans for special purposes, etc.

In general, if a subsidy is to be used, the direct payment, or use of the expenditure side of the budget (rather than the tax side of the budget), is preferable in facilitating evaluation of the cost of the subsidy and the benefits sought.

OTHER APPROACHES. A number of other approaches have been suggested to prevent continuing deterioration of the quality of the environment, some of which overlap the categories already mentioned. These include the recycling of wastes and the preservation of links to nature.

Recycling of wastes. The basic idea here is to view waste products as a resource or raw material. This not only decreases the drain on the still available supplies of raw materials but also may make pollution control profitable. For example, centers for recycling newspapers, cans, and glass bottles have already been established in many urban and suburban areas by civic or governmental units and by private companies or trade associations. In part, the pressure for developing technologies making recycling economically feasible can be attributed to attempts to avoid the costs imposed through legislation, as discussed above. A significant element, however, in the success of these ventures thus far has been the growing concern by individuals and business firms that such efforts are important and necessary.

Preservation of links to nature. It is necessary to set aside national parks, national forests, national seashores, national prairies, etc., and to maintain conditions for the survival of the animal and plant life that has evolved with man over millions of years, because each species or ecosystem may provide a clue to answer questions that man has not yet learned to ask.⁷ Man rather blithely introduces

changes in his life the full consequences of which he does not know and often can hardly guess. Repeatedly, he has proclaimed a miracle drug, pesticide, or other product to solve some problem, and for a time it appears that he has accomplished wonders. Later, as the miracle substances work their way through the intricate chain of interrelationships that exist on this planet, the miracle achievement no longer glows. The experience with the widespread use of DDT is an apt illustration of this process. There is the need to preserve the earth's unreproducible environmental treasures, and for each new miracle product that man produces there is the need to "go slow" and to subject it to more critical evaluation and testing.

The foregoing discussion of "solutions" for protecting and improving the quality of the environment has focused on economic answers appropriate to problems originating in the production of goods and services or the handling of waste products by the private sector and governments. However, there are a number of important threats to the quality of the environment, which stem from sources other than those usually discussed.

One of these environmental threats arises from the use of pesticides in agriculture and for the prevention of disease in the developing countries. The solutions listed above, nevertheless, are still appropriate in some combination to help cope with such problems. For example, pesticides causing less harmful environmental damage are available as substitutes for DDT even though they may be more costly; a combination of direct regulation (such as licensing the purposes for which DDT may be used) and subsidy programs to offset the higher cost of DDT substitutes might limit the damage attributable to the current widespread use of DDT.

Another threat to environmental quality emerges at the stage of final consumption, such as detergents with non-degradable components which are harmful to water supplies. The chemical composition of such products can be modified under direct regulation or licensing requirements. For example, local communities scattered throughout the nation recently have banned detergents containing phosphates.

All levels of government have begun to move more vigorously in the field of environmental protection. At the Federal level, two organizations established in 1970 divide the major responsibilities. The Council on Environmental Quality (CEQ) is concerned with broad policy questions, including the coordination of all environmental quality programs and the review of other Federal programs that affect the environment. Moreover, all Federal agencies are now required to file with the CEQ (and to make public)

⁷ This proposal is discussed in John G. Mitchell, "On the Spoor of the Slide Rule", *Ecotactics* (New York: Simon and Schuster, 1970), pages 23-35.

a statement giving in detail the environmental implications of all legislative proposals and of other major activities with a significant environmental impact. (Some of these reports have received wide publicity, e.g., the report by the Department of the Interior on the proposed construction of an oil pipeline in Alaska.) The other agency, the EPA, is primarily concerned with enforcement and was formed by gathering into one organization functions that had been scattered among several departments and independent agencies. As noted earlier, the EPA recently promulgated national air quality standards to be attained by 1975.

At the state and local levels, new environmental agencies have been established or existing agencies have been reshuffled and renamed, sometimes with added responsibilities. Last year, New York State consolidated many of its existing environmental programs into the Environmental Conservation Department and broadened its jurisdiction. In New York City, where environmental problems are particularly acute, a new superagency—the Environmental Protection Administration—was established in 1968 by combining many of the programs of four formerly separate departments (sanitation, water supply, air pollution, and public works). While the new organization still renders the municipal services that the old departments had supplied, the environmental protection aspects now are given more stress than previously.

THE COSTS OF POLLUTION CONTROL

The costs of coping with pollution problems are going to be tremendous. Comprehensive estimates must be considered tentative, because we have barely scratched the surface of understanding the dimensions of the environmental problem. "Environmental pollution is not an incidental by-product. Rather, it is an intrinsic feature of the very technology developed to enhance productivity. This technology is so imbedded in the agricultural and industrial production processes that the required change would involve serious economic dislocations."⁸ The dilemma we face is how to enjoy the fruits of science and technology and at the same time safeguard the natural world we live in.

Any assessment of the question of the costs of pollution must keep in the forefront the fact that someone already is paying for the costs of pollution because pollution damage falls somewhere. At the present time, however, the dis-

tribution of this pollution cost is inequitable, since it is often "paid for" by persons or industries which are neither polluting nor buying and using the marketable products produced jointly with the pollution products. To a substantial degree, the costs also are imposed on future generations. The objective of transforming the social costs of production and marketing to individual costs is, in part, an attempt to put the costs where they truly belong. Shifting to a more equitable distribution of the costs of production clearly will involve some difficult transitional adjustments, especially for those industries—such as paper and copper mining—that generate a substantial amount of pollution products along with their marketable products. As noted previously, a successful attack on the pollution problem will require changes in the rules of the game via government regulation to insure that pollution problems are attacked on a sufficiently wide front to make a difference. Even though part of the pollution-control costs during the transition will be met by the general public through some form of government assistance, the adjustment will still require heavy investment spending by some segments of private industry and possibly higher prices for some marketable products. Since these costs may impair the profitability of an individual firm, it is not surprising that specific pollution-control proposals are not always embraced with enthusiasm by the firm or industry affected.

Although the cost aspects of coping with the pollution problem by industry are scarcely a topic giving rise to joy, there is a positive side to this cost picture. Products to reduce or eliminate pollution will constitute a new industry, generating employment and profits, not to mention the better quality of the environment that will benefit all. Moreover, a full-scale attack on pollution problems could actually minimize our eventual costs. In economic terms, while costs will rise substantially in the short run, they will be smaller in the long run if the attack on the pollution products is not postponed.

In the remainder of this section, cost estimates for different types of pollution will be summarized.⁹ These estimates are only rough approximations, as we know so little about the full ramifications of the problems and the technologies to deal with them. Cost estimates for specific pollution problems often span a wide range, since each analyst may build his estimates on different assumptions as to what is necessary, desirable, or possible.

⁸ Barry Commoner, "The Social Significance of Environmental Pollution", *Business Economics* (January 1970), page 70.

⁹ The cost and volume estimates presented in this section are based mainly on information contained in *Environmental Quality*, the first annual report of the Council on Environmental Quality, transmitted to the Congress in August 1970.

WATER POLLUTION. The problem of water pollution has received more attention over a longer period than other pollution problems. Estimates for coping with water pollution, therefore, are more solidly grounded, but even these are subject to considerable uncertainty. It has been estimated that industrial outlays for the control of water pollution in the period 1971-74 will run in the neighborhood of \$1.2 billion to \$1.4 billion per year, about half for new investment and the other half for operating charges. Municipal waste-treatment plants will require about \$2.0 billion of new investment per year and an additional \$500-700 million for operating expenses. (Estimates are not available on how much investment will be needed for additional collection and treatment facilities.) Thus, the annual costs for both industrial and municipal outlays total an estimated \$4 billion.¹⁰

AIR POLLUTION. Only the more obvious forms of air pollution have been identified thus far. Consequently, little is known about the full costs of air pollution abatement except the rather safe guess that they probably amount to many billions of dollars. At the present time, the most important sources of industrial and municipal air pollution arise from particulate matter, sulfur oxides, hydrocarbons, and carbon monoxide. For these four types of pollutants, it is estimated that an investment of about \$2.6 billion will be needed in one hundred metropolitan areas of the United States through 1975. Operations, maintenance, depreciation, and interest will cost another \$1.9 billion.

SOLID WASTE. In 1969, residential, commercial, and institutional solid wastes totaled 250 million tons, of which 60 million tons remained uncollected. An additional 110 million tons of solid waste (other than mineral solid waste) was generated by industry in the same year. Firmly based cost estimates for handling the ever-growing

mountain of solid waste are virtually nonexistent.

The disposal of solid wastes illustrates how different aspects of the pollution problem may be highly interrelated. Burning solid waste in dumps or incinerators (especially in inefficient incinerators) adds to the air pollution arising from other sources. Similarly, land disposal may contribute to contamination of groundwater used for drinking purposes, or may breed rats and other pests.

Unfortunately, the technology of solid-waste collection and disposal has lagged far behind the capacity of the American economy to produce the waste products. The technological improvements that could ease the problem of solid-waste disposal would involve not only better methods of disposal but also methods of using the waste product in some form of recycling. For some basic minerals, recycling is now a major source of supply for new output; more than half of the lead production and almost half of the copper output comes from scrap. While recycling holds considerable promise for dealing with some forms of solid waste, other approaches will have to be devised for the sizable remainder not suitable for recycling.

OTHER POLLUTANTS. Several other forms of pollutants which do not fit neatly into any of the previous three categories have been growing in importance, such as noise, pesticides, and radiation. All of them have been present to some degree for a long time, but they have become a far more serious menace to man in recent years. The radiation danger, in particular, has tended to be underestimated because it is often thought to be confined to dangers from the nuclear bomb. In industrialized nations, however, there is increasing exposure to low-level (and cumulative) radiation from such sources as X-rays, radioactive materials used in research and industry, and electronic devices in the home, office, and industry. While these pollutants probably are exacting a heavy toll now, there are no firm estimates about the extent of the damage they inflict or the costs of reducing the pollution products.

Although it is not possible to calculate firm estimates of the costs which will be incurred to reduce pollution to a reasonable level, the preceding analysis provides some insight into the enormity of the problem. Clearly, if water pollution alone will require at least \$4 billion per year over the next five years, it is not difficult to understand why some students have suggested that costs may exceed \$70 billion in the next five years, if significant progress is to be realized in the abatement of pollution. As difficult as it is to estimate these costs, it is even more difficult to determine how these costs will be distributed between the

¹⁰ The difficulties and costs of dealing with water pollution as a domestic problem may prove relatively small, compared with the difficulties and costs of water pollution as an international problem. Jacques Yves Cousteau, the famed underwater explorer, has said: "People do not realize that all pollution ends up in the seas. The earth is less polluted. It is washed by the rain which carries everything into the oceans, where life has diminished by 40 percent in 20 years." (*Time*, September 28, 1970, page 64.) Coping with pollution in the oceans will require international agreements which are usually more difficult to achieve and implement than domestic legislation. Such difficulties may have tragic consequences for the developing countries with large populations suffering from malnutrition, because food from the oceans has been viewed as a prime resource for solving the food problems of these countries.

FEDERAL POLLUTION-CONTROL AND -ABATEMENT ACTIVITIES

In millions of dollars

Budget funding	Fiscal 1970 (actual)	Fiscal 1971 (estimate)	Fiscal 1972 (estimate)
Budget authority	1,432	1,828	3,127
Obligations	1,071	2,036	3,088
Outlays	751	1,176	2,014

Source: *Special Analyses (Budget of the United States Government)*, Fiscal Year 1972, page 219.

government and the private sector.

Since the Federal Government is a prime mover in the pollution-control field, it is interesting to note the level and growth of its commitment since fiscal 1970. Under budget procedures, the Congress grants an agency budget authority up to a certain amount; the agency then may enter into obligations to implement a program which in turn leads to actual spending immediately or at some future date. Budget projections for fiscal 1972 (see table) indicate spending almost three times greater than in fiscal 1970 for pollution-control and -abatement activities. More than half of the total spending is concentrated in the area of water pollution, more specifically in grants and loans to state and local governments for the construction of municipal waste-treatment facilities. For the other pollutants, the funds are mainly used for research on the effects of pollution, for technology, for the setting of standards, and for enforcement.¹¹

Regardless of the specific distribution of costs, there is no question that pollution-control efforts will have wide-ranging impacts on the output of the nation. We can expect noticeable changes in the product mix, accompanied by adjustments in price relationships among products. Some of the more important implications of this aspect of the pollution problem are sketched briefly in the next section for some of the more common economic indicators.

¹¹ Of course, direct spending by the Federal Government does not fully measure the extent of the Government's role in pollution abatement. Some legislation, such as the establishment of air quality or water standards, has far-reaching impacts with relatively minimal Governmental spending. In addition, as noted previously, subsidies may be provided to encourage private expenditures on pollution-control devices. In the Tax Reform Act of 1969, there is a provision to permit the rapid amortization (over a period of five years) of pollution-control devices. The costs to the Government of rapid amortization, or other types of tax subsidies, are not recorded in the budget.

IMPACT OF THE ENVIRONMENTAL CRISIS
ON ECONOMIC INDICATORS

The level of and changes in gross national product (GNP) are the most widely used indexes of how well the economy is performing. With some exceptions, GNP represents the dollar value of goods and services produced in a given period and moving through market channels. If it is to provide a reasonable measure of economic welfare, then the negative contribution of pollution products "produced" along with the marketable products should be subtracted from GNP as presently computed.¹² In short, to calculate "real" GNP, it is necessary not only to make a price adjustment for the inflation factor but also to correct for the social costs of production in each period. There is no question that such a correction would always operate to reduce the real level of GNP from that recorded in the national income statistics as they now stand.

Actually, some of the costs of the pollution product are in GNP as now calculated.¹³ Ironically, instead of making GNP smaller for any given period, as indicated above, these costs make GNP larger. In effect, GNP is a "grosser" concept than that suggested by the official explanation, where the gross aspect represents depreciation of plant and equipment. The additional "grossness" is in the inclusion of all the goods and services produced because of the disutilities arising from the pollution products, such as cleaning services and medical services which merely attempt to restore the previous level of well-being and would not have been needed in the absence of the pollution products. Estimates of health costs and pollution cleanup costs, reported in the previous section, are suggestive of the dollar magnitude by which current GNP estimates

¹² It should be emphasized that GNP was designed as a measure of output, not of welfare (used in the economist's sense of well-being, not in the social worker's sense of "relief"). Output and welfare, however, are very much interrelated, so that it is not surprising that GNP is frequently used as a proxy for welfare not only by the general public but also by economists. For a more extended discussion of this point and several others in the text of the article, see Edward F. Denison, "Welfare Measurement and the GNP", *Survey of Current Business* (January 1971), pages 13-16 and 39, and F. Thomas Juster, "On the Measurement of Economic and Social Performance", *50th Annual Report* (National Bureau of Economic Research, 1970), pages 8-24.

¹³ More technically, pollution-control activities generally are treated in three ways for the purposes of calculating current-dollar GNP. Some goods and services increase GNP, including devices treated as quality improvements in existing products; some increase the implicit price deflator and thereby are viewed as inflationary; and some are excluded from the GNP calculation, such as cleanup services by volunteers.

overstate how well the economy is doing in creating *net* new goods and services.¹⁴

As the drive to reduce pollution products gathers momentum, dollar expenditures for pollution-control devices and systems will rise. It would not be surprising if in the short run, defined in this context as the next five to ten years, pollution-control expenditures increase relatively faster than total output. It is not unreasonable to expect that the introduction of recycling devices, emission control devices, and better waste disposal will stretch out the production process, making it more expensive without necessarily enlarging output of the marketable product. It is also likely that legislation providing for effluence charges and standards for product performance (such as auto emission standards) will require more and better quality control efforts by industry, which again might affect adversely some economic series, such as output per man-hour and the index of industrial production.

More generally, steps taken to reduce pollution products can be expected to have far-ranging impacts on the statistical series typically used to judge the state of the

economy. These measures now are basically quantity oriented and take account of quality changes not at all or only very imperfectly. As suggested above, statistical series are likely to be adversely affected, as more and more resources are devoted to protect the environment. For example, output per man-hour may increase more slowly or perhaps not at all; capital investment may appear to be less productive than formerly; business profits may be adversely affected if the additional costs cannot be passed on; if the additional costs are passed on, the cost of living may rise at a rapid rate and yet not reflect any actual inflationary push. It is important to consider the other side of the coin as well. Failure to begin meeting the pollution-product challenge today is likely to affect output adversely and increase costs in the future.

In effect, bringing into the marketplace, and into the standard statistical series, costs that have previously been part of the social costs of production probably will give the standard economic series a rather bleak look for a time, because these series will be measuring a very different basket of goods and services than formerly. Although the figures will look worse, they will be painting a more realistic picture than is available now of how the economy is functioning. Therefore, if pollution-control efforts should expand significantly, new guideposts will be needed to interpret what the statistical series are telling us about the economy, since the new data really will not be comparable to data in use today.

¹⁴ Dr. Paul Kotin, Director of the National Institute of Environmental Health Sciences, has estimated that man's misuse of the environment is costing Americans \$35 billion a year through ill health and related losses alone (*The New York Times*, October 7, 1970, page 33).