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This Quarterly Review is published by the Research and Statistics Function of the Federal Reserve Bank of New York. A speech on the political economy of the dollar by the president of the bank, PAUL A. VOLCKER, begins on page 1. Among the members of the function who contributed to this issue are WILLIAM C. MELTON (on corporate equities and the national market system, page 13); KENNETH D. GARBADE and MONICA M. KAICHER (on exchange-traded options on common stock, page 26); LEONARD SAHLING (on the question of whether state and city corporate income taxes are stifling investment in New York, page 41); and ROBERT BRUSCA (on the United States export performance, page 49).

An interim report of Treasury and Federal Reserve foreign exchange operations for the period August through October 1978 begins on page 63.

The Fred Hirsch lecture
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The Political Economy of the Dollar*

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New York

In view of this occasion, I spent some time in recent weeks reading and rereading Fred Hirsch, and of course came away with a renewed feeling for the strength and breadth of his thinking. Surely few men have so successfully melded command of technical modern economics with insight into the political processes and social setting within which economic policy is framed.

In his last works, Fred battered at the doors of our professional insularities. To carry that work forward will require the effort of more than one man or one lifetime—certainly when that life was cut so short. As one who has practiced at the margin of economic analysis and the political processes for some years, I can only appreciate the privilege of initiating this lecture series in his honor.

For a good many years, the world of international monetary affairs was Fred's particular specialty. In an area where much commentary written only a few years ago seems stale and naive, his continue to stimulate.

Indeed, I was tempted to take as my text today one

of Fred Hirsch's last dicta: "A controlled disintegration in the world economy is a legitimate objective for the 1980's" The phrase captures what seems to me the prevailing attitudes and practices of most governments in this decade, as they struggle with two central issues that bedevil so much of our negotiations and our actions, not just with respect to money, but over the full range of international economics.

We live in a world in which individuals and businessmen, as never before, have the capacity and the incentives to buy and sell, invest and travel, where they want and when they want—and they want to do so unencumbered by national boundaries. At the same time, modern democracies, at least as much as other forms of government, long for autonomy; they want to control their own destinies in ways responsive to the needs of an electorate often concerned less with national than with local or sectorial interests. Yet, theory and experience indicate we can't have it both ways, full integration and full autonomy.

A compromise needs to be struck, and the way we strike that compromise seems to me conditioned and vastly complicated by needed adjustments to another set of circumstances. The United States no longer stands astride the world as a kind of economic colossus as it did in the 1940's, nor, quite obviously, is its currency any longer unchallenged. Now, other centers of strength and power have arisen in the indus-

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These remarks are in the nature of a personal reflection; they do not purport to reflect the official views of the Federal Reserve System or any United States administration.

trialized world, and they will need to share in the leadership. Developing countries have a new economic importance and political consciousness of their own.

A world of more widely dispersed power may have some advantages. But ease of achieving consistent and coherent leadership in the collective international interest is not among them. Intellectually, it is easy to recognize our interdependence. But in practice the instinct is to exert our independence.

Perhaps in the circumstances, the objective of "controlled disintegration"—modest as it may seem to be—is indeed a legitimate goal. Yet the phrase leaves me uneasy.

I start from the premise that the underlying pressures toward integration and interdependence are growing stronger, not weaker. We cannot reverse or stop the advancing technology that brings us fast and cheap communication and transportation, or the spread of knowledge. Nor can we fail to recognize the sheer gains in economic welfare inherent from a relatively free flow of trade and investment in a world in which endowments of labor, capital, and scarce natural resources vary so widely.

No doubt, we can conceive of national economic policies, whether purposeful or accidental, powerful enough to repel the integrating forces. Indeed, in the monetary sphere itself, we seem to have gone some distance in that direction.

But let us be aware of the difficulty of controlling disintegration, once fairly started. Already there are temptations to take instability in exchange rates as justification for measures to control or subsidize trade; restraints on trade in turn invite emulation and retaliation. I doubt whether we can proceed very far down that slippery slope while retaining market mechanisms as the main guides to economic adjustments,

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or without disappointing minimal expectations of rising living standards (particularly among those "southern" nations only now entering into a "manufacturing age" which seek our markets). And in time, an increasing sense of commercial rivalry could cloud—or perhaps rather define—political relationships among nations.

I do not suggest that we stand on a knife's edge, forced to choose between integration and autarchy. But I would much rather take as my rallying cry, as a

focus for necessary negotiations, as an ideal from which to measure progress, the challenge of "managing integration" rather than disintegration.

I inescapably approach these problems from the context of American experience with the international monetary system, a system in which the dollar has long played a special—in fact an integrating—role. There are those, of course, who would reject the label

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"system" as descriptive of the current state of affairs. Certainly, it lacks the sense of agreed structure explicit in the Bretton Woods agreement (a structure, let us not forget, not always paralleled by the actual operation of the "Bretton Woods system"). Nor does the present system bear much resemblance to the theorizing about floating exchange rates, at least as propagated by the enthusiasts in the 1960's and early 1970's. Indeed, it may not be entirely appropriate to label the system by the single word "floating", as I shall for convenience, for it has hybrid elements, reflecting in part the absence of a strong consensus on the manner in which it should be managed.

The "free form" of the present system is hardly surprising, given the circumstances of its birth in early 1973. There was no agreed sense among governments then (and perhaps not even now) that floating provides a basis for a superior monetary system over time, although some officials of some governments had come to hold that view. In the framework of the reform discussions that were taking place before and after the decision to permit the dollar to float, floating exchange rates were eventually relegated to vaguely defined "special circumstances".

No doubt, the events of early 1973 could be considered one such "special circumstance"—it reflected an inability to conceive of any other practical way of proceeding at the time. That conclusion was widely shared despite (or perhaps because of) sharp differences about the desired future evolution of the system. But that was not a setting which encouraged governments to give priority to efforts at "systemization", in the sense of developing agreed codes of conduct within a framework of floating rates.

In the event, floating has of course turned out to be more than a temporary escape valve. Conventional

thinking—influenced by the evidence of economic instability all around us—has changed to the point that it finds it difficult to conceive of any general return to officially sanctioned and defended exchange rates. But more than passive acceptance of the *status quo* is involved. After the end of the reform discussions, successive American administrations aggressively espoused the floating rate doctrine on its own merits. They had strong support from economists—liberal and conservative alike—within and outside official circles. Mainly schooled in and preoccupied with the economics of a closed (or nearly closed) economy, the economists tended to see floating primarily as a way of freeing macro policy from the awkward external constraints of the balance of payments. At the same time, they theorized that, in practice, floating rates could provide as much, or even more, stability than was evident in the latter days of Bretton Woods. The point had obvious appeal to political leaders with a full plate of domestic problems, particularly if they did not fully appreciate the warnings of those economists who emphasized the importance of price stability at home to the orderly functioning of the system. Some key Congressional figures, important because they held a virtual veto power over legislation that would be necessary to implement a new monetary system, became particularly ardent supporters. And important elements of the financial and business community, fearing that the defense of any set of fixed rates would lead to controls on capital or even on trade, provided powerful support. Similar thinking was evident in some other important governments; the allure of autonomy was strong.

The idea of floating as a fully respectable and more or less permanent part of monetary arrangements now has its institutional manifestation in the new Article IV of the IMF Agreement. But that Amendment does not provide much in the way of substantive guidance about how the system should operate, beyond rather broad strictures to “behave thyself”.

There have been attempts, first in the reform discussions and later within the IMF, to specify codes of conduct for the new system, at least in the area of defining rules to govern intervention practices. But these efforts have not gone far enough to have had much influence on actual behavior. Present arrangements are also, if not quite silent, then reticent on such matters as the size and composition of reserves, the appropriate or inappropriate use of controls, and the like. There is, indeed, acceptance in principle (or perhaps I should say in writing) of the need for international surveillance. But the actual practice, except when countries find it necessary to borrow in the higher credit tranches of the IMF, is undeveloped. In

fact, an IMF council of representative national finance ministers, which was intended to provide adequate political authority to the surveillance process, has not even come into formal existence despite years of discussion and authorization in the new articles.

As all reform discussions have made clear, these are matters fraught with technical difficulties. But large as those technical difficulties are, they cannot in my mind fully account for the lack of progress in providing a more precise framework for the operation of the present system. Nor can we claim that the operation of the system has been so effective as to render the question irrelevant. Present arrangements have plainly not afforded the sense of stability or speed of adjustment one would instinctively associate with a well-functioning international monetary system. That is as true today, more than five years after its origin, more than three years after the major recession, and at a time when the extraordinary OPEC surpluses have largely been absorbed, as it was in the turbulent “learning” period.

The happy days of Bretton Woods, often viewed today with nostalgia, were a special case, workable because of a particular economic and political setting . . . the inherent contradictions in the system were too great. With the benefit of hindsight, it would seem that an erosion of the United States competitive position was implicit in the postwar arrangements.

It would surely be wrong to point to international monetary arrangements as the principal source of instability at a time when many national economies have been marked by home-grown inflation, when growth trends have diverged so widely, and when the world economy has had to try to adjust both to the oil shock and the dislocation of the dollar. But it seems to me equally wrong to evade the question as to whether the management—or lack of management—of the system has not to some degree contributed to the instability or, to put it another way, has failed to provide timely incentives for better economic performance. It does not seem to me an adequate answer to the question to suggest that the system would be more stable if only national economies were stable. Of course, that is true. But, as with chickens and eggs, how does the benign process start?

The contrast between the troublesome performance of present arrangements—at least as measured by the extreme volatility of exchange rates and the slowness of current account adjustment—and rather passive acceptance is striking. It seems to me to reveal much

about the problems and preferences of governments in operating a monetary system. Management of an international system requires that certain rules and decisions be agreed among a number of countries, and those participating must have a sense of obligation to conduct their affairs within that framework.

The most sensitive of the rules and decisions involved the exchange rate itself. There is a becoming professional modesty amongst economists about their ability to approximate equilibrium exchange rates. The views of different countries, looking at the same exchange rates from different perspectives, usually differ. There is no objective way to settle the question. Yet no country today can feel indifferent to the decision. There are direct effects on industrial activity and structure. Support of an exchange rate structure may entail financial costs and impinge upon domestic policy whether as a result of intervention or because explicit adjustments in monetary or other policies will become necessary. And when financial markets are so open and fluid as in today's world, the potential costs and pressures seem even greater than in the past.

In these circumstances, it is tempting to look to the market itself as an impartial arbiter. If the result is instability, then the potential costs in terms of integration may become relatively high. But balancing the requirements of a stable international system against the desirability of retaining freedom of action for national policy, a number of countries, including the United States, opted for the latter.

Others—most particularly smaller countries with open economies—may and do feel differently. To a considerable extent, their choices are limited by those of others, and they have a clear interest in binding these larger trading partners to codes of conduct. But they have not generally wanted to be bound by rules restricting their own options still further.

The nice question to which I want to return is whether these choices and compromises have, in fact, been appropriately struck—and whether the promise of autonomy, even for the United States, is not more than present arrangements can deliver.

The compromise appeared in a vastly different light at Bretton Woods. The world of Bretton Woods was, of course, a lopsided world. There was the United States emerging from World War II with unrivaled economic, financial, and political might; across the oceans were devastated and divided nations. Looking back at the disturbed interwar period, farsighted leaders of both the strong and the weak could appreciate the enormous potential for their own economies in an open, nondiscriminatory world paving the way to growth of trade and international investment. A par value system, with exchange rates ordinarily confined in narrow limits,

bolstered by international credit facilities and at least the formal obligation for international monitoring and approval of exchange rate changes, seemed the logical monetary component of such a world.

There were, to be sure, strong reservations on the European side to participating so fully in an open world order, given their economic vulnerability. But the economic reservations were overcome by arrangements

A nation, most of all a great world power, does not want to be hampered in its domestic policies, or in its international security or political objectives, by external economic constraints, and specifically by the need to guard against a breakdown of the monetary system.

not an inherent part of the formal structure and symmetry of Bretton Woods, but which plainly recognized the asymmetry of the world as it was. The United States, in effect, held an umbrella over the system. It accepted a long transition period toward convertibility and open markets for weaker countries. A few years after Bretton Woods, exchange rates were fixed at levels that, in purchasing power terms, vastly overvalued the dollar. The Marshall Plan provided the spark and part of the substance for European recovery. And, in the background, the willingness of the United States to assume the major costs of the common defense—and the palpable need for a strong common defense—helped provide the incentive and will for cooperation.

The results turned out to be broadly consistent with the economic and political interests of the United States and its trading partners alike. Leading from a position of strength, the exchange rate relationship was hardly a burden for the United States. Rather, for a long time, it would enjoy the benefits of cheap imports, while its exports (largely of goods that could not yet be produced in volume elsewhere) benefited from increased buying power abroad. External defense and economic assistance did pose budgetary costs for the United States, but there was no “transfer” problem. With the international value of the dollar unquestioned, the use of the dollar as a reserve currency provided a ready means for satisfying demand for increased reserves of others without straining those of the United States. It also helped provide the flexibility to meet shifting international economic, defense, or political commitments of the United States—and to permit free outward capital flows—without much concern about an external constraint.

Other countries found they could increasingly compete effectively while rapidly rebuilding their econo-

mies—export-led growth became the norm for some. While there came to be political qualms, American investment speeded the growth process, helping particularly to bring modern technology and production methods. There was a broad coincidence of political objectives and low defense costs. Most leading countries were able to maintain exchange rates for long periods. The relatively stable level of prices within the United States made the dollar an acceptable unit of value. Both trade and capital flows flourished.

What was not so widely appreciated was that these happy circumstances depended on premises that were not sustainable in the new world the monetary arrangements themselves helped bring out. Viewed in that light, the happy days of Bretton Woods, often viewed today with nostalgia, were a special case, workable because of a particular economic and political setting.

It was symptomatic that hardly were the last books on the “dollar shortage” published than new authors set to work on the “dollar crisis”. Triffin, as early as 1959, only a year after the restoration of European currency convertibility, produced the classic description of the ultimate fallacy of operating a system on the basis of increasing use of a convertible reserve currency. The “Triffin dilemma” inspired a long collective effort to reinforce the system by creation of a new international reserve asset. But, as that effort proceeded and before it would be crowned with full success, the persistence of the involuntary payments deficit of the United States raised still more difficult dilemmas in the management of the adjustment process in a fixed rate system, especially when the adjustment directly involved the United States and the dollar itself.

For years, exchange rate adjustment as a means of approaching the dollar problem could barely be mentioned—much less seriously considered—in polite official circles. The instinct was strong, and with justification, that a change initiated by the United States in its own exchange rate was bound to be profoundly disturbing in a system in which the dollar had not only become the leading reserve medium, but a trading vehicle and unit of account for almost all the Western world.

Appreciation of other leading currencies never seemed (to me at least) to provide an answer. It was expecting too much to think then, before inflationary concerns had become so great a consideration in exchange rate policy, that individual countries would voluntarily take the political and economic risks of seeming to write off export jobs and profits so long as they had another alternative. Even as occasional appreciations did appear in the latter days of Bretton Woods, in response to strong market pressures, they

inspired a certain ambivalence; the potential small relief to the United States balance-of-payments position from limited and scattered appreciations had to be balanced against the psychological undermining of confidence in the United States dollar, risking an unraveling of its fixed position. Actually, of course, devaluations by foreign countries remained more common long after the United States payments position came under pressure, persistently working against the efforts of the United States to deal with its adjustment problem.

The origins of the dollar as a reserve currency antedate Bretton Woods; the design for the postwar monetary system did not contemplate a striking new departure in that respect. Markets, not governmental intentions, make and sustain an international currency; the increasing role flowed quite naturally from the political stability of the United States, its relatively stable economic performance, the sheer size of the economy, and its open financial markets. But it is also true that the international use of the dollar was freely accepted by the United States and supported formally by the policy of gold convertibility. As time passed, it came to be seen as a convenient and even essential means for operating a monetary system that was broadly in accord with United States economic and political interests.

As might be expected, sensitivity to protecting the stability and international role of the dollar was strongest among the Treasury and Federal Reserve officials directly involved in its management. Their instincts at the time of the first stirrings of the “gold problem” in the late 1950’s were orthodox: concern about the dollar contributed to the relatively tight fiscal and monetary policies at the end of the 1950’s. The recession that ensued—whatever the reasons for it—helped narrowly elect a new President, but it probably did not help the cause of orthodox measures to

We have learned that even large exchange rate changes have not been nearly as effective as hoped in achieving adjustment of long-standing imbalances in current account positions.

protect the balance of payments. The analogy of the “tail wagging the dog” seemed particularly apt for a continental economy with exports then a little more than 3 percent of the GNP.

As it happened, President Kennedy, perhaps partly because he did not initially enjoy wide confidence in the business community, was himself instinctively apprehensive of the potential political and interna-

tional effects of a dollar crisis (one of his biographers has reported that "he used to tell his advisers that the two things which scared him most were nuclear war and the balance-of-payments deficit"). But there also began to be, for the first time in the postwar period, a sense of dilemma between "getting the country moving again" and maintaining confidence in the dollar.

For years, the issue could be, and was, dealt with in a manner that did not seriously compromise domestic policy. The need to protect the dollar did influence macro-policy, but the influence was felt largely at the margins (as in the effort to "twist" short-term interest rates higher in the early 1960's) or to provide support for major and politically difficult policy steps that had a plain domestic justification, notably in the fight for a tax increase in 1968 when concern about the dollar became a clinching argument for a reluctant Congress. From the late 1950's onward, efforts were made to reduce the balance-of-payments effects of the overseas defense burden and economic assistance. More importantly, against American instinct and tradition, controls were placed on some capital transactions.

The effectiveness of these approaches was limited in part by the inherent limitations of such selective measures. But it also seemed to me that, as time passed, the will to retain or reinforce these measures dwindled as they more clearly cut into other perceived objectives domestically or internationally. It was symptomatic that, by 1968, the winning Presidential candidate pledged in his campaign to remove the capital controls—a pledge honored only after the floating system came into effect—despite the parlous state of the balance of payments and rumblings of uncertainty about the dollar. And, as business chafed under the restraints of balance-of-payments programs, so did others within the government who found room more limited for foreign policy initiatives that had balance-of-payments costs. The line was drawn quite clearly at security commitments; they would not be impaired.

The system held together for a decade and more after the first signs of weakness, despite the resistance to more fundamental adjustment measures. International cooperation flowered in the area of new financial mechanisms and improvisation to deal with potential points of breakdown—the swaps, Roosa bonds, and multicountry packages of short-term financial assistance to maintain the stability of one currency or another were born during that period. These complex mechanisms had limited economic costs or political risks and could be sustained and expanded over time. Probably more important, but less obvious, was the self-interest of other countries in maintaining a highly competitive external posture, and their perception of the long-term stability of the United States and its cur-

rency. United States growth and a credible defense posture were important to others than Americans, so there were strong incentives to avoid aggravating pressures on the dollar by refraining from gold conversion—and as the conversions were delayed it soon became evident that conversion on a large scale was no longer practically possible.

But in the end, the inherent contradictions in the system were too great. With the benefit of hindsight, it would seem that an erosion of the United States competitive position was implicit in the postwar arrangements. First Europe and later—with even greater momentum—Japan brought its industrial capacity and efficiency close to United States standards. It took some twenty years, but eventually the United States payments position was irreparably undermined. The full extent of the erosion never was reflected in price indices. But it happened and businessmen and unions knew it was happening. By the end of the 1960's protectionist instincts were aroused, particularly in the labor movement, directly threatening maintenance of a liberal world order. By that time, it began to look as if no feasible combination of macroeconomic or other policies would offer credible approaches to the underlying adjustment problem, even though cyclically tight money for a time strengthened the dollar.

The risks of initiating an exchange rate change for the dollar also seemed high, whether viewed from the standpoint of domestic politics or damage to the international system. There were strong doubts about the willingness of other countries to permit a sizable adjustment, however initiated. So there was no eagerness to precipitate exchange rate action before the need became crystal clear.

Finally, in August 1971, the United States did move decisively to promote the adjustments that seemed necessary. The precise timing was forced by the desire to retain some room for initiative in a situation where the pressures on the dollar were inexorably moving to the point at which inconvertibility would be forced upon us in any event. But the way was eased by the fact that decision provided an appropriate setting for a sudden shift in the administration's domestic policies that seemed urgent in its own right, for dealing constructively with protectionist pressures, and for pushing reforms of trading practices and a realignment of defense burdens that, to us at least, seemed necessary to restore and maintain the United States external position for the longer run.

It turned out to be a contentious period. The historians can debate whether it was unnecessarily contentious: Mr. Connally's manner may have grated some foreign (and a few domestic ears), but it was no mean feat to manage a devaluation of the proud dollar in a way that

did not turn American opinion and policy inward.

The conclusion reached by some that the United States had shrugged off responsibilities for the dollar and for leadership in preserving an open world order does seem to me a misinterpretation of the facts. The effort to devalue the dollar externally was, you may recall, accompanied by a program to deal with inflation internally. The devaluation itself was the strongest argument we had to repel protectionism. The operating premise throughout was that a necessary realignment of exchange rates and other measures consistent with more open trade and open capital markets could accomplish the necessary balance-of-payments adjustment.

The confusion about intentions stemmed in part from the fact that the United States did, for the first time in decades, move to exert strong influence on its own effective exchange rate—something that had not seemed practical under the Bretton Woods system. There was a sense that the United States no longer had the capacity, politically or economically, to accept the position of “nth” country in the monetary system, passively reconciling the balance-of-payments objectives of others. Put more concretely, the United States was reluctant to resume convertibility without a reasonable prospect for maintaining a strong enough balance-of-payments position to support that obligation. That in turn implied the need for a thoroughgoing reform of the monetary system that reflected the new balance of economic power.

If . . . markets come to believe exchange rate stability is not itself a significant policy objective, we should not be surprised that snowballing cumulative movements can develop that appear widely out of keeping with current balance-of-payments prospects or domestic price movements. At that point, freely floating exchange rates, instead of delivering on the promise of more autonomy for domestic monetary or other policies, can greatly complicate domestic economic management.

Presidents—American presidents—have not in my experience wanted to spend much time on the complexities of international finance. But the repeated charge to the negotiators seemed clear, and in a sense ominous: “I want a system that doesn’t have all these crises!” The preoccupation was clear enough: a nation, most of all a great world power, does not want to be hampered in its domestic policies, or in its international security or political objectives, by external economic constraints, and specifically by the need to

guard against a breakdown of the monetary system. In other words, we wanted an open system, but like others had a taste for autonomy too.

To me, the charge to find a crisis-free system could not be satisfied. The passage of time has not altered the judgment. In an open system, the external constraint is there. If ignored for long, a crisis will develop. But a crisis can also be therapeutic—it forces a response.

The first way station in the combined adjustment and reform effort was the Smithsonian Agreement. The problems in reaching that limited agreement provided ample warning of the inherent difficulty of reconciling the varied objectives of different countries when no single participant felt itself strong enough to, in effect, take the risks of underwriting the system.

In retrospect, it still seems a remarkable achievement for the industrialized countries to have agreed together on a new grid of exchange rates. But the agreement was flawed from the start. From an American perspective, the agreed exchange rates (and the barely discernible changes in trade barriers) fell well short of promising the adjustments in the United States balance of payments necessary to provide assurance that the new dollar could be maintained, a judgment that seems amply confirmed by subsequent developments. That ended any possibility of others persuading the United States at the time to assume a formal commitment on its part to sustain the new pattern. Convertibility would be left for subsequent negotiations, when its sustainability could be judged in the context of an entire new system.

As a result, neither the economic underpinnings nor the sense of mutual commitment to the Smithsonian arrangements proved strong enough to induce countries to take strong action to repel speculative attack. The British defected by summer 1972 with what appeared, by earlier standards in defending a fixed exchange rate, to be relatively little provocation. When an intra-European currency disturbance led to floating of the Swiss franc and to strong renewed pressures on the dollar in February of 1973, the moment was seized to arrange a further general and larger exchange rate realignment—not after months of difficult negotiation as in 1971 but in days.

Attitudes had plainly changed. In retrospect, some of the Smithsonian haggling over minute changes in exchange rates must have seemed ridiculous; the earlier changes had neither helped as much nor hurt as had been anticipated. To me at least, the new exchange rate pattern this time did seem economically appropriate and defensible. But by that time we had had too many changes in exchange rates too

frequently to make any fixed rate easily credible. It had become evident, in the midst of the crisis, that official inhibitions on floating were fast diminishing. When the United States devalued, both Japan and Italy found it easier to respond by floating than by taking the political responsibility of fixing a new exchange rate. There was already a strong strand of opinion within the United States administration sympathetic to floating, and that opinion began to find some echoes elsewhere. As inflation gained momentum, some surplus countries, in particular, saw their efforts to restrain their money supply undercut by the defense of a fixed rate. Moreover, there was no urge to settle unresolved disputes about the form and nature of convertibility obligations in a new monetary system in the heat of crisis. So, when the new rates came under attack in the market, the alternative of permitting the dollar to float for an indefinite period no longer seemed so unthinkable a step. The industrial countries were tired of trying to make a fixed exchange rate system work, at least without reaching fundamental agreement about the manner in which such a system would work.

The American proposals that provided most of the focus for the on-going reform negotiations were designed to develop the logic of a par-value convertibility system suited to a more symmetrical world. Part of our preoccupation—and that of others—was to develop even-handed pressures on surplus and deficit countries for adjustment. Others were preoccupied with ensuring that the United States, as the most powerful country and the provider of the reserve currency, could not evade discipline. These concerns on both side for a fair sharing of responsibilities seemed to require more continuous, stronger, and more explicit international surveillance than that to which we or others had been accustomed. And even with significant new elements of exchange rate flexibility, there was an implication of the need for closer coordination of demand management, and particularly monetary policies.

The particular role of the dollar in a future system was a source of confusion in the discussion. To some, providing a reserve currency had aspects of what General de Gaulle had long before termed an “exorbitant privilege” and, more technically, some were fearful that its use could delay the need for American adjustment. The United States looked at the other side of the coin; other countries could refuse adjustment by piling up dollars and thrust us back in the “nth” country position. In the last analysis, most other countries did not seem to want to give up all the flexibility in reserve management afforded by reserve currencies, nor did the United States want to lose all the element of elasticity provided by some use of the dollar. So, at times,

it seemed possible that the basic positions were not so far apart. But the negotiators never fully resolved the more technical questions of how outstanding dollars would be consolidated—a matter of direct and visible financial consequences for participating countries—and the larger question was dropped with the reform effort.

The vision of a highly structured new monetary system that emerged from that debate may rest on the library

I do not depart from the strong consensus that we have, on a worldwide scale, no other practical choice than to work ahead within the broad framework of a floating system—and that system offers the most promising framework for “managing integration” as far ahead as we can now see.

shelf, but three observations drawn from that debate and subsequent events still seem relevant. First, in the last analysis, the practical politician, already struggling with intractable domestic problems and pressures and looking toward a murky future, does not want to be bound by more rules and obligations than absolutely necessary—and the more precise and complicated the rules, the more difficult to reach agreement. Large and small countries alike resisted the requirements for heavy and explicit surveillance from without and for policy coordination—all under the oversight of a rather anonymous supranational body that, in the eyes of domestic legislators, would lack political weight or even legitimacy. In concept, the need for these disciplines could be recognized. In practice, the way the rules would be defined was crucially important to all, but views about just which rules were important did not easily coincide.

My second observation is that the reluctance to develop a highly structured system does not mean the underlying issues will not return. Indeed, I believe they are returning, for they are inherent in the management of any international monetary system.

Third, the difficulties of writing a rule book for a highly structured system, combined with simple observation of the divergences of policy and performance in the real world, suggested that floating could be—indeed would have to be—more than a safety valve. If imperfect, it need not be the disaster that so many looking back at the 1930's feared.

By and large, that has been the way it has worked out. From the standpoint of integration, growth in trade has slowed, but not necessarily more than could be explained by the slower growth in worldwide GNP. Amid all the turbulence in exchange markets, financial

markets have successfully recycled massive amounts of funds from OPEC and other surplus areas to points of need in the developing world and elsewhere. The general trend of exchange rates has been broadly in the direction of changes in purchasing power parities—in other words, real changes in exchange rates have been generally smaller than the nominal. And the real exchange rate changes have themselves generally been in a direction suggested by structural or cyclical payments imbalances.

Quite obviously, the industrial world has had more inflation and less growth over recent years than that to which it had grown accustomed. But those problems clearly had their roots in earlier developments, and it seems to me a fruitless exercise to try to compare what has happened with what might have happened under some quite different system.

But I do think we can say, with some confidence, that, whatever the net balance of pros and cons, experience had begun to reveal some potential difficulties more reminiscent of the flavor of the 1930's than much of the theorizing.

For one thing, we have learned that even large exchange rate changes have not been nearly as effective as hoped in achieving adjustment of long-standing imbalances in current account positions. Where clear improvements have been made, they can be traced mainly to changes in relative demand pressures, or to structural changes such as North Sea oil. I do not doubt that trade and current account positions will in time shift in response to real exchange rate changes, but I believe we are learning that the process takes a number of years—possibly even a decade—to work its way fully through the economic structure.

At the same time, there is little evidence that floating exchange rates have substantially dampened the tendency for changes in business activity in one country to affect the trade of others. Changes in income continue to dominate current account balances in the short run. The shifts in current account positions may exert a pronounced influence on exchange rates, but the exchange rate movements will not, in turn, have much impact on cyclical imbalances. Indeed, for extended periods, J-curve effects may be perverse.

Above all, we have seen again and again what some had forgotten—in these circumstances, exchange rates can be dominated by expectations of what they will be tomorrow, or next month, or next year. And, those expectations will be volatile when divergencies in national policies seem pronounced, or when those policies are subject to great uncertainty. If in these circumstances markets come to believe exchange rate stability is not itself a significant policy objective, we

should not be surprised that snowballing cumulative movements can develop that appear widely out of keeping with current balance-of-payments prospects or domestic price movements.

At that point, freely floating exchange rates, instead of delivering on the promise of more autonomy for domestic monetary or other policies, can greatly complicate domestic economic management. Strongly depreciating currencies will not only reflect but exaggerate inflationary forces; in an inflationary world, appreciations may assist efforts to stabilize the domestic price level, but they will undercut efforts to deal with the other side of the “stagflation” dilemma. As uncertainty infects domestic as well as international financial markets, business decisions to invest slow down.

But it is not only domestic economic management that is affected when swings in exchange rates lose touch with underlying price and interest rate relationships. When patterns of trade or capital become influenced by monetary fluctuations rather than lasting comparative advantage, the underlying rationale of a

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liberal trade and investment order is undercut. The point is not merely theoretical. The instinctive political reaction in the face of seemingly capricious impacts on one industry or another is to protect or subsidize domestic industry, or to impede the flow of capital.

Major nations have wisely and repeatedly pledged themselves during this disturbed period to maintain open markets. By and large, they have resisted the pressures to turn inward. But we cannot be blind to the evidence that, under strong pressure from monetary instability as from other forces, the fabric of discipline is fraying at the edges.

I do not depart from the strong consensus that we have, on a worldwide scale, no other practical choice than to work ahead within the broad framework of a floating system—and that system offers the most promising framework for “managing integration” as far ahead as we can now see. It seems to me particularly suited to a world in which the major adjustments, in trading patterns and in political thinking and organization, required by the dispersion of economic and political power have not yet been completed.

But, at the same time, we have had plain enough warning of the fact that international money, any more than domestic, will not manage itself. It will deliver neither the promised autonomy nor integration if we fail to deal with some of those issues that were unresolved in earlier efforts at more structured reform.

In quite different ways, the monetary initiatives under way in both Europe and the United States reflect

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a new appreciation of the dangers. A European Monetary System and the forceful program to stabilize the dollar at home and abroad can help point to solutions. I would like to suggest, in a very general way, how we might build on those initiatives in several areas.

The exchange rate is the most visible and sensitive manifestation of an international monetary system—and exchange rates inherently involve the interests of more than one country. A floating rate offers two enormous advantages in a world of uncertainty, and where more than one sovereignty is involved; it requires neither explicit international agreement nor a closely defined commitment to defend. For larger countries, these advantages are likely to remain decisive. But they do not negate the fact that, at some point, left to themselves the swings in market rates can become so large as to damage the growth and stability of countries with both depreciating and appreciating currencies.

We cannot identify with any conviction or agree upon an "equilibrium rate". But it should be possible over time to reach a broad consensus about levels of a few key exchange rates that are *not* acceptable—that are plainly disruptive of mutual objectives. I refrain entirely from the semantics of target or reference rates, which imply more confidence about identifying a central tendency or a narrower range of fluctuation than is warranted today, and a formality of obligation that is beyond our reach.

What I have in mind is more in the nature of quiet mutual contingency planning. Clearer understanding of a few leading nations among themselves about what extremes of fluctuation are mutually tolerable, and which should be strongly resisted, would seem to me to enhance the prospect for effective domestic policy-making, as well as lay a base for more stability in international markets. After all, we have the example

before us of even the largest country, the United States, finding that it had to care when it found its domestic policy undercut by extreme exchange rate movements—a lesson long ago learned in the United Kingdom. At the same time, a sense that extreme fluctuations will be resisted and reversed could help stabilize market expectations, and thus reduce the risk of those extreme fluctuations developing in the first place.

I do not suggest that merely stating the objective will produce the result, or that there should be any public commitment to particular rates. It will be action that counts. In that connection, intervention alone seems to me a relatively weak reed upon which to lean; it will be effective over time only if more fundamental policies support the objective. Prolonged and massive intervention itself, of course, has implications for domestic monetary policies. But, in the end, if we are serious, domestic policy measures will need to be brought more consciously into action. The lesson of experience is that those instruments will, sooner or later, need to be used with force when markets become disruptive. At that point, the risks to the domestic economy may be greater than if more marginal changes were made earlier, before market uncertainty becomes so great and expectations perverse.

In an American political context, it has been a difficult matter to bring these considerations of exchange market stability to bear on a Congress or even an executive preoccupied with the domestic economy. In retrospect, the case can be made that, more often than not, a more forceful response to pressures on the dollar would have ultimately been helpful in promoting domestic as well as international stability. Experience in late 1972 and early 1973—when policy was slow to recognize the impending inflationary explosion—is one case in point. A floating system, unlike a convertibility system, does not flash its warning signals in a way that more or less demands a prompt policy response, but we need to learn that the warning is there nonetheless.

There seem to me implications for the way we organize ourselves for economic policy decisions. I alluded to the tendency in the United States to think of domestic and international economic policy as distinct, and the latter as the tail on the dog. The analogy is less apt as time passes, and the United States economy has become so much more exposed to external developments. Yet, partly by the accident of personalities, partly by explicit organization, the responsibilities for, and direct exposure to, the international side of the equation have sometimes been lodged with those most influential in domestic policies and sometimes not. Historically, the main preoccupation of Presidents

themselves in the international arena has understandably been with security and political matters; the international dimensions of economic policy have not had the priority many foreign leaders attach to it. The situation is further complicated by the dispersion of responsibilities in the committee system in the Congress, where there are no mechanisms for looking at international economic policy as a whole, or for regularly blending oversight and legislative responsibility with those for domestic policy.

It is a matter of emphasis and continuity to which there are no simple organizational answers. Efforts to deal with the situation in both the Congress and in the earlier administrations of which I was a part were inevitably impeded by efforts to protect the bureaucratic "turf" and institutional jealousies. Even within the independent Federal Reserve, the right balance is hard to keep.

No doubt comparable problems exist in other large governments. But my experience strongly suggests that our mix of policies will be more effective as those responsible for the external side are also in the mainstream of domestic policymaking.

Obviously, the characteristics of economies differ in their exposure to foreign trade. A looseness of exchange rate relationships tolerable for some countries with relatively small external sectors may not be so desirable for others which feel more exposed. One approach toward reconciling those different needs is inherent in the current effort toward a European Monetary System. Clearly, that effort has more than economic dimensions—it is a part of the larger European ideal and a matter for European decision.

As Fred Hirsch emphasized some years ago, the transition toward a European system could pose difficult problems. I hope we will all be alert to dealing with the complications that the transitional period could present for international cooperation on a wider scale, to protecting the legitimate role of the IMF, and to the implications of decisions within Europe for the monetary systems as a whole. But I see no inherent conflict with the needs of the international system once the new regional system is fully effective. One important group of countries will have achieved conditions of monetary stability for the greater part of their trade. In economic relations with the rest of the world, Europe would be in much the same position as the United States and Japan with respect to trade and external influence. In those circumstances, with Europe speaking with one voice, a harmonious approach toward the international system could be easier than before.

There does seem to me a latent danger—no part of the intention of present European leaders—implicit in the development. Regional monetary unity implies

a greater degree of visible loss of autonomy for member countries; yet national economic problems will remain. The temptation could arise to solve some of these regional adjustment problems within Europe by direct subsidies to producers, by protection against the outside world, or by other means damaging to the trading opportunities of others.

In the last analysis, the United States, Europe, and Japan have similar endowments of skills, technology, and industrial plant—our comparative advantages *vis-à-vis* each other are not immense. (Ironically, where they are greatest, in agriculture, some of the largest barriers to trade exist.) At the same time, we are each heavily interdependent with the third world. In theory, a process of disintegration within the *industrial* world could probably go a long way without intolerable damage to our economic welfare. But it is hard to visualize that process without it also leading to intense national competition for the markets and materials of developing countries. It would not be a pretty picture.

In considering the sources of the recent monetary disturbances, I recognize the point has been made that the very large proportion of dollars in official and non-official balances held for international purposes is partly a vestige of the old system, and a desire to diversify can potentially become an independent influence on the stability of current arrangements. However, the forces that motivate decisions to diversify by a foreign dollar holder are, in the last analysis, no different than those bearing on the decisions of those holding the vastly larger stock of dollars in the United

In retrospect, the case can be made that, more often than not, a more forceful response to pressures on the dollar would have ultimately been helpful in promoting domestic as well as international stability. . . . A floating system, unlike a convertibility system, does not flash its warning signals in a way that more or less demands a prompt policy response, but we need to learn that the warning is there nonetheless.

States. And, experience suggests that, as the dollar strengthens, concern about diversification dwindles.

For those reasons, emphasis on the "dollar overhang" as a special problem has often seemed to me misplaced, for it could easily divert attention from the need for more fundamental measures to maintain confidence in the dollar generally. The vigorous domestic and international measures in support of the dollar recently announced by the United States, including some sales of United States Government obligations denominated in foreign currencies abroad, can relieve

pressures from the direction of diversification, as others. But, if the problem is indeed more structural, it does not seem to me one for United States concern or action alone; if so, the preferred option for the United States would in all likelihood be the opportunity to earn back any excess dollars through a current surplus. There is something unedifying, moreover, about some central banks taking full advantage of the flexibility afforded by present arrangements to place their funds where and when they choose, while complaining at the same time about instability in the system.

In a floating system, some of the particular concerns in a convertibility system about controlling the volume and composition of international reserves appear in a different light and may reasonably have lower priority. But that should not mean that, with the collective instruments at hand, progress could not be made under international auspices toward achieving an appropriate balance between the supply of dollars and its desired use in official reserves.

All of this raises questions of governance—if the system is to be managed, who will do it and how. The obvious institutional focus is the IMF, and it plainly has a full plate of work ahead. I have long felt that, if that work was to proceed with full effectiveness, the effort of the international bureaucracy—however able, and it is very able—needs to be reinforced by more active regular participation by politically responsible officials of member governments. That is, of course, the rationale of the council authorized by the new articles. To a degree, the function has been performed on an interim basis by the advisory council. But it would seem to me useful, more than symbolically, for that body to assume now full legitimacy by transforming itself formally into the council, and renewing the sense of commitment to develop its surveillance function.

As a practical matter, that body will be too cumbersome and too far removed to deal adequately with some of the continuing issues of exchange rate and economic policy management that arise among the leading industrial countries, nor could it really hope to have the kind of political authority in those countries necessary to make the process work most effectively. That gap can be filled, it seems to me, only by more or less continuous consultation among the “tri-lateral” countries: Japan, Europe, and the United States. And the consultation must extend to the highest level. The recent practice of “economic summitry” points that way.

The value over time will not, I suspect, lie primarily in particular decisions reached at particular times; in

fact, one of the potential problems with summitry is that, when world leaders meet together on a special occasion, there is an artificial pressure to respond to public expectations by dramatic new initiatives, even when the most sensible and realizable objectives may be more modest. Instead, the most important result can be in the less public process of exposure to each other's problems and viewpoints, working against the natural bias to focus primarily on the internal consequences of economic policy. There is a chance to develop common objectives that can also be practically fitted into the domestic context; sometimes, the setting of the summit can help provide the necessary impetus at home for appropriate domestic action. And, as mutual understanding is enhanced at the top, the response to particular problems as they arise from time to time can be facilitated and speeded at lower levels.

This may seem a modest program. All of it grows directly out of the logic of recent practices, market developments, and governmental decisions. But if commitments to the approach were meaningful—if those recent initiatives are interpreted not just as isolated events but as frank recognition of the fact that the recurring issues of monetary stability cannot be shrugged away—then I feel confident that, in the end, the floating system will come much closer to the ideal of reconciling our domestic and international objectives.

This turbulent period started with two dollar devaluations. I thought then, and think now, they were necessary to lay the base for needed adjustments in the world economy.

But they also, perhaps inevitably, helped upset expectations and loosen disciplines. We have not yet been able to restore a firm sense of stability.

Today, a stronger and stable dollar is plainly in the interest of the United States and the world. These recent months have, if nothing else, been instructive to all—a sliding dollar undercutting our own anti-inflationary effort, generating uncertainty at home and abroad, hurting growth. There has been a sense of drift, of a lack of control or direction in the monetary system infecting and reinforcing other sources of economic instability.

Now, we can see the beginnings of a new base. It cannot rest on the actions of the United States alone—for we are no longer the dominant power of Bretton Woods. But our strength can be joined with others to provide fresh impetus and a renewed sense of commitment to a stable international order. And as we do, an objective of “managing integration” may not sound so utopian after all.

Corporate Equities and the National Market System

The last decade has witnessed more fundamental changes in the structure and organization of the market for corporate equities than any comparable period since the 1930's. Responding to widespread concern over the progressive fragmentation of the equities market during the 1960's and early 1970's, the Congress and the Securities and Exchange Commission (SEC) initiated a period of rule-making and legislative activity that culminated in the abolition of fixed minimum commission rates on "Mayday" 1975 and the enactment shortly afterward of the Securities Acts Amendments of 1975, which mandated development of a national market system (NMS). The key features of the NMS as envisioned in the 1975 legislation are nationwide interaction of buy and sell orders and competitive market makers.

Though the Congress mandated the establishment of the NMS, it specified only broad criteria and left the determination of operational details to the SEC and the securities industry. Currently, two very different NMS prototypes are in active competition for their support. Both trading systems have in common that they rely heavily on electronic communications systems, but they differ greatly in their implications for the mechanics of trading. (See box on pages 14-15 for a brief description of trading in the secondary market.)

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The Intermarket Trading System (ITS), promoted by the New York Stock Exchange (NYSE) and much of the securities industry and put in operation on a pilot basis in April 1978, provides an electronic linkage between the New York, American, Philadelphia, Pacific, Midwest, and Boston exchanges. ITS currently permits orders for about 300 listed stocks to be routed from the floor of one participating exchange to the floor of another. It has recently been supplemented by the Composite Quotation System (CQS), which allows instantaneous display of quotations for the stocks.

The Multiple Dealer Trading System (MDTS)—famously referred to as the "Cincinnati experiment"—is a fundamentally different trading system. MDTS is an integrated electronic display and execution system operated under the sponsorship of the Cincinnati Stock Exchange. It is an outgrowth of the Regional Market System (RMS), an essentially similar system which connected specialists on the floors of several regional stock exchanges. MDTS supplanted RMS on May 1, 1978, when any broker-dealer firm which was a member of the Cincinnati Stock Exchange was allowed for the first time to install MDTS terminals in its own "upstairs" offices. Currently, forty stocks are traded on MDTS by five broker-dealer firms as members of the Cincinnati Stock Exchange as well as by specialists on the Boston, Midwest, and Pacific stock exchanges.

No final commitment has been made by the SEC and the securities industry to either of the two NMS prototypes, and their supporters continue to debate their relative merits. To understand the controversy, it is useful to review briefly the pressures which led to the

The Secondary Market for Corporate Equities

The secondary market for corporate equities performs a central role in the nation's economy by providing liquidity—*i.e.*, the ability to buy and to sell securities quickly without causing significant price changes. The existence of a secondary market encourages potential savers to invest in new and outstanding corporate equities, thus facilitating the process of capital investment by business firms. Equally important, as the market values the shares of different firms, it facilitates the flow of capital to firms with superior performance and disciplines poorly managed firms.

Trading

There are several ways in which buyers and sellers may find appropriate trading partners. The classic procedure for concentrating buyer and seller interest is a public auction in which buyers and sellers (or brokers representing them) may make bids and offers for securities. If the auction is held at a designated time, as in a "call" market, all buyers and sellers make bids and offers for a security simultaneously, after which auction trading ceases until the next auction. The advantage of concentrating buying and selling interest at a specific time is that possible price distortions resulting from a temporary imbalance of buy and sell orders are minimized, thus enhancing the liquidity of the market.

A public auction can also be organized on a continuous time basis—as is done on United States stock exchanges—so that buyers and sellers may enter orders at any time during the trading day. An important advantage of a continuous auction market relative to a call market is that it permits much more time for auction trading, thus allowing investors greater flexibility in reacting to events and executing transactions. However, the longer the trading day during which orders may be brought to the market, the more the order flow is spread out over the day, and the more likely it is that a temporary imbalance of buy and sell orders may exist at some point during the day. In such a situation, the market price would tend to be deflected momentarily from its longer term level. To the extent that this occurs, market liquidity would be impaired.

However, the price pressures created by such momentary imbalances open up opportunities for professional securities dealers—often referred to as "market makers"—to profit by standing ready to buy when there is an excess of sell orders and to sell when there is an excess of buy orders. They will profit by maintaining an offering price sufficiently higher than their buying price (their bid-asked spread) to compensate them for the risk involved in allowing their inventory of securities to act as a buffer against temporary order imbalances. The result of dealer activity will be reduced

price volatility and thus a more liquid secondary market.

Dealers will not be willing to participate in all transactions. For example, some securities are not widely held and are seldom traded, so that it is uneconomic to provide dealer services for them. Also, some offerings of well-known and widely traded securities may be so large that no individual dealer would be able to take the opposite side of the trade. In such cases, direct negotiation—generally through a broker—is necessary for the buyer or seller to find a trading partner.

The exchange auction procedure

In the United States, by far the greatest volume of stock trading takes place on stock exchanges and, as the table indicates, the New York Stock Exchange is the premier stock exchange. Stocks listed on the NYSE are the most widely held and the most actively traded. Though many of them are traded on regional exchanges and in the "third market",¹ the NYSE remains their primary market.

The NYSE auction trading procedure is designed to ensure fair, orderly, and liquid markets by incorporating certain features of call and dealer markets to supplement the continuous public auction. When trading is opened, all the buying and selling interest which has accumulated since the previous close of trading is represented in what resembles a call market. If an imbalance of orders exists for a stock, the stock specialist will try to solicit matching orders to resolve the imbalance. Failing that, he will resolve the imbalance by buying or selling for his own account.²

After the opening, trading is conducted in a continuous auction market designed to maximize the likelihood that public buy and sell orders will be executed directly with each other to minimize the public's total costs of trading. Were the public to trade only with a dealer, their costs of executing matched buy and sell transactions would be increased by the amount of the dealer's bid-asked spread. Trading by dealers for their own accounts is kept to a minimum by the priority of execution assigned to public orders. A specialist, for example, will have priority of execution only if his bid price is higher, or his offering price lower, than that of any public order on the exchange. In the event of an imbalance of incoming orders, it will be impossible for all public orders to execute against each other, and the specialist will be able to trade for his own account. In doing so, specialists on the NYSE and the Ameri-

¹ The so-called "third market" is the group of dealers who trade NYSE-listed stocks off the floor of any exchange.

² Broad guidelines for trading by specialists are contained in NYSE Rule 104, "Dealings by Specialists".

**Market Value and Volume of Sales of Stock on
United States Securities Exchanges, June 1978**

Stock exchange	Value (millions of dollars)	Volume (millions of shares)
American	1,566	97
Boston	136	5
Cincinnati	19	1
Midwest	1,095	39
New York	20,557	744
Pacific	641	27
Philadelphia	398	14
Intermountain	*	*
Spokane	*	1

* Less than 0.5 million.

Source: Securities and Exchange Commission.

can Stock Exchange—but not on regional exchanges—have an “affirmative obligation” to ensure continuity of transaction prices. On the NYSE, about 90 percent of specialists’ transactions achieve this purpose.³

When an investor decides to sell some stock, he generally contacts a brokerage firm to assist in the transaction. The firm will probably transmit the order to its broker on the floor of an exchange where it can be executed. Since the investor is remote from the market, he must give his broker instructions as to how the order is to be executed. For example, if the investor is primarily interested in selling the stock immediately, he will give the broker instructions to sell the stock “at the market”. To execute such a “market” order, the floor broker will take it to the position on the exchange floor where the stock is traded and execute it at the best obtainable price by trading with either a member of the “crowd” or the stock specialist.⁴ With a market order, the investor gains certainty of execution, but he cannot be completely certain what the market price will be when his order is executed. Alternatively, the investor may be more interested in avoiding trading at an unacceptable price than in assuring that the trade will take place. In such a case he can give his broker a price-limited, or “limit”, order, which will be executed only at the specified price if

obtainable.⁵ If a limit order cannot be executed immediately, it may be held by a floor broker in the crowd in front of the position where the stock is traded on the exchange floor, or the floor broker may leave it with the specialist, who will enter it in a book which he maintains. Either way, when the limit price of the order is reached by the market, the order generally will be executed in whole or in part.⁶

Large block transactions

Large block transactions—usually defined as a transaction involving at least 10,000 shares of stock—typically require the assistance of broker-dealer firms to locate suitable trading partners and to assist the buyers and sellers in negotiating the terms of the trade.⁷ The reason is that the inflow of orders to the exchange floor is generally too small to execute the trade in a reasonable period of time, and specialists typically do not have sufficient capital—and are not sufficiently indifferent to risk—to execute such transactions on a dealer basis. In addition, NYSE rules do not allow specialists to communicate directly with public buyers and sellers as do block positioners. When the trade has been negotiated, it is “crossed” on the exchange.⁸ Because of their size, block transactions initiated by sellers usually take place at a discount from the auction market bid price. NYSE Rule 127 requires that blocks crossed on the NYSE must allow public limit orders held in the crowd or by the specialist in the order book to participate in the transaction at the negotiated or “clean-up”, price. In this way, the block trading procedure is integrated with the auction market on the exchange floor. The integration is not complete, however, as only public limit orders must be allowed to participate, and they are limited to 1,000 shares or 5 percent of the block, whichever is greater. Moreover, since some regional exchanges have very few limit orders for NYSE-listed stocks left with them, brokerage firms may send block transactions to these exchanges and effectively avoid allowing public limit orders to participate.

⁵ A large variety of limit orders exists, depending on how the price is specified, the length of time for which the order is valid, etc. These are defined in NYSE Rule 13, “Definitions of Orders”.

⁶ This is true of all limit orders except the “fill or kill” order, which must be executed in its entirety immediately upon receipt or canceled.

⁷ Several broker-dealer firms popularly known as “block houses” specialize in this kind of activity.

⁸ A “cross” is the execution by a broker of two or more matched orders. The orders may not be crossed without first representing them to the crowd and the specialist to determine whether any other limit orders have priority to participate in the trade.

³ NYSE, *Annual Report of the Quality of Markets Committee* (1977), page 16.

⁴ On some exchanges, electronic communications facilities allow some orders to be transmitted directly to the specialist, who represents them to the crowd and executes them as a broker. On the NYSE, this system is called Designated Order Turn-around (DOT) and handles about 40 percent of total transactions.

Congressional mandate for the NMS and then to consider how trading takes place in the two systems.

Growth of institutional trading

The principal stimulus to the development of proposals for the NMS was the strain on the equities market caused during the 1960's and early 1970's by the increase in the institutional share of trading.¹

An important source of institutional dominance in equities trading was the steady decline in holdings of equities by the household sector (individuals, personal trusts, and nonprofit corporations). Flow-of-funds data indicate that households have been net sellers of corporate equities in every year since 1962. There are several reasons for this persistent withdrawal of households from direct participation in the market. First, in the 1950's and even more so in the 1960's, the view was widely held that professional management of an equities portfolio could lead to significantly better performance, and hopes for improved returns undoubtedly stimulated many individuals to invest in shares of mutual funds rather than to purchase corporate equities directly. Another advantage of mutual funds was the enhanced liquidity provided by the right of redemption of mutual fund shares. Also, households' investments in life insurance and contributions to private pension funds increased dramatically during this period, and the attractiveness of such tax-exempt sources of income may well have displaced direct investment in equities to some extent.

Paralleling the decline in net purchases of equities by households during the 1960's was the rapid increase in net institutional purchases of such securities. Private pension funds and state and local government retirement funds in particular increased the portions of their portfolios that were allocated to equity investments. In addition, during the late 1960's and the early 1970's, institutional investors generally increased the turnover of their portfolios, which also contributed to their dominance in equities trading.

Institutional dominance was not reduced by the general reduction of turnover in institutional portfolios that began around 1972. Institutions currently account for about 45 percent of total volume on the NYSE and about 55 percent of total value. The institutional share of public trading—i.e., total trading less trading by NYSE member firms for their own accounts—is about 60 percent of volume and 70 percent of value (Chart 1). Large block transactions—which are almost exclu-

sively accounted for by institutional trades—now account for almost a fourth of total volume (Chart 2).

Market fragmentation

Historically, a variety of restrictions on price competition governed the NYSE. The most important of these was the requirement of fixed minimum commission rates, which precluded competitive pricing of commission rates and enabled the NYSE membership to function as a cartel. Other restrictions enhanced the value of membership in the NYSE by preventing free entry and by discouraging members from sending orders to be executed off the NYSE. Rules designed to channel transactions to the NYSE floor were in the public interest to the extent that they served to encourage a steady inflow of orders, permitting specialists to maintain tight bid-asked spreads and thus fostering a more liquid securities market than might otherwise have existed. But these gains were offset insofar as they were achieved at the cost of commissions paid by the investing public, which were higher than justified by the costs of executing their transactions.

In general, the survival of cartels tends to be jeopardized by the incentive that individual members of the cartel have to lower their prices in order to increase their sales at the expense of the other members of the cartel. Undoubtedly something like this would have happened to the NYSE, except for the fact that the NYSE, as a self-regulatory organization under the supervision of the SEC, had the power to promulgate rules for its members and to enforce compliance. For example, during the 1950's, when some NYSE member brokerage firms began to send orders off the exchange to the third market in order to lower net execution costs for their customers, the NYSE adopted Rule 394 to discourage this practice.

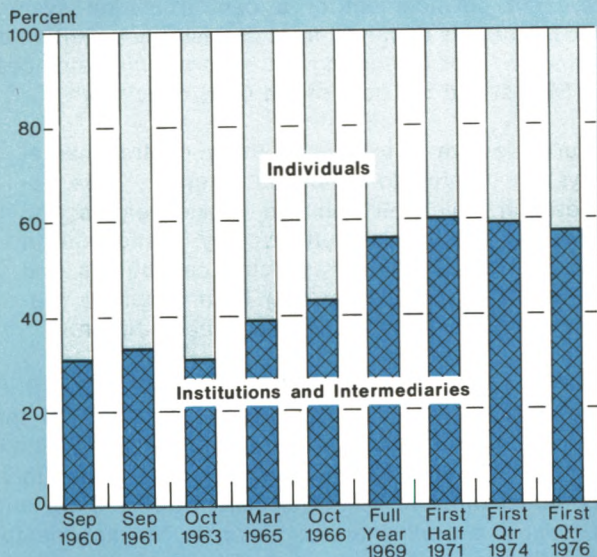
Such internal discipline would have been inadequate to preserve the cartel, however, if other market centers had been capable of executing transactions at significantly lower net costs than those of the NYSE. Such competition was inhibited, however, by the considerable economies of scale involved in making markets in securities. As noted in the box, the larger and more uniform the inflow of orders, the more liquid the market. The result is that, if an existing market center already has a large order flow, its costs should be substantially lower than those of a new market center contemplating competition. Compounding this disadvantage to new marketplaces is the fact that investors value certainty of execution and thus may have an incentive to send their orders to the largest market, even if dealers in another market center charge somewhat lower commissions.

The fixed-rate commission structure of the NYSE

¹ The major institutional investors include private pension funds, state and local government retirement funds, mutual funds, bank-administered trust funds, and insurance companies.

Chart 1

Distribution of Public Share Volume on the New York Stock Exchange



Source: New York Stock Exchange.

which was in place throughout most of the 1960's provided for a minimum commission determined according to the value and volume of shares involved in the order. Although brokers could charge more than the minimum commission, in practice almost all transactions were executed at the minimum rates. While the calculation of the minimum commission was complex, the important feature was that the commission charge per share did not decline as the number of shares in the order increased, even though the per share costs of executing large transactions are generally far less than those for small transactions.²

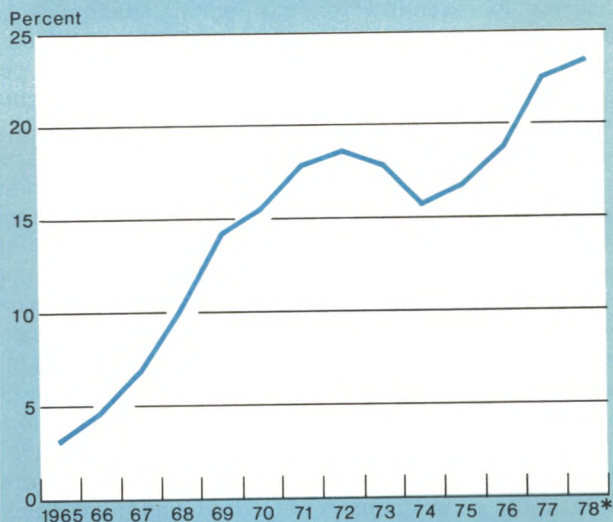
Institutions are peculiarly inclined to trade in blocks because their holdings of individual stock issues are frequently so large that a realignment of their portfolios can be achieved in a reasonable period of time only if large amounts of certain issues are bought and sold. As a result, institutional investors were generally confronted with a commission-rate schedule that levied commission charges far in excess of the actual costs of execution of their transactions.

Institutions responded to fixed commission rates

² An exception was the minimum commission rate for odd lots (transactions for less than 100 shares), which was substantially higher than that for one or more round lots of 100 shares.

Chart 2

New York Stock Exchange Block Transactions as a Percentage of Reported Volume



* First eleven months of 1978.

Source: New York Stock Exchange.

by trying to lower their net execution costs in a variety of ways, some of which caused problems for market efficiency and raised serious questions of equity. Since NYSE member brokerage firms could not compete for institutional commission business by lowering their rates, they competed by providing free a variety of ancillary services, such as research and marketing of mutual fund shares, in return for commission income. For example, a mutual fund might direct a brokerage firm executing its order to "give up" part of the commission to another brokerage firm to pay for the services of the latter to the mutual fund.³

Another strategy for reducing net execution costs was for an institution to establish a brokerage subsidiary on a regional exchange—a practice that was prohibited on the NYSE and the American Stock Exchange (ASE) by rules of the exchanges. The subsidiary would either execute the parent's transaction on

³ On December 5, 1968, the SEC ordered that "directed give-ups" of commissions be abolished and that a volume discount be initiated for commission rates on the portion of orders exceeding 1,000 shares and that negotiations be permitted for the amount of commission in excess of \$100,000. Later, on April 5, 1971, negotiated rates were permitted on the portion of orders exceeding \$500,000, and in April 1972 the breakpoint for negotiated commissions was lowered further to \$300,000.

the regional exchange and earn the commission itself or, more likely, a NYSE member firm could execute the parent's transaction on the NYSE and later send the subsidiary an agreed-upon amount of commission business for execution on the regional exchange to reciprocate for the parent's commission business. Such reciprocal brokerage arrangements created potential conflicts of interest for institutional managers and brokerage firms.

Another way for investors to reduce their net execution costs was to send orders to the third market. During the 1950's, a number of broker-dealer firms which were not members of the NYSE began making markets in stocks listed on the NYSE, thus competing with the NYSE specialists. These third-market firms were not bound by a fixed minimum commission rate, and investors could sometimes realize considerable economies by routing transactions to the third market.

To the extent that investors sent their transactions off the NYSE and ASE to reduce their net execution costs, the equities market was fragmented, and several undesirable consequences were produced. First, transactions on the regional exchanges and in the third market were not recorded on the NYSE and ASE tapes and thus were not immediately disclosed to the investing public. Second, public orders on the NYSE floor, for example, had no opportunity to participate in transactions routed off the NYSE, even if their bid or offer prices were better than those at which the trades were made in the other markets. When this occurred, the classic auction principles of price and time priority were violated.

Much of the impetus for the development of the NMS derived from a growing conviction in the Congress, the SEC, the securities industry, and among the investing public that a truly national secondary market was necessary to avoid the inequities and inefficiencies associated with market fragmentation.

Response of the Congress and the SEC

The Institutional Investor Study Report, submitted to the Congress by the SEC on March 10, 1971, was a milestone in the early discussion of the NMS. The voluminous report examined in detail the impact of institutional investors on the equities market and reached several conclusions of major importance for succeeding developments. The first of these was the SEC's conclusion that fixed-rate commissions on orders of *institutional size* were the source of many difficulties in the market, including market fragmentation and the growth of reciprocal brokerage arrangements. In addition, the report concluded that "institutional trading overall has not impaired price stability in the market", thus tending to support the view that small

trades and institutional trades can be transacted in the same marketplace without serious consequences for small investors. Most importantly, in the letter of transmittal of the report, the SEC for the first time advocated development of a central market system (CMS), and thus departed from its historical position of tending to favor competing but separate marketplaces. The SEC stated the goal of the CMS concisely:

our objective is to see a strong central market system created to which all investors have access, in which all qualified broker-dealers and existing market institutions may participate in accordance with their respective capabilities, and which is controlled not only by appropriate regulation but also by the forces of competition.

About a year later, on February 2, 1972, the SEC issued its Statement on the Future Structure of the Securities Markets (the Structure Statement) in which it identified several problem areas in the securities markets, endeavored to refine its concept of a CMS, and put forward a preliminary program for its implementation. Of principal concern to the SEC were the growth of trading in large blocks, the dispersion of trading to many market centers, the growth of reciprocal brokerage practices, and the increasing amount of trading in listed stocks which was not reported publicly.

The CMS was defined as a system of communications among all market centers, including exchanges and over-the-counter markets, and a set of rules governing their interaction. The two basic objectives of the CMS were (1) to centralize all buying and selling interest in order to maximize the opportunity for public orders to meet each other without recourse to a dealer and (2) to maximize market-making capacity in order to provide the greatest possible liquidity for large transactions. Accordingly, the Structure Statement contemplated that both broker and dealer markets would remain integral parts of the trading system.

The implementation of the CMS was felt to require, among other things, development of a nationwide disclosure system to make available information in trading and quotations in all market centers and the elimination of artificial impediments to trading in the best markets. The disclosure system comprised a composite tape reporting trades of major securities occurring in all markets and a composite quotation system reporting firm quotations of all market makers. Among the impediments to trading which the Structure Statement viewed as inconsistent with the CMS were fixed-rate commissions and rules preventing member firms from sending orders to other market centers. It was also contemplated that, to stimulate competition be-

tween market makers, it might be necessary to make the order book public rather than to allow a specialist to have exclusive knowledge of it.

The Structure Statement perceived (correctly, as it later turned out) that the elimination of fixed commission rates would redirect existing competition into price channels, thus lowering commission rates for transactions of institutional size and making outright institutional exchange membership less desirable.

Of some interest in light of later developments, the Structure Statement advanced the view that, since evidence indicated block trades caused some short-term price volatility and since the burden of this volatility was borne by the investing public in the form of reduced liquidity, public orders in the CMS should be allowed to participate in block transactions.

The SEC soon implemented many of the proposals contained in the Structure Statement. In early 1972, proposed rules for a consolidated tape, including all transactions in NYSE-listed shares, and for a composite quotation system to collect quotations for such shares from all market centers were released. Several committees were appointed to make recommendations concerning other proposals, and rules were issued to control the abuse of reciprocal brokerage and the establishment of brokerage subsidiaries by institutional investors to evade established commission rates. In addition, at the urging of the SEC, the NYSE adopted Rule 127, which subject to certain limitations (see box on pages 14-15) allowed public limit orders on the NYSE to participate in a large block transaction at the "clean-up" price, thus integrating the floor action more effectively with large blocks crossed on the NYSE.

On March 29, 1973, the SEC issued its Policy Statement on the Structure of the Central Market System (the Policy Statement). This release reiterated many of the views expressed in the Structure Statement but, building on information obtained through committee reports and hearings, it also proceeded to outline the kinds of rules that would be necessary in the CMS. The SEC proposed two such trading rules, an auction trading rule and a public preference rule. The auction trading rule proposal would provide price priority for all public limit orders throughout the system. The effect of this rule would require that any broker putting together a cross would have to clear the order book of all eligible limit orders in all marketplaces in order to allow them to participate in the transaction, thus eliminating market fragmentation. The Policy Statement advanced the view that this rule would create a greater incentive for the insertion of limit orders, thus enhancing the stability of the market. The public preference rule would accord preferential treatment to public orders by preventing any broker-dealer in the CMS

from participating as principal in any CMS transaction unless his purchase price was better than any public bid or offer in the system. The object of this rule was "to provide the maximum opportunity for public orders to meet" without the intervention of a dealer. Taken together, these rules were felt to be adequate to preserve the public auction procedure within the CMS.

In addition, the SEC emphasized the importance of the principle of best execution—i.e., the obligation of a broker to seek the best possible price for his customer—in an agency auction market. The existing market structure fell far short of attaining best execution in the SEC's view, because a variety of inefficiencies or impediments to trading—such as NYSE Rule 394—either prevented best execution or could be used to rationalize a broker's failure to obtain it. In the CMS, information on quotations in all market centers would be readily available and all obstacles to achieving best execution on the basis of that information would be eliminated. The SEC stated that it would abolish Rule 394 if the NYSE did not do so first. In its place was to be a broader rule confining virtually all trading in listed securities to the CMS.

Extensive Congressional hearings led to passage of the Securities Acts Amendments of 1975, the most fundamental and far-reaching piece of securities legislation enacted since the 1930's. The Amendments provided that, after the date of enactment (June 4, 1975), "no national securities exchange may impose any schedule or fix rates of commissions, allowances, discounts, or other fees to be charged by its members". An extension of the cutoff date to May 1, 1976 was, however, provided for minimum fees for floor brokerage and odd-lot dealer activities. This provision thus mandated negotiated commissions, both for institutional customers and small investors. However, the SEC had already moved to abolish fixed minimum commission rates effective on Mayday 1975, and by the date of enactment of the 1975 Amendments, commission rates were beginning to decline from their pre-Mayday levels.

The part of the legislation concerned with the NMS noted that securities markets are an important national asset which must be preserved and strengthened and that electronic communications technology created an opportunity for more efficient and effective operations. Furthermore, it stated that

The linking of all markets for qualified securities through communication and data processing facilities will foster efficiency, enhance competition, increase the information available to brokers, dealers, and investors, facilitate the offsetting of investors' orders, and contribute to the best execution of such orders.

The Amendments directed the SEC to facilitate the establishment of the NMS and to designate securities appropriate for trading in it. The legislation also directed the SEC to establish a National Market Advisory Board to study the means available for implementing the NMS and to make recommendations. The SEC was directed to review all off-board trading rules and to amend any such rules found to impose a burden to competition not necessary or appropriate for the furtherance of the purposes of the Exchange Act. In addition, the SEC was authorized to regulate information processors, and its authority to regulate broker-dealers generally, including those in the third market, was significantly enhanced.

Implementation of the 1975 legislation

The 1975 legislation laid out only broad goals for the NMS, leaving a variety of issues to be resolved by the SEC and the securities industry. Among the most important is the question of whether the NMS is to be structured as a linkage of existing exchange floors or as an electronic trading system with no inherent dependence on any exchange floor. While the Congress clearly contemplated that the exchanges and the third market would continue to compete, the legislation did not mandate any specific design for the NMS. In essence, the Congress expressed a preference for nationwide implementation of public auction trading principles, for competition in all aspects of the market, and for the development of an electronic communications system to facilitate attainment of these objectives.

Following passage of the 1975 legislation, the SEC continued to press for enhanced disclosure of transaction and quotation information. The composite tape, rules for which had been proposed earlier, was actually put in operation on a full-scale basis on June 16, 1975. More difficulty was encountered with the composite quotation system. Vendors who developed display systems for the quotations experienced considerable difficulty in marketing them, since the quotations generally were "subject to change"—i.e., not necessarily current and not binding—and thus of little use for trading purposes. The SEC responded to this problem by establishing a requirement that all quotations supplied must be binding. Following this initiative, the system finally commenced operation for a selected list of about fifty NYSE-listed stocks on August 1, 1978.

The SEC has also proposed that nationwide limit order protection be incorporated in the NMS to prevent the price and time priority of limit orders in one market center from being violated by transactions taking place in another market center. Nationwide limit order protection requires that certain information concerning the limit orders held anywhere in the NMS be

communicated to broker-dealers when necessary and that orders be capable of being executed against any limit order in the system. The only way of satisfying these requirements strictly is to establish a central limit order book (CLOB), in effect an electronic file of all outstanding limit orders for a stock, irrespective of the geographical location of the broker-dealer who entered them. However, as will be seen shortly, the strict price and time priority of limit orders in a CLOB poses serious problems for the existing exchange auction procedure, and accordingly other proposals have been advanced to attempt to achieve a measure of nationwide limit order protection without recourse to a CLOB. More than any other feature, it is the strategy for implementing nationwide limit order protection which distinguishes the alternative designs that have been proposed for the NMS.

Rule 390

In June 1977 the SEC released its proposal for abolition of restrictions on off-board trading by member firms. This proposal was consistent with the SEC's stated intention to promote competition in the securities industry by removing anticompetitive barriers. Earlier, the SEC had mandated that Rule 394 be modified to allow member firms to send agency orders out of the NYSE to third-market dealers. Effective March 31, 1976, this was done, and the modified Rule 394 was renamed Rule 390. The objective of the modification was to facilitate competition for orders by the third market, as mandated by the 1975 Amendments. The June proposal was designed to remove barriers to executing principal orders off the exchanges as well. However, the June proposal generated considerable concern, especially in the securities industry, since it in effect sanctioned removal of what was felt to be a critical regulation channeling order flows into the public auction markets and preventing large retail firms from siphoning off order flows to be executed on an "in-house" basis.

As noted earlier, in the Policy Statement the SEC advocated confining all trading in listed stocks to the CMS. Such a rule would clearly prevent "in-house" order execution. The problem was that the National Market Advisory Board had not been able to agree on a design for the NMS, and the industry had made little progress toward its implementation. The SEC, bound by its Congressional mandate, proposed to abolish Rule 390 in advance of the establishment of the NMS, and it was the absence of Rule 390 during the (possibly lengthy) transition to the NMS which would create an opportunity for "in-house" order execution and would present several problems. First, to the extent that buy and sell orders were merely crossed in house without being sent to the exchange floor, the order flow on the

exchange would be reduced as would the liquidity of the public market. Second, in the absence of rules requiring strict observance of nationwide limit order protection, price and time priority might be violated for some investors. In addition, broker-dealer firms might be tempted to engage in "overreaching", i.e., executing agency orders on a dealer basis at less than the best obtainable terms. The existing Rule 390, it was argued, avoided these problems. The SEC's June release presented only proposals designed to mitigate the occurrence of such problems during the transition to the complete NMS. Thus it was not surprising that, in hearings held during the summer of 1977, considerable criticism was directed at the proposal to remove Rule 390 without implementing at a minimum some sort of interim procedure to forestall its potentially undesirable effects.

In January 1978 the SEC reacted to the criticism of its June release by backing off somewhat from its earlier demand for removal of Rule 390. Whereas the June release had called for the removal of Rule 390 by January 1, 1978, the January release postponed implementation of the removal. The SEC emphasized its view that a variety of configurations might be consistent with the attainment of the objectives of the NMS and that it did not intend to assume the role of designing the system. At the same time, the SEC clearly interprets its mandate from the Congress as requiring that it ensure that the industry develop a trading framework conforming to the NMS within a reasonable period of time.

Evaluation of the reforms

The reforms imposed on the equity market by the SEC to date have already had significant impacts on the

structure of the market. First and most importantly, the repeal of fixed-rate commissions has led to a substantial reduction of commissions primarily for institutions. As the table indicates, commissions for very large trades by individuals have declined roughly in line with the commissions paid by institutions, but the commissions paid by individuals on small trades of one or several round lots have scarcely changed. This disparate pattern undoubtedly reflects both the relative costs of executing individual and institutional orders and the fact that institutions are more aware of the opportunities for negotiating commission reductions than are most individuals.⁴

Since the introduction of fully negotiated commission rates, a considerable number of broker-dealer firms have merged. However, the influence of negotiated commission rates on this process is not entirely clear. Industry concentration—as measured by the share of total commission revenues accounted for by the ten largest firms—was increasing even before Mayday, so that any additional impact due to negotiated commission rates is difficult to quantify. Concentration in the securities industry still remains far below that in most other industries in the United States. Accordingly, most of the recent concern about concentration in the securities industry has not focused on the existing

⁴ The data in the table probably understate the impact of negotiated commission rates in at least two ways. First, the changes are measured from commission rates prevailing immediately prior to Mayday 1975, but at that time commissions on orders of \$300,000 or more were already negotiable. Accordingly, the impact of negotiated rates on commissions on large transactions is probably understated. Second, the surveys on which the table is based did not cover the small brokerage firms that have been most actively soliciting individual commission business on a "no frills" basis and offering very competitive discounts.

Commission Rates on Institutional and Individual Equity Transactions

Size of trade (shares)	Institutional			Individual		
	Commission rates* (cents per share)		Percentage change April 1977 December 1977	Commission rates* (cents per share)		Percentage change April 1975 December 1977
	April 1975	December 1977		April 1975	December 1977	
Less than 200	60.0	40.4	—32.7	50.0	48.7	— 2.6
200 to 999	46.0	25.4	—44.8	33.0	30.8	— 6.7
1,000 to 9,999	28.0	14.0	—50.0	20.0	16.1	—19.5
Over 10,000	15.0	8.9	—40.7	9.0	5.7	—36.7

* Commission rates are averages of those charged by firms surveyed.

Source: Securities and Exchange Commission.

industry structure, but on the consequences for future industry concentration of various proposals being advanced to implement the NMS.

Alternative designs for the NMS

Basically there are two competing designs for the NMS currently being implemented on a pilot basis. The SEC has given its sanction to both as possible prototypes for fulfilling the Congressional mandate but has refrained from designing a system itself and imposing it on the securities industry.

Intermarket Trading System

The design favored by the NYSE and much of the securities industry is an electronic linkage of existing exchanges. Such a linkage would preserve the exchange floor as the prime locus of the auction process, while facilitating the flow of orders from brokers and specialists on one floor to specialists on another. Its essential components are (1) CQS mandated by the SEC and implemented on a pilot basis on August 1, 1978 and (2) ITS, which started on a pilot basis on April 17, 1978. CQS is an electronic system designed to display to broker-dealers on an exchange floor the best quotations with size for listed stocks in different market centers. As a display system, it contains no execution capability. Also, since CQS displays only the best quotations in different market centers, specialists continue to have exclusive knowledge of limit orders in their order books, and a broker still must be physically present on the floor to know of limit orders being held in the crowd. This is inconsistent with nationwide protection of limit orders. Accordingly, the NYSE recently informed the SEC of its intention to develop an electronic market center limit order file (MCLOF) to replace the NYSE specialists' limit order books currently in use and to integrate it into ITS. The NYSE MCLOF—and similar files possibly developed for other market centers—would facilitate protection of limit orders in all market centers and would integrate them more effectively with block trades. In addition, it is planned that brokerage firms will be able to insert limit orders directly into the MCLOF without their being carried by floor brokers, an innovation which should reduce substantially the expense of floor brokerage and speed transmission of orders to the market.

Currently the ITS trading procedure is as follows. Upon receipt of an order, a broker on the floor of a participating exchange checks the CQS display screen showing quotations on the various markets. If the quotation on his exchange is as good as or better than any other on the display screen, the broker would execute it on his exchange. If the display screen shows that a better quotation is posted on another exchange,

the floor broker may decide to send the order there.

To do this, he enters a commitment for the bid or offer, stipulating the amount of shares and the price, in an ITS terminal located on the exchange floor and transmits it to the specialist on the other exchange. In principle, the price placed on a buy order must be the offering price quoted for the destination market on the CQS display, and a sell order must carry the bid price quoted for the destination market; the broker cannot enter a price between the quoted bid and offer. The specialist can either fill the order or cancel it. He might cancel it if there has been some sort of malfunction or if he was in process of changing his quotation. Any commitment not accepted within two minutes is automatically canceled by the system.⁵ While an order commitment is in ITS, the sender may not retrieve it to execute it on his own floor. Currently, the average time elapsed between submission of order commitments and receipt of return messages is slightly less than one minute.

The time delay results largely from the separation of the order execution system from the quotation display system. Due to this delay and the irretrievability of an order commitment once entered, a floor broker might want to avoid using ITS in a fast-moving market, where a two-minute delay in receiving notice of a canceled commitment (due, perhaps, to a change of quotation by a specialist) might result in an order execution substantially inferior to what would have been obtained if other exchanges had been ignored.⁶

The implementation of means to facilitate the flow of orders between different market centers would appear likely to increase the relative attraction of the NYSE and the ASE. If this happened, the ITS market linkage might actually make itself obsolete as the NYSE and the ASE became increasingly better markets relative to their competitors. No doubt the regional exchanges would attempt to provide bid-asked spreads equally as good as those on the primary exchanges, but with reduced order flows this would be more and more difficult. Indeed, the limited experience with ITS so far suggests that considerably more orders flow to the NYSE from the other participating exchanges than flow to them from the NYSE. If this tendency should gather momentum, the viability of specialists for NYSE-listed stocks on regional exchanges might be seriously impaired. The potential contradiction between implementation of procedures to facilitate the flow of orders

⁵ In addition, the sender of the commitment may specify a shorter time limit if desired.

⁶ At present, about 30 percent of commitments entered in ITS are returned canceled. The NYSE is actively seeking to reduce the cancellation rate.

to the best market and the maintenance of separate market centers has not yet been resolved by proponents of market linkage systems.

Similarly, once instantaneous display of alternative firm quotations becomes widespread, it should become increasingly difficult to tolerate much slower forms of order execution, such as those currently in place on exchange floors. This conflict between instantaneous information display and slower execution capability may increase pressure for the implementation of an integrated electronic display and execution system.

Multiple Dealer Trading System

Such a system, known as a "hard CLOB", integrates the display of the electronic order book with the capability of executing orders.⁷ At present, the only hard CLOB operating in the equities market is the Cincinnati Stock Exchange's MDTs. A broker-dealer with access to the system can enter his own quotations and limit orders into the system, and he can "hit" bids and offers displayed on the system essentially instantaneously. Assuming that all transactions in listed securities were required to be executed through the system, broker-dealers with sufficient capital and expertise to make markets could do so without also having to be capable of generating an inflow of retail orders. This feature of a hard CLOB could be important to increasing competitive market-making capabilities.

Another advantage of a hard CLOB is that it is extremely easy to impose priority rules of the type proposed by the SEC. For example, price and time priorities are almost implicit in the operation of the electronic execution system. Priority differentiations according to order size and other characteristics would be somewhat more difficult to agree on, but whatever system was implemented would be compatible with the hard CLOB. The advantage thus rests, not with the precise formulation of the priority rules, but with the ease with which a hard CLOB permits them to be enforced.

Similarly, a hard CLOB facilitates regulation of specialists and other market participants, since their activities leave a clear record for any future audit. In addition, rules governing reconciliation of differences in the process of settlement could be simplified, since the process of entering and hitting bids and offers provides a single, definitive record. Also, no rule is required concerning the posting of nonfirm quotations. Thus, from the standpoint of reducing the complexity and expense of rule making and regulation, an elec-

Glossary of Abbreviations

- CLOB Central Limit Order Book. An electronic file of all outstanding limit orders, irrespective of the market center in which they were inserted. Sometimes referred to as CLOF (Central Limit Order File). A "hard CLOB" integrates electronic order execution capability with the CLOB.
- CMS Central Market System. The SEC's designation for its proposed restructuring of the equities market; supplanted in 1975 by the NMS.
- CQS Composite Quotation System. A display system for quotations for certain NYSE-listed stocks in different market centers.
- DOT Designated Order Turnaround. A system for electronically transmitting smaller market and day limit orders from brokerage firms directly to specialists on the NYSE floor.
- ITS Intermarket Trading System. An electronic linkage of six stock exchanges allowing orders to be sent from the floor of one exchange to the floor of another.
- MDTS Multiple Dealer Trading System. A hard CLOB sponsored by the Cincinnati Stock Exchange.
- MCLOF Market Center Limit Order File. An electronic file of limit orders held in a market center.
- NMS National Market System. The designation of the restructuring of the equities market mandated by the Congress in the Securities Acts Amendments of 1975.
- RMS Regional Market System. An electronic trading system which linked several regional exchanges; supplanted by MDTs.

tronic execution system integrated with an electronic display system has much in its favor.

Such a system has not been without its critics, however. Many market participants have sharply criticized the notion of a "black box" which would supplant the "crowd" of floor brokers in front of the specialist posi-

⁷ The first full statement of the rationale for and operation of a hard CLOB was presented in Junius W. Peake, Morris Mendelson, and R. T. Williams, Jr., "The National Book System: An Electronically Assisted Auction Market", submitted to the SEC on April 30, 1976.

tions on the floor of an organized exchange. There is some truth in this view. For example, on the NYSE limit orders may be held in the specialist's order book as well as in the crowd, but it would be very difficult for an electronic system to recognize the priority of orders not entered into the system. Similarly, instead of a broker representing a market order in the floor crowd, the order could be entered into the hard CLOB at a price which would match that of the best contra order stored in the system or, if the price of the best contra order stored in the system did not appear sufficiently favorable, the broker could attempt to improve on the execution of his customer's order by entering it into the system at a better price. If the order were not hit in a reasonable period of time, the broker could reprice the order to hit the best contra order. Thus, market orders must be priced *provisionally* in the form of limit orders to be entered into a hard CLOB; like the exchange floor, however, market orders are priced *definitively* when they are executed. Because orders may quickly be inserted and retrieved (if unexecuted), other, more complex trading strategies may also be implemented through the broker-dealer's entering of bids and offers into the system. The "crowd action" of a dynamic auction market would continue to exist, but it would operate through electronic terminals and not through direct, face-to-face contact on an exchange floor.

Another issue raised by the hard CLOB is the role of specialists. MDTs does not preclude the existence of specialists. Indeed, it enhances opportunities for market makers to compete because the order book is public and orders may be hit irrespective of the geographical location of market makers. The problem is that exchange specialists currently derive a substantial amount of commission income by executing limit orders left with them. In MDTs, execution of such orders is automatic and there are no commissions to be earned. Thus specialists may have less of an incentive to accept an affirmative obligation to preserve price continuity in the market unless some other means of compensating them is developed. Whether such compensation is necessary—and if so, how best to provide it—is an important policy issue, but there is no logical inconsistency between payments for specialist services and hard CLOB.

MDTs has been hampered by a regulatory problem. Its initial authorization from the SEC was for the eight months ending January 31, 1979. During this time, the possibility that the authorization might not be extended naturally inhibited broker-dealer firms from making the financial commitments necessary to initiate trading on MDTs. The SEC's recent extension of the authorization to January 31, 1980 should substantially alleviate

that problem. Nevertheless, the possibility that authorization might not be extended beyond January 1980 will probably continue to discourage expansion of capacity beyond the fifty stocks which MDTs currently can handle.

Implications of the NMS

As should be apparent, the development of the NMS has important implications for the organization and structure of the nation's capital markets. Implementation of the NMS thus far has increased the visibility of trading activity in NYSE-listed stocks by the printing of all transactions on the composite tape and also has increased the visibility of quotations available in different markets by their dissemination through the CQS display system. The ability of investors, or brokers representing them, to act on this information has been enhanced by the electronic linking of exchange floors, as through ITS, and by integrated electronic trading as in MDTs. The same systems also improve the ability of market makers to compete and thus should improve the liquidity provided by the market. Though these systems are not yet fully developed, further enhancements—such as the MCLOB being developed by the NYSE—are in the offing. These innovations, though clearly given momentum by the regulatory activity of the SEC and the 1975 Congressional mandate, should be seen as part of a general trend toward use of electronic communications and data-processing facilities as a means of securing faster, more accurate communications and order execution while reducing costs.⁸

An example of this trend is the Designated Order Turnaround (DOT) system of the NYSE, which allows member brokerage firms to send smaller market and day limit orders directly from their offices to specialists on the NYSE floor and thus avoid the expense of using floor brokers to carry them. Though not an integral part of the NMS, DOT represents one way the NYSE has automated the order delivery process in order to reduce the costs of order execution.

The results of this and similar innovations should be increased operational efficiency in the capital markets. In addition, to the extent that trading rules are built into the software of automated trading systems, they may decrease significantly the burden of regulation, while creating a detailed audit trail which would make investigation of suspected abuses easier than it is today. Furthermore, the development of facilities to implement nationwide limit order protection—whether through a CLOB or a set of MCLOBs—should

⁸ For a discussion of recent innovations in the Government securities market, see Kenneth D. Garbade, "Electronic Quotation Systems and the Market for Government Securities", *Quarterly Review* (Summer 1978) pages 13-20.

tend to reduce further the kind of market fragmentation that contributed to the original interest of the Congress and the SEC in the NMS.

One of the most interesting opportunities created by electronic trading systems is that of substantially reducing the "remoteness" of the investor from the market in which his order is executed. At present, an investor contemplating a sale of shares, for example, cannot see prices currently available in the market but only reports of recent transactions. As described in the box on pages 14-15, the investor must accordingly rely on a broker to execute his order. To ensure that the execution conforms to his wishes, the investor may choose among a variety of different kinds of orders. However, if the market were not remote from the investor, his ability to "call the shots" would be greatly increased, and the order execution process could probably be simplified considerably.

Whither the NMS?

In the 1975 Amendments, the Congress laid down only very broad goals for the NMS and generally left detailed operational questions to be resolved by the SEC and the securities industry. Within this broad framework, the development of the NMS is essentially open ended, with no specific trading system mandated as the target toward which the securities markets are evolving. As a consequence, the SEC's task of enforcing implementation of the NMS is difficult. The SEC has wisely refrained from attempting to design a system and to impose it on the industry, and has instead proceeded to implement the NMS by prodding the industry to develop trading systems that possess the essential features of the NMS as mandated by the Congress. This approach has occasionally given rise to considerable controversy—especially in connection with the proposed removal of NYSE Rule 390—but the result has been to set in motion a variety of innovations which have transformed and will continue to transform the procedure of stock trading.

At present, it is not possible to predict in detail how the future equities market will operate, although two prototypes—ITS and MDTs—are now in operation. However, some general trends can be discerned. The trend toward automation of routine aspects of the trading process is likely to continue as the securities industry endeavors to improve service and to reduce costs. For example, the National Securities Clearing Corporation is progressing toward replacing physical transfer of stock certificates with an automated book-entry system, thus greatly speeding the clearing pro-

cess and reducing its costs. In the order execution process, systems such as DOT are likely to be enhanced to carry a greater volume of transactions in the near future, and the NYSE MCLOF is scheduled to be implemented on a pilot basis during 1979 as an interim step toward nationwide limit order protection. An important feature of the MCLOF is that broker-dealer firms will be able to insert limit orders directly into it and thus to reduce floor brokerage expense and the time delay between the receipt of orders by firms and their representatives on the exchange floor. With this capability, only a minor modification would be required to allow firms to execute orders electronically by inserting a bid, for example, which matches an existing offer in the MCLOF. Should this occur, the system would then possess the essential features of a hard CLOB—integrated display and execution of orders. In other words, the NYSE—responding to pressures from the SEC to implement the NMS objectives of disclosure, access, and limit order protection and from its members to reduce operating costs—is rapidly automating many features of equities trading, and a real possibility exists that the trading system may develop into a hard CLOB despite the NYSE's avowed intention to avoid replacing the exchange floor with a "black box".

Irrespective of the actual course of future enhancements of ITS, there will be continual comparisons between it and a hard CLOB, as represented by the MDTs. The reason is that both systems are providing their users with concrete information concerning the comparative speed and economy of order execution through the two systems. By encouraging experimentation with such prototypes, the SEC has performed the useful service of shifting the focus of the continuing NMS debate from the arena of largely impressionistic arguments over the advantages of the floor crowd versus a "black box" to concrete comparison of the relative merits of two operating systems: one using electronic communications and processing facilities to link exchange floors and the other using comparable facilities to allow trading from "upstairs" offices as well as on exchange floors. If the future pace of change in the equities market continues at anything like the rate observed during the last few years, a fully developed NMS should be attained before long. Along the way numerous questions of detail must be resolved by the SEC and the securities industry. It already seems safe to say, however, that the trading system which ultimately emerges will differ significantly from that which has traditionally characterized the equities market.

William C. Melton

Exchange-Traded Options on Common Stock

No financial instrument has aroused the enthusiasm of speculators, hedgers, and arbitrageurs—and the concern of regulatory authorities—as quickly and completely as exchange-traded stock options following their introduction in 1973 by the Chicago Board Options Exchange (CBOE). Market participants and informed observers have argued variously that options offer opportunities for speculative profits and for hedging or reducing risk, that options provide strong incentives for the manipulation of stock prices and the defrauding of investors, and that options may ultimately be the cause of a collapse comparable in magnitude to the great crash of 1929.

The explosive popularity of stock options is evident from the growth in trading volume from under 6 million call option contracts in 1974 to almost 39 million contracts in the first nine months of 1978.¹ When the CBOE first opened for business, it sponsored trading in call options on sixteen common stock issues. By the fall of 1978, four additional exchanges were sponsoring trading in options, including the American Stock Exchange, the Philadelphia Stock Exchange, the Midwest Stock Exchange, and the Pacific Stock Exchange.² The five options exchanges presently sponsor trading in call

options on about 220 stock issues and put options on twenty-five of those issues.

The concern of regulatory authorities with this remarkable growth became evident during the summer of 1977, when the Securities and Exchange Commission (SEC) declared an informal moratorium on additions to the list of stocks on which exchange-traded option contracts may be written.³ In the fall of 1977, the SEC formalized that moratorium and began an extensive study of the options market.⁴ Among the major questions being examined in that study are the adequacy of self-regulation by the options exchanges, the financial integrity of the options markets, practices in selling options to individual investors, and the relation between trading in stocks and options on those stocks.⁵

Contractual aspects of stock options

A stock option is a contract, granting to the holder specified rights which can be exercised against the writer of the contract. There are two basic types of option contracts: puts and calls. Under the most common form of call option, the holder can purchase from the writer of the option some number of shares of a specified stock (called the *underlying stock*) at a des-

This study would not have been possible without the assistance of Doree Gerold, Irwin Gutttag, Warren Kaiser, Kenneth Marks, Michael O'Connor, William Silber, Edward Sinclair, and Paul Stevens, none of whom bear responsibility for the opinions expressed herein.

¹ Exchange-traded options are traded as contracts for the purchase or sale of one round lot of stock, which is typically 100 shares.

² An Amsterdam exchange also sponsors trading in options on common stock issued by American corporations.

³ Securities Exchange Act Release No. 13760 (July 18, 1977).

The regulatory power of the SEC over the market for options derives from Section 9(b) of the Securities Exchange Act of 1934.

⁴ Securities Exchange Act Release No. 14056 (October 17, 1977).

⁵ In June 1978 the SEC requested public comment on a wide variety of issues related specifically to the structure of markets in stock and options. See Securities Exchange Act Release No. 14854 (June 15, 1978). Some of these market structure issues are discussed in the box on page 28.

ignated *strike price* on or before an *expiration date*. Thus, an investor may hold a call option for the purchase of 100 shares of International Business Machines (IBM) stock at a strike price of \$260 per share which can be exercised on or before April 21, 1979.⁴

Should the holder of a call option choose to exercise his contract rights, he tenders to the option writer funds sufficient to complete the purchase. If an option holder does not exercise his right to purchase on or before the expiration date, all obligations of the writer terminate and the option *expires*.

A put option is a right to sell stock. Under the most common form of put option, a holder can sell a specified number of shares of some underlying stock to the writer of the put contract, on or before an expiration date, at a designated strike price. If an option holder decides to exercise his put option, he tenders to the option writer the shares he is entitled to sell. The right to sell the stock terminates after the expiration date.

Why an option has value

An option will have value if a holder can profit by exercising immediately his contract rights, or if he thinks he might be able to profit by exercising his rights at some future date on or before the expiration of the option.⁷ If IBM stock is trading at, say, \$293.50 a share, then an option to purchase IBM at a price of \$240 per share is clearly a valuable right. An option to purchase IBM at \$300 per share is also valuable if there is a possibility that the price of IBM stock will go over \$300 before the expiration date of the option.

Tables 1 and 2 show an array of values on twelve different IBM put and call options as reflected in the closing prices on the CBOE on Friday, September 1, 1978. Table 1 shows that the price of a call option decreases as the strike price of the option increases. An option to purchase IBM at a price of \$260 per share, for

example, is more valuable than a call option with the same expiration date and a strike price of \$280. Table 1 also shows that the price of an option increases with the futurity of the option. An option to purchase IBM stock on or before April 21, 1979 confers on the holder more rights than an option which expires on January 20, 1979. It follows that call options with more distant expiration dates will have higher prices, everything else being the same. Table 2 shows that the value of a put option increases with the strike price (since puts are rights to sell, a higher strike price implies a more valuable option) and increases with the futurity of the expiration date of the option.

Exchange markets for stock options

Until 1973, stock options were bought and sold in the over-the-counter (OTC) market. In practice, a secondary market sale of an unexpired OTC option was rare. Most of the business consisted of buying options and holding them to expiration, at which time they were either exercised or allowed to expire. The strike price on an OTC option was generally set at the contemporaneous price of the underlying stock, and the expiration date was most often set at one, two, three, or six months in the future. At any point in time there typically existed a wide variety of options on a given stock, with little uniformity of either strike prices or expiration dates among different options.

The innovation in 1973 by the CBOE of an organized market for options revolutionized trading in those securities. Perhaps the single most important CBOE innovation was the standardization of option strike prices and expiration dates.

Looking again at Table 1, note that there were only twelve call option contracts in IBM available for trading on the CBOE on September 1, 1978. There are only four potential expiration dates for IBM options each year: the Saturday following the third Friday in January, April, July, and October.⁸ Only the three nearest dates are open for trading at any one time.

Strike prices on exchange-traded options are initially selected to bracket the price of the underlying stock. Strike prices are set in intervals of \$5 for stocks priced below \$50, in intervals of \$10 for stocks priced between \$50 and \$200, and in intervals of \$20 for stocks priced over \$200. Trading in a new strike price will be opened if the price of the underlying stock moves at least halfway through the interval bounded by the new strike price. For example, if there are options with

⁴ The concepts discussed in this article are illustrated with options on IBM common stock. IBM stock is widely owned and familiar to many investors, and both the stock and the options are actively traded. On December 19, 1978, IBM announced a four-for-one stock split, to take effect on or after May 10, 1979. Following the effective date of the split, each previously outstanding exchange-traded option contract for 100 shares of IBM stock will become four contracts for 100 shares each, with strike prices equal to one quarter of the original strike prices. For example, the holder of one call option contract for 100 shares at \$260 per share will become the holder of four call option contracts for 100 shares each at \$65 per share. The stock split will have no impact on the economic position of either writers or holders of IBM options. The stock split will also not affect any of the illustrative examples given below, since all of those examples involve options which expire on or before April 21, 1979.

⁷ It is noted in an appendix to this article that, under one theory of option pricing, the price of an option is equal to the discounted present value of the price the option is expected to have on its expiration date.

⁸ This is called the January-April-July-October expiration cycle. Other options may have the same expiration cycle, or may have a February-May-August-November cycle or a March-June-September-December cycle.

Market Structure

At the present time, trading in an option occurs on an exchange different from the primary exchange for transactions in the underlying stock. In mid-1977, however, proposals submitted to the Securities and Exchange Commission (SEC) by the New York Stock Exchange (NYSE) and the Chicago Board Options Exchange (CBOE) raised several novel questions about the structure of trading in stock and options. The NYSE proposal was a request to trade options, most of which would be on stocks already traded on that exchange. (The NYSE proposed, however, to separate physically trading in options from trading in underlying stocks.) In reaction to the NYSE proposal, the CBOE proposed to begin trading stocks for the first time. More importantly, the CBOE proposal would not segregate stock and options trading and would permit "dual market making" where floor members could make markets in both securities simultaneously.

On the basis of the NYSE and CBOE proposals, the SEC requested public comment on alternatives to the current geographic separation of stock and option trading.* One such alternative is the dual market making system advanced by the CBOE. A less radical alternative is "contiguous market making", in which options and underlying stocks would be traded at the same location but floor members would be prohibited from making a market in both securities simultaneously. These alternative market structures could have important consequences for efficient securities pricing.

Pricing efficiencies of an integrated market

At the present time, information on the price and size of stock transactions first becomes known to option market participants through publicly available price interrogation systems. Were the floor markets in stock and options physically integrated, transaction price information from one market would reach the other market much more rapidly. In consequence, market makers would be able to adjust their purchase and sale quotations to reflect that information on a more timely basis.

Integrated stock and options markets would also permit the simultaneous observation of order flow in both markets. At the present time, an options market participant does not learn of orders for the purchase and sale of an underlying stock until after they have been executed and reported. A stock market participant may know of pending orders in the stock, but not of orders in options on that stock. Thus, neither the quotations of a stock specialist nor those of an options

market maker or options specialist fully reflect the aggregate order flow.

Off-floor arbitrageurs now devote time and resources to searching for discrepancies between option prices and stock prices, implying that the current fragmentation of the markets is not insignificant. If the markets were physically integrated, the increased and accelerated availability of information would lead to transactions by floor members to eliminate price discrepancies even before they became known to off-floor participants. The consolidated market would then appear to be in relative equilibrium continuously because an off-floor participant would never see an unusual profit opportunity.

Front running

A major deterrent to the physical integration of stock and options markets is the fear that an integrated market could facilitate practices like *front running*. Front running is the purchase or sale of options on the basis of knowledge of impending transactions in the underlying stock. In an integrated market, an options trader could have substantially greater access to information on order flow in underlying stocks. If he learned that a stockbroker was executing a large stock purchase order through a series of small trades, he would have an incentive to buy call options on that stock in anticipation of a subsequent price increase. His purchases might push up the prices of the call options, leading on-floor arbitrageurs to sell the options and to buy the stock. Any resulting stock price increase would deprive the original stock buyer of his right to "best execution" of his purchase order.

The issues

The fundamental issues in the integration of stock and option trading are (1) deciding who should be able to use information which has not yet become widely available and hence has not yet been reflected in securities prices and (2) deciding how notions like best execution are to be balanced against the desire for efficient securities pricing. If the markets are integrated, the advantage in trading will go to floor participants. Their efforts to profit from information not yet available off an exchange floor will result in prices which more rapidly reflect that information. Opportunities for stock/option arbitrage may then exist only for floor participants. If the markets remain segregated, off-floor participants will be at a smaller disadvantage, but prices in one market will not adjust as rapidly to the arrival of new information in the other market.

* Securities Exchange Act Release No. 14854 (June 15, 1978).

strike prices of \$80 and \$90, the underlying stock must trade at or above \$95 a share before trading is opened in options with a \$100 strike price.

The standardization of contract terms and the limitation of the number of different contracts available for trading is a deliberate policy decision of the options exchanges. Standardization of the terms of put and call options means that trading is concentrated in a small number of contracts rather than spread out over tens or hundreds of different contracts, as was the case prior to 1973. This has resulted in more liquid markets and has facilitated trading in options.

Purchase and sale of exchange-traded options

Most investors are familiar with the mechanics of trading stock on an exchange like the New York Stock Exchange (NYSE). Brokers representing the buyer and seller meet on the Exchange's floor and agree to a mutually acceptable transaction price.⁹ The seller delivers his stock to his broker, who redelivers the stock to the buyer's broker, who in turn sends it to the ultimate buyer. Payment for the stock follows the reverse path. Transactions in exchange-traded options *do not* occur the same way.

Suppose one investor wants to sell a single IBM April 280 call option contract, *i.e.*, a call option on 100 shares of IBM stock with a strike price of \$280 per share and an expiration date of April 21, 1979, and a second investor wants to buy the same option. As in the case of stock trading, brokers representing the two investors will meet on the floor of the CBOE and agree to a mutually acceptable transaction price. The transaction will not, however, be completed by the delivery of a call option contract written by the seller to the buyer.

Transactions in exchange-traded stock options result in the establishment of a series of contractual relationships. Following the agreement of the two brokers in the example to a transaction price on the IBM April 280 calls, the broker representing the *seller* will give a call option contract to an organization known as The Options Clearing Corporation (OCC), agreeing to deliver 100 shares of IBM stock upon payment of \$280 per share before the April expiration date. The OCC in turn gives an identical call option contract to the broker representing the *buyer* of the option. The buyer has a right to demand 100 shares of IBM stock from his broker upon payment of the strike price, and the seller's broker has a similar right to demand stock from the seller. Funds from the

ultimate buyer reach the ultimate seller through the OCC and the transactors' brokers.

The significance of these contractual relations is that the option contract does not run directly from the seller's broker to the buyer's broker, but rather runs *through* the OCC. The OCC is a contractual intermediary in all exchange-traded stock options.¹⁰

The importance of the OCC stems from the homogeneity of risk which it imparts to exchange-traded options. In the OTC options market that existed before 1973, an investor had to be careful not to buy an option from a financially unreliable writer. A holder certainly wanted to have confidence that the writer would deliver stock if his call was exercised, or would deliver cash if his put was exercised.¹¹ A buyer of exchange-traded options does not need to know or pass judgment upon the creditworthiness of either a seller or a seller's broker, since he never enters into a contract with either one. His contract is with the OCC, and the integrity of that contract rests solely on the creditworthiness of the OCC.

The Options Clearing Corporation

The OCC is a corporation owned by the five exchanges that sponsor trading in options. Legally, it is an *issuer* of option contracts to brokerage firms. It does not, however, act like an ordinary corporation selling securities. The OCC issues an option only when a buyer and seller have agreed, through brokers on an exchange floor, to a transaction in that option. The OCC then issues an option contract to the buyer's broker and acquires an option contract from the seller's broker. In this way, the OCC maintains a balanced book in option contracts: it writes exactly the same type and number of contracts that it holds. The number of contracts in a particular option which the OCC has written is called the *open interest* in that option.

The holder of an OCC option can sell his option by locating, through his broker, an agreeable buyer on an exchange floor. Technically, however, the sale of an option contract by an existing holder is actually a repurchase by the OCC of one of its outstanding contracts and, unless the buyer had previously written an

⁹ The mechanics of trading stock on an exchange is discussed more completely in William Melton, "Corporate Equities and the National Market System", this *Review*, box on pages 14-15.

¹⁰ The OCC deals only with brokers who are members of one of the five options exchanges and who have sufficient financial resources. Such brokers are called "clearing members" of the OCC. Any participant in the options market who is not a clearing member of the OCC must have purchases and sales booked through a clearing member. This includes other brokers and traders active on the floors of the options exchanges.

¹¹ Writers of OTC options usually had their option contracts endorsed or guaranteed by a member of the NYSE to improve the creditworthiness of those contracts. The endorser charged a fee for this service.

identical contract to the OCC, the reissuance of that contract to the new buyer. Had the buyer previously written an identical contract to the OCC, his purchase would close out that earlier position. That is, his purchase would eliminate his contractual obligation to the OCC. The difference between the two sales is that in the first case the open interest in the option is unchanged while in the second case the open interest is reduced by one contract.

Exercising OCC options

When a holder decides to exercise a call option he informs his broker, which in turn informs the OCC that it is exercising an option which it holds on that corporation. To complete the exercise, the OCC randomly selects a broker on whom it holds an identical option. That broker will then select one of its customers who have written call options to deliver stock according to his or her contract. The broker can select the customer randomly, or by any other reasonable method. The stock obtained from the exercise of a call option moves from the ultimate writer to the ultimate holder through their respective brokers. Put options are exercised in a similar way.

A broker who has written an option to the OCC is contractually obligated to make good on his option regardless of whether or not his customers can deliver stock (on calls) or cash (on puts). To ensure that brokers can meet their obligations, the OCC requires brokers representing option writers to maintain deposits of cash, United States Government securities, or bank letters of credit or, in the case of writers of call options, deposits of the underlying stock. In practice, the bulk of the deposits held by the OCC is in the form of letters of credit, which amounted to over \$780 million on June 30, 1978. The OCC, of course, remains liable for the options that it has written to brokerage firms representing option holders.

If the price per share of some stock is greater than the strike price of a call option on that stock, the option clearly has positive value. When such an option approaches expiration, a holder will usually either sell or exercise the option, since its value will fall to zero following the expiration date. Experience with exchange-traded options has shown that most (but not all) holders of such valuable option contracts never exercise those contracts. Instead, they close out their positions by selling to other investors who are short to the OCC. If the strike price of a call option exceeds the price of the underlying stock, a holder may allow his option simply to expire.

How much is a call option worth?

Call options have positive value because they impose

obligations only on the writer and not on the holder. As Table 1 shows, however, the value of an option depends on its strike price and expiration date. The characteristics of this dependence illuminate the nature of a call option.¹²

The intrinsic value of a call option

Consider, in Table 1, the October 280 call option in IBM. Since IBM was trading at \$293.50 a share at the close of the markets on September 1, 1978, an investor holding that option could profitably exercise his right to buy IBM stock at a price of \$280 a share. His net revenue would be the difference between the market price of the stock and the strike price of his call option, or \$13.50 per share. This price difference is called the *intrinsic value* of the option.

The intrinsic value of a call option measures the value of the option to an investor who would buy and exercise the option immediately. If the stock price is greater than the option strike price, an option exercise, followed by a sale of the stock, produces a profit. Hence, the option has a positive intrinsic value, and is said to be *in-the-money*. If the stock price is less than the strike price, an exercise would not generate any revenues (it would, in fact, cause a loss), so the option has zero intrinsic value and is *out-of-the-money*. The IBM October 300 call option shown in Table 1 was out-of-the-money and had zero intrinsic value on September 1, 1978.

The price of an unexpired option must always be greater than, or equal to, its intrinsic value. If the option price is less than intrinsic value, arbitrageurs¹³ will buy and exercise the option and simultaneously sell the underlying stock at a price greater than the cost of the option and its strike price. They will use the shares obtained from the exercise to deliver against the stock sale. Such riskless arbitrage will keep the option price from falling below the intrinsic value of the option. Table 3 shows the intrinsic values of the twelve call option contracts exhibited in Table 1. All of the option prices exceed the corresponding intrinsic values.

¹² Because trading in call options is far more important at present than trading in put options, this section on option valuation, and the two following sections on hedging and speculating, discuss only the former.

¹³ Arbitrage is the purchase of undervalued securities, and the sale of overvalued securities. In an intrinsic value arbitrage, the purchase of the option and simultaneous sale of the stock will yield a profit at no risk and hence is called riskless arbitrage. Other arbitrage activities may involve risk, but are nevertheless undertaken if their anticipated profits far outweigh their risks.

Table 1

Closing Prices of IBM Call Options on September 1, 1978*

In dollars; per share optioned

Strike price	Expiration date		
	October 21 1978	January 20 1979	April 21 1979
240	56.00	58.75	62.00
260	38.00	41.00	45.75
280	20.63	26.75	32.38
300	8.63	15.13	20.00

* International Business Machines stock closed at \$293.50 a share on the New York Stock Exchange on September 1, 1978.

Table 3

Intrinsic Values of IBM Call Options on September 1, 1978*

In dollars; per share optioned

Strike price	Expiration date		
	October 21 1978	January 20 1979	April 21 1979
240	53.50	53.50	53.50
260	33.50	33.50	33.50
280	13.50	13.50	13.50
300	0	0	0

* Computed as the greater of (a) zero and (b) the difference between the closing stock price of \$293.50 and the strike price of the option.

Table 5

Estimated Hedge Ratios for IBM Call Options on September 1, 1978*

Change in dollar price of an option on one share per \$1.00 change in the stock price

Strike price	Expiration date		
	October 21 1978	January 20 1979	April 21 1979
240	1.00	.98	.96
260 .....	.97	.91	.88
280 .....	.81	.77	.77
300 .....	.46	.56	.61

* See appendix for method of estimation.

Table 2

Closing Prices of IBM Put Options on September 1, 1978*

In dollars; per share optioned

Strike price	Expiration date		
	October 21 1978	January 20 1979	April 21 1979
240 .....	.07	1.19	2.88
260 .....	.56	3.75	6.50
280	3.63	9.00	11.63
300	11.63	17.00	20.25

* International Business Machines stock closed at \$293.50 a share on the New York Stock Exchange on September 1, 1978.

Table 4

Time Values of IBM Call Options on September 1, 1978*

In dollars; per share optioned

Strike price	Expiration date		
	October 21 1978	January 20 1979	April 21 1979
240	2.50	5.25	8.50
260	4.50	7.50	12.25
280	7.13	13.25	18.88
300	8.63	15.13	20.00

* Computed as the difference between the closing option price in Table 1 and the intrinsic value of the option in Table 3.

Table 6

Estimated Elasticities of IBM Call Options on September 1, 1978*

Percentage change in dollar price of an option per 1 percent change in the stock price.

Strike price	Expiration date		
	October 21 1978	January 20 1979	April 21 1979
240	5.21	4.66	4.21
260	7.76	6.16	5.24
280	12.37	8.14	6.48
300	19.24	10.54	7.91

* See appendix for method of estimation.

The time value of a call option

Market participants will value an option at a premium over the revenue they can get from an immediate exercise if they believe they may be able to make even more money by exercising the option at some future date. When the price of an option exceeds its intrinsic value, the option is said to have a positive *time value*.

That options should have a positive time value is most easily seen by considering out-of-the-money options with zero intrinsic value. Such options are clearly not worthless because there is always the chance that the stock price will move above the option strike price before the expiration date. In Table 1, an IBM October 300 call option was worth \$8.63 on September 1, 1978, even though the underlying stock was then trading at less than \$300 a share. Investors knew it was not impossible that the stock price could exceed \$300 some time during the fifty days before the October 21 expiration date.

Table 4 shows the time values of the twelve IBM call option contracts. Observe that the time values of options with a common strike price increase as the futurity of the expiration date increases. This shows that "time" really is a valuable aspect of an option.

The total value of a call option

Chart 1 shows the relation between call option prices and stock prices (both expressed as a percentage of the option strike price) for IBM options with three different expiration dates. On its expiration date, an option will have a price which lies on one of the two intrinsic value line segments. Prior to that date, the value of an option will vary with the price of the underlying stock approximately as shown in the chart. The option/stock price curve will shift closer to the intrinsic value line segments as the expiration date approaches. This downward shifting shows why market participants sometimes refer to an option as a *wasting asset*. As the time remaining to expiration declines, so does the value of an option when the price of the underlying stock remains unchanged.

The option/stock price curves shown in Chart 1 were computed from a theoretical model of option pricing derived by Fischer Black and Myron Scholes. (Their model is described in the appendix.) That model has come into general use among participants in the options markets and is available through several electronic information systems.

How option/stock price relationships are maintained

Chart 1 also locates the values of the twelve IBM call option contracts shown in Table 1. Although the option/stock price curves exhibited in Chart 1 are based on a theoretical model, the proximity of the actual IBM

option prices to their predicted values suggests the model is reasonably accurate. This is the result of arbitrage activity by market participants.

Suppose, for example, that the price of IBM common stock increases in trading on the NYSE but that IBM option prices remain unchanged on the CBOE. The option/stock price curves imply that the options have become "undervalued", *i.e.*, priced below their theoretical values derived from the now higher price of the underlying stock. This may lead some market participants to buy the options and, if they want to hedge their risk, sell the stock. (Exactly how they hedge their risk is explained in the next section.) Their transactions drive up the price of the options relative to the stock price. Such arbitrage activity will continue until the predicted option/stock price relationships are reestablished.¹⁴

Information on the price at which an underlying stock is trading is a critically important piece of information to the market in options on that stock. Under normal circumstances, stock price information reaches the options exchanges via ticker tapes and price interrogation systems. Although these systems usually report the price of a stock trade within a minute or two after it has occurred, market participants have a substantial incentive to get even faster information. In the summer of 1976, the NYSE found some of its members were relaying information on IBM stock price changes to colleagues at the CBOE over open telephone lines. Their colleagues then bought or sold IBM options in arbitrage activities like that described above. This practice, known as *tape racing*, ended when the NYSE upgraded the speed of reporting transactions in IBM. The incident is noteworthy because it illustrates the value to the options markets of information on stock transactions and the lengths to which market participants will go to obtain and use such valuable information.¹⁵

It should not be assumed that causality runs only in the direction of stock price changes affecting option

¹⁴ Since clearing charges and other transactions costs are incurred in trading both stock and options, an option/stock price discrepancy must be large enough to permit an arbitrageur to make a profit net of those costs. Thus, there is a region around the "equilibrium" option value within which the actual option price can fluctuate freely without inducing arbitrage activity.

¹⁵ A related, but different, type of activity, called *front running*, involves the purchase or sale of options on the basis of *future* stock transactions. For example, if a market participant learns of the impending sale of a large block of stock, he may anticipate a price decline and hasten to sell options on that stock. Tape racing involves the use of information on transactions which occurred in the *past*, but which have not yet been reported to the options markets. See also the box on page 28.

prices. The converse, whereby changes in option prices are reflected in subsequent stock price changes, can also occur. Indeed, since call options give an investor substantial leverage of his capital, it may sometimes make more sense to buy options instead of stock, especially if the buyer has access to favorable information about a stock issuer which has not yet been fully reflected in securities prices.¹⁶ Any resulting increase in option prices relative to stock prices would lead arbitrageurs to sell options and, as a hedge, buy the underlying stock. Their efforts to restore equilibrium between the stock and options markets will push up the stock price, an increase which would appear as a sympathetic response of stock prices to the original increase in option prices.

The option/stock price curves of Chart 1 illustrate a price level equilibrium between the stock and options markets. That chart does not, however, give any hint as to whether price changes will first appear in the stock market or in the options market.

Spreading

Arbitrage keeps stock prices and option prices approximately at their relative equilibrium values. A similar activity, called *spreading*, maintains the relative values of different option contracts. Suppose, for example, an influx of retail purchase orders on the floor of the CBOE was to drive up the price of IBM January 280 call options. Market professionals would quickly observe that those options had become overpriced relative to other IBM option contracts. They would then sell January 280 calls at what they perceive as a premium price and, to hedge their exposure to risk, buy other IBM call options.

Spreading, or the simultaneous purchase and sale of different option contracts, is an arbitrage of relative values between two options rather than between an option and the underlying stock. It is usually undertaken by floor traders on an options exchange, because their access to trading in options is quicker than the access of off-floor arbitrageurs.

Spreading is important to options markets, because it increases the liquidity of contracts which trade infrequently. In the absence of spreading, a relatively small public purchase or sale order in a thinly traded

option could cause a large price change in that contract. Because of the opportunity to spread, however, market professionals are willing to take the other side of a public trade, thereby dampening price fluctuations, since they know they can hedge their risk in more actively traded contracts. Even though they may have to hold a position in the infrequently traded option for some time, their spread hedging removes much of their exposure to market risk.

Hedging risk by writing call options

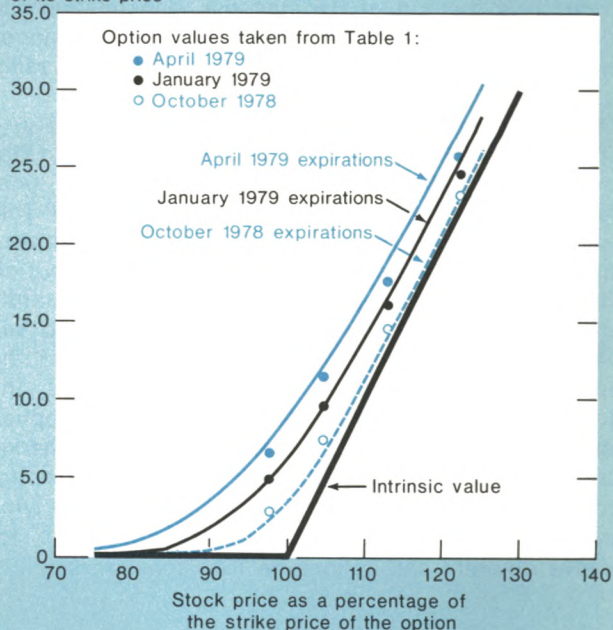
When an investor owns common stock, he is exposed to the risk of unanticipated changes in the value of his stock. One way to avoid that risk is, of course, to sell the stock. Another, and increasingly popular, way to reduce or to eliminate risk on equity investments is to write call options.

Chart 1 shows that call option prices move in the same direction as stock prices. If the price of a stock declines, an investor who earlier wrote call options on his stock can recover part of the losses on that stock by buying back the same options at their new, lower,

Chart 1

Estimated Values of IBM Call Options as a Function of the Stock Price on September 1, 1978*

Call option price as a percentage of its strike price

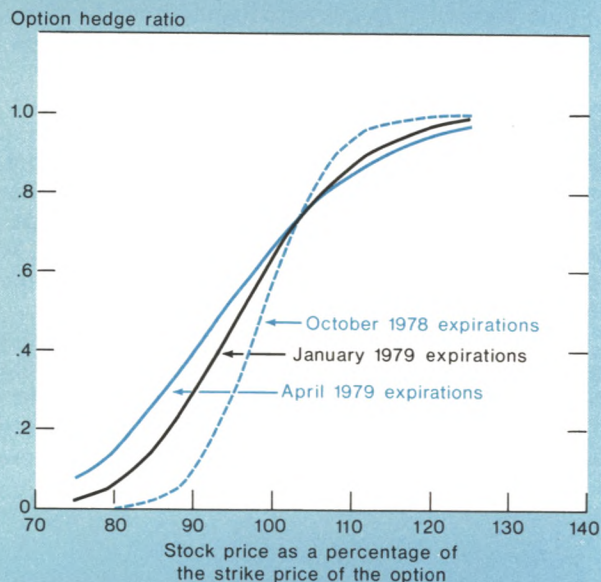


*See appendix for method of estimation.

¹⁶ Such undissemminated information typically involves future earnings prospects of the issuer, but also includes information about the value of the issuer's securities which is not directly related to future earnings. Examples of such information, called *market facts*, include tender offers and block transactions. See Arthur Fleischer, Robert Mundheim, and John Murphy, "An Initial Inquiry into the Responsibility to Disclose Market Information", *University of Pennsylvania Law Review*, 121 (1973), pages 798-859, and Martin Lipton, "Market Information", *Institute on Securities Regulation*, 5(1974), pages 287-304.

Chart 2

Estimated Hedge Ratios of IBM Call Options as a Function of the Stock Price on September 1, 1978*



* See appendix for method of estimation.

price. This method of hedging risk depends on the relation between changes in option prices and changes in stock prices, a relation known as the *hedge ratio*.

The hedge ratio

The hedge ratio of an option is defined as the dollar change in option value which accompanies a one-dollar change in the price of the underlying stock.¹⁷ This ratio must lie somewhere in the interval between zero and unity. It will be zero if the option is far out-of-the-money, so that changes in the stock price hardly affect the value of the option. The hedge ratio will be unity if the option is deep-in-the-money, for the option is then tantamount to a commitment to buy the underlying stock. In that case, the stock and the option change in value dollar for dollar. In general, the hedge ratio will depend on the strike price and time to expiration of the option and on the price of the underlying stock. Table 5 shows estimated hedge ratios for twelve different call options on IBM common stock at

the close of the markets on September 1, 1978. Note that deep-in-the-money contracts, like the April 240s, have hedge ratios near unity regardless of their expiration dates, while out-of-the-money contracts which are close to expiration (the October 300 contract) have lower hedge ratios.

Hedge ratios and small price changes

To illustrate how writing call options can reduce the risk on a stock position, consider writing January 280 calls against a position in IBM stock. As shown in Table 5, on September 1, 1978 a \$1.00 increase (or decrease) in the price of IBM stock would have been accompanied by approximately a \$0.77 increase (or decrease) in the price of the January 280 call option. Suppose an investor owned 10,000 shares of IBM stock and wrote calls on 13,000 shares of the stock. If his stock decreased in value by \$1.00 per share, the options would decrease in value by \$0.77 per share optioned. The investor could then repurchase the options which he previously wrote, at a cost \$10,000 less than the revenues he received when he wrote them ($\$10,000 = 13,000 \text{ shares optioned} \times \$0.77 \text{ per share optioned}$). This gain just balances the decline in the value of his stock. Conversely, had the price of IBM stock increased by \$1.00 a share, the investor would have gained \$10,000 on his stock position and lost \$10,000 on his option position. For this reason, the short position in options is a hedge against the risk of small changes in the price of the underlying stock. The decision to write calls on 13,000 shares, rather than on 14,000 shares or 12,000 shares, is based on this balancing or hedging, i.e., $13,000 = 10,000/0.77$.

Among the most active writers of call options for hedging purposes are securities firms which provide block positioning services to their customers. When an investor wants to sell more stock than his broker can readily find buyers for, the broker may offer to purchase the remaining unsold stock for his own inventory, or to "position" the excess shares. As long as the stock remains in his inventory, the broker has capital at risk. Until 1973, this risk could be eliminated only by selling the positioned stock. Because the markets in exchange-traded options have become so active, however, it is now sometimes more efficient for a broker to hedge his risk by writing call options rather than by selling the underlying stock.

It should not be assumed that simply because an investor has hedged a long stock position by writing call options he therefore bears no risk. The value of his portfolio may be insulated against small stock price changes, but it is not immune to losses which can result from sudden, large stock price changes. Moreover, the investor must monitor continually the

¹⁷ The hedge ratio of an option is also called the option delta, a reflection of its definition as the change in option value associated with a small change in the stock price.

Effect of Changes in the Hedge Ratio on a "Hedged" Position

An investor can lose money on a supposedly "hedged" position because the hedge ratio of an option changes with the price of the underlying stock. The variation in the hedge ratio which follows a stock price change is illustrated in Chart 2. Note that the hedge ratio becomes larger when the stock price rises, and grows smaller when the stock price falls. One consequence of this behavior is that a long position in stock and a short position in call options may be hedged but it is not riskless.

As was demonstrated in the text on page 34, on September 1, 1978, an investor who was long 10,000 shares of IBM stock and short January 280 call options on 13,000 shares was hedged against the risk of small changes in the price of the stock. If the stock price began to fall, however, the hedge ratio on the options would also decrease. Were the hedge ratio to fall from 0.77 (its value on September 1) to, say, 0.72, the investor hedging 10,000 shares of stock would need to increase his short option position to call options on 13,900 shares of IBM ($13,900 = 10,000/0.72$). If he fails to sell options on an additional 900 shares, then for every additional \$1.00 decrease in the stock price he will lose \$640 ($-\$640 = 0.72 \times 13,000 - 10,000$). Were the stock price to continue to fall, his risk exposure to further price declines would become progressively larger.

A similar argument applies in the case of increases in the stock price. If the stock price increased, the hedge ratio on the January 280 options would also increase. Were the hedge ratio to increase from 0.77 to, say, 0.80, the investor hedging 10,000 shares of stock would need to maintain a short position in January 280 calls on only 12,500 shares of IBM ($12,500 = 10,000/0.80$). Unless the investor buys back calls on 500 shares of stock, for every additional \$1.00 increase in the stock price he will lose \$400 ($-\$400 = -0.80 \times 13,000 + 10,000$). This happens because his short position in calls on 13,000 shares now hedge 10,400 shares of IBM, yet the investor owns only 10,000 shares.

Hedge ratios and large price changes

The loss on a hedged position which can result when stock prices change by a large amount in a short interval of time provides an extreme example of the consequences of failing to maintain the correct number of short calls against long stock. Suppose again that an investor hedged on September 1, 1978 a position in 10,000 shares of IBM stock by writing January 280 call options on 13,000 shares. His portfolio would then be insulated from small positive or negative changes in the price of IBM stock. Suppose, however, another corporation announced on Tuesday, September 5, a cash tender offer for any and all shares of IBM common stock at a price of \$400 per share, i.e., at a premium of 36

percent over the market price of \$293.50.¹ The value of a January 280 call would rise *immediately* to about \$120 a share. This implies a gain of \$106.50 per share on the stock ($\$106.50 = \400.00 new stock price $-\$293.50$ old stock price) and a loss of \$93.25 per share optioned ($\$93.25 = \120.00 new option price $-\$26.75$ old option price). The investor would incur a loss of \$147,250 ($\$147,250 = 13,000$ shares optioned $\times \$93.25$ per share optioned, minus $10,000$ shares owned $\times \$106.50$ per share owned). These losses are unavoidable because the investor will be unable to repurchase his calls while the price of IBM stock is rising; the stock price will move to about \$400 a share in a single, large jump as soon as the tender offer is announced.

Naked options and covered options

Because the hedge ratio of a call option cannot exceed unity, an investor hedging a long stock position by selling calls can protect himself against unlimited losses due to stock price increases by writing calls on only as many shares of the underlying stock as he actually owns. This is called "covered" writing.

Covered option writing limits an investor's losses.² In the "worst case", where a stock price increase pushes the option hedge ratio almost to unity, any further losses on the short option position will be balanced by gains on the stock held long. Looked at another way, a covered option writer has just enough stock to deliver in the event his options are exercised, so he will never have to draw on any cash reserves to unwind his stock and option positions.

For an investor to hedge fully a long stock position against small stock price changes, he must write options on more stock than he owns. In the example of an investor hedging 10,000 shares of IBM by selling January 280 calls, the investor had to write options on 13,000 shares. Call options on 3,000 shares are not covered and are called *naked* options. It is the sale of these naked options which gives rise to the investor's risk exposure on *large* price increases, even though they must be written to complete the hedge against *small* price changes.

¹ While an "any and all" tender offer for IBM is unlikely in view of the amount of cash which would be required, tender offer premiums of 40 percent over the market price of the target stock are hardly unusual any more, and as there is trading in options on many companies much smaller than IBM, the example is not without merit.

² The maximum loss the investor can experience is the original value of his stock at the time he wrote the calls, less the proceeds from writing the calls. This loss will occur if the stock price falls to zero. Because his options are fully covered, he has no risk exposure to stock price increases, although his gains are limited to the strike price of the options plus the proceeds from writing the calls.

price of the stock, because hedge ratios change with stock prices. The number of options written against the stock may have to be increased or decreased from time to time to maintain the hedge. The box on page 35 discusses the implications of large stock price changes for hedged positions and the consequences of changes in the hedge ratio.

Speculating with call options

When an investor believes there is an unusually strong likelihood of a security appreciating rapidly in price, he may be willing to expose his capital to substantial risk by making a leveraged investment in that security. Options provide a remarkably efficient vehicle for leveraged speculation, because their values are extraordinarily sensitive to underlying stock prices. Where a stock price might increase by 5 or 10 percent on favorable news, an option can appreciate by 30 or 60 percent on the same news.

The elasticity of option prices

The elasticity of an option is defined as the *percentage* change in the value of the option which accompanies a 1 percent change in the value of the underlying stock.¹⁸ Thus, elasticity is a measure of the relative price sensitivity of an option contract.

The elasticity of an option depends on the strike price and time to expiration of the option and on the price of the underlying stock. Table 6 shows the estimated elasticities of twelve call options on IBM stock at the close of the markets on September 1, 1978. Taking, as an example, the October 240 option, if IBM had closed on that day at a price 1.00 percent higher (at $\$296.44 = 1.01 \times 293.50$), then an October 240 call option would have closed approximately 5.21 percent higher (at $\$58.92 = 1.0521 \times 56.00$).

As shown in Table 6, for a given strike price, option contracts close to expiration are more elastic than contracts with relatively distant expiration dates. For contracts with a common expiration date, an out-of-the-money option will be more elastic than an in-the-money option.

The foregoing comments illustrate why out-of-the-money options close to expiration are considered volatile securities: they are extremely sensitive to movements in the underlying stock price. This sensitivity is well illustrated by the behavior of IBM options dur-

ing the April 1978 market rally. Table 7 gives the prices of IBM stock and the April 240 call option on that stock at the close of the markets each day for the two weeks preceding the April 22 expiration date of the options. On April 12, the April 240 options were out-of-the-money because IBM stock was then trading at \$236.75 a share. Over the next nine days, however, the stock market enjoyed a substantial rally. The price of IBM stock rose to \$253.25 a share by April 21, and the April 240 calls expired in-the-money. Between April 12 and April 21, the April 240 calls appreciated from \$1.06 to \$15.25 per share optioned, an increase of 1,339 percent. Over the same interval, the price of IBM common stock showed a gain of 7 percent. The April 240 options clearly provided enormous leverage for an investor prescient enough to have predicted the mid-April rally. Of course, had the market fallen during April, those same options would have expired out-of-the-money and a holder would have lost his investment.

Writing naked options

Investors can speculate against declines in securities prices by writing call options without owning the underlying stock, or by writing *naked* options (see box on page 35). If an investor is primarily concerned with small price fluctuations, such naked writing will put him in a position comparable to that of a short seller. For example, an investor who wrote on September 1, 1978, January 280 call options on 13,000 shares of IBM would have had a position similar to that of an investor who sold short 10,000 shares of IBM stock on the same day. A \$1.00 decrease in the price of the stock would increase the wealth of both the short seller and the option writer by about \$10,000. (This is obviously true for the short seller. It is true for the option writer because the hedge ratio of the January 280 calls was 0.77 on September 1, 1978, as shown in Table 5.)

Should the price of an underlying stock rise instead of fall, the losses incurred by a writer of naked options will accumulate more rapidly than those of a short seller. This follows because the hedge ratio of an option increases with the price of the underlying stock. (The variation of the hedge ratio of an option with respect to stock price changes is described in the box on page 35.) January 280 calls on 13,000 shares of IBM were equivalent to 10,000 shares of stock on September 1, 1978, when IBM was trading at \$293.50 a share. However, if the stock price subsequently rose, the hedge ratio would begin to increase. If it reached, say 0.80, then every additional \$1.00 increase in the price of the stock would cost the naked option writer \$10,400 ($\$10,400 = 0.80 \times 13,000$ shares optioned.) A short seller of 10,000 shares would still be

¹⁸ If a call option changes in value from C_0 to C_1 while the price of the underlying stock changes from S_0 to S_1 , then the elasticity of the option is $e = ([C_1 - C_0]/C_0)/([S_1 - S_0]/S_0)$. $[C_1 - C_0]/C_0$ measures the relative change in price of the option contract and $[S_1 - S_0]/S_0$ measures the relative change in the stock price. Note that the hedge ratio is $h = [C_1 - C_0]/[S_1 - S_0]$, so the elasticity may also be defined as $e = h S_0/C_0$.

losing \$10,000 for every \$1.00 increase in the stock.

An extreme example of this type of risk from writing naked options occurs when an out-of-the-money option is close to expiration. Hedge ratios on such options are small. If, however, the stock price rises and the option goes in-the-money, the hedge ratio of the option will change very rapidly to almost unity and the price of the option will increase to more than its now positive intrinsic value. A writer of naked options would then face the risk of catastrophic losses from further increases in the stock price (because the hedge ratio is almost unity), and he can avoid that risk only by buying back his options at a substantial loss.

The April 1978 experience in IBM options illustrates this point. As shown in Table 7, on April 12, 1978, the April 240 calls on IBM had a hedge ratio of 0.34 and a price of \$1.06 per share optioned. By Wednesday, April 19, the April 240 calls had gone in-the-money as a result of increases in the price of IBM stock. The price of the calls rose to \$13.25 per share optioned and the hedge ratio had jumped to unity. Speculators who wrote naked calls on April 12 suffered substantial paper losses by April 19. They then faced the choice of taking those losses immediately by buying back their much appreciated options or remaining exposed to the risk of additional stock price increases.

Another difference between short selling and writing naked options is that, while a short seller eventually

has to cover his borrowing of the stock sold short, a short position in options which expire out-of-the-money never has to be covered. To a writer of options who looks toward the expiration date, if there is only a small probability of an option having positive intrinsic value on its expiration date, then there is a large probability that he will be able to keep the proceeds of his option sales. Of course, as the April 1978 experience showed, there is always some finite probability that a rally will lead, unexpectedly, to options going in-the-money. The losses borne by those who wrote naked options can then become catastrophic.

Does the existence of an options market affect the markets for underlying stock issues?

One of the principal concerns expressed by the SEC when it imposed its moratorium on new options was whether options affect the market for underlying stocks. This issue is important because corporations raise equity capital by selling stock, not by selling options. If options somehow reduce the willingness of investors, in the aggregate, to hold stock, regulatory authorities might conclude that restrictions on option trading may be in the public interest.

It appears that options could affect the prices of underlying stocks in three ways: (1) by affecting the *level* of stock prices; (2) by affecting the *volatility* of stock prices, and (3) by inducing *fraudulent manipulation* of stock prices.

Effects on the level of stock prices

As pointed out in the previous section, call options provide a convenient vehicle for optimistic investors who want to make highly leveraged investments in a particular stock. Because they believe the stock is undervalued, optimistic investors necessarily also believe that call options on that stock are undervalued.¹⁹ In buying options for their leverage, optimistic investors may bid option prices to a premium *relative* to the price of the stock. As the options rise to a premium, arbitrageurs will enter the markets to sell what they perceive as relatively overvalued options and to buy the underlying stock to hedge their option sales. They will continue to sell options and to buy stock as long as they continue to perceive the options as relatively overvalued. Eventually, the buying activities of arbitrageurs will push up stock prices. Thus, the purchase of call options by a group of optimistic speculators

Table 7

Closing IBM Stock and Option Prices in April 1978

Date	Stock price (dollars)	April 240 options Price (dollars)	Hedge ratio
April 10	241.25	2.94	.60
April 11	239.88	2.56	.53
April 12	236.75	1.06	.34
April 13	238.00	1.44	.41
April 14	243.50	4.75	.75
April 17	251.13	11.75	.99
April 18	251.63	11.88	1.00
April 19	253.00	13.25	1.00
April 20	253.25	13.25	1.00
April 21*	253.25	15.25	1.00

* Trading in options on the CBOE terminates at 3:00 p.m. Eastern time on the day prior to their expiration (April 22 in the above table). The underlying stock trades on the NYSE until 4:00 p.m. Thus, the \$2.00 time value of the option on April 21 may be an artifact of closing stock and option prices recorded at different times.

¹⁹ That is, even though option prices may be in equilibrium with respect to the *existing* price of the underlying stock, optimistic investors believe that the stock price is "too low" and likely to appreciate substantially in the future. They would expect options to appreciate in value even more substantially as a consequence of the leverage of those securities.

may find expression in rising stock prices through the perfectly normal activities of arbitrageurs.

The foregoing scenario suggests that call options, and especially highly elastic call options with substantial leverage, may facilitate the formation of speculative bubbles in stock prices. Such bubbles could collapse when the optimistic holders of options liquidate their positions, depressing the relative values of the options. Arbitrageurs would then reverse their former activities by buying back the options which they had previously sold and by selling the stock which they had previously bought. These stock sales may have a depressing effect on stock prices.

Effects on stock price volatility

The existence of an options market may increase the short-term volatility of stock prices, especially when a particular option series is close to expiration.

When a call option is close to expiration, it will have negligible time value and its price will be only slightly greater than its intrinsic value, where the latter is defined as the excess, if any, of the stock price over the strike price of the option. If the price of an in-the-money option which is close to expiration moves significantly above its intrinsic value, arbitrageurs will sell the option and buy stock in anticipation of an imminent exercise of the option. If the price of an option falls significantly below its intrinsic value, arbitrageurs will buy the option and sell the stock. The stock needed to deliver against the sale is obtained by exercising the option.

While arbitrage plays the important role of keeping stock prices and option prices at their "correct" relative values, it also leads to purchase and sale orders for stock, which would not have appeared in the absence of an options market. An in-the-money option close to expiration is a virtually perfect substitute for the underlying stock.²⁰ The existence of geographically separated trading in stock and options thus gives rise to a type of market fragmentation not much different from the more familiar fragmentation associated with multiple markets trading identical securities.

When trading in options and underlying stocks is fragmented, arbitrageurs will send purchase and sale orders to one or both markets as they seek to take

advantage of transient price discrepancies. Indeed, the very existence of arbitrage orders is evidence that the markets were not previously well integrated. While this induced order flow is beneficial to both the options market and the stock market because it keeps prices on close substitutes in line with each other, it may also have the effect of inducing transient fluctuations in stock prices which would not have been present had the options and stock markets been better integrated. In particular, market makers may not realize that the sudden appearance of selling interest in a stock is the result of an option trading below its intrinsic value and may lower their bid and offer quotations for the stock too rapidly, only to induce countervailing purchase orders from arbitrageurs. Such surges in order flow between market centers could be anticipated whenever securities trade actively in multiple, fragmented, markets, but they may be especially important in the present context in view of the now substantial size of the options markets.

Observers have generally agreed that the deleterious consequences of market fragmentation can be mitigated by enhancing the integration of competing market centers. With respect to stock and options markets, such enhancement could be obtained either by geographic concentration of trading in both stock and options on the same exchange floor or by improved communications between exchanges trading in options and exchanges trading in stocks.²¹ The box on page 28 discusses some of the consequences of trading stock and options in the same location.

Fraudulent manipulation of stock prices

A third way an options market can affect the prices of underlying securities is the unusually strong incentive options give for the fraudulent manipulation of stock prices. *Capping* is a frequently cited example of such manipulation.

Suppose a market participant has a naked short position on soon-to-expire call options with a strike price only a few dollars above the contemporaneous price of the underlying stock. If the options expire out-of-the-money, the investor can keep whatever price he received originally for writing the options. If, however, the stock price moves above the option strike price prior to expiration, the investor's losses from covering his short option position could be substantial. He may, therefore, try to "place a cap" on the stock price by short selling the stock whenever its price approaches

²⁰ That is, an investor can buy the stock or he can buy an in-the-money option which is close to expiration, knowing that it is almost certain that he will want to exercise the latter on the expiration date. Conversely, a holder of the stock can either sell stock or write an in-the-money call option which is virtually certain to result in an exercise. The idea of stock and in-the-money options being close substitutes is therefore quite similar to the more familiar observation that the purchase of stock in one market is a perfect substitute for the purchase of the same stock in some other market.

²¹ The role of communications in overcoming fragmentation is discussed in Kenneth Garbade, "Electronic Quotation Systems and the Market for Government Securities", *Quarterly Review* (Summer 1978), pages 13-20, and William Melton, "Corporate Equities and the National Market System", *this Review*, pages 13-25.

the strike price of his options. If he can defer what may be an ultimately irresistible stock price increase until after his options expire, he may incur less total loss (including the costs of eventually covering his short stock position) than were his options to expire in-the-money.

Manipulative stock transactions can also push stock prices above the strike price of an option. If an investor has a long position in options which are only slightly out-of-the-money, he may feel he would be better off buying stock (with the intent of pushing the stock price through the option strike price) and then selling his in-the-money options than simply allowing his options to expire out-of-the-money.

It appears that the incentives which options provide for the manipulation of stock prices are unlikely to be important except immediately before option expiration dates. Near those dates, there may be substantial rewards to a manipulator who can defer or accelerate a stock price change by a few days. At other times, the capital required to effect and maintain a prolonged change in the level of stock prices will be beyond the resources of almost all market participants. The SEC and self-regulatory organizations like the NYSE, the American Stock Exchange, and the CBOE have substantially enhanced their market surveillance programs and improved their ability to detect manipulative activities. These efforts are important for creating public confidence that the stock and options markets are fair and equitable for all participants.

Conclusions

The last five years have witnessed a remarkable growth in investor interest in options. This growth can be attributed to the much enhanced liquidity of exchange-traded option contracts. The limitation of contract terms to a modest number of expiration dates and strike prices resolved the problem of trading interest in OTC options being spread too thinly over too many different contracts to permit a viable secondary market. The creation of the OCC as a contractual intermediary eliminated the need for holders of options to evaluate the creditworthiness of ultimate writers. Greater homo-

geneity of both credit risks and contract terms reduced the "investigation" costs of trading in options and led to greater investor interest in those securities.

Exchange-traded options have now become important as both hedging and speculative devices. The ability to write call options against stock positions has given investors an important new way to reduce their risk exposure to price fluctuations on specific securities. On the other hand, because call option prices are extremely sensitive to the prices of underlying stocks, optimistic investors can obtain substantially leveraged returns from small capital commitments in options.

The growth of interest in option trading has also created new problems for regulators and for the securities industry in general. More frequent occurrences of manipulative practices like capping might be expected in view of the greater stake which more investors now have in options. Similarly, the greater liquidity of the options markets may encourage practices like front running (front running is described in the box on page 28). The SEC and the self-regulatory organizations have recognized the need for much more careful scrutiny of markets and trading practices in an environment of active options markets.

Because the experience with exchange-traded options is still relatively limited, there exist additional problems whose importance is difficult to assess at present. Call options could provide a vehicle for the formation of speculative bubbles in stock prices. The collapse of such bubbles would bring losses not only to options traders but also to investors in the underlying stocks. Nor is it entirely obvious that there is adequate preparation for the possibility of catastrophic losses by writers of naked call options. History suggests, however, that, as the interests of participants in the options markets become more entrenched, the chances for an orderly appraisal of these potential problems will diminish. Moreover, any reform which follows in reaction to catastrophic losses by writers of naked options will likely be excessive. The current SEC review of the options markets is thus both timely and important.

Kenneth D. Garbade
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Appendix: The Black-Scholes Option Pricing Model

In 1973, Fischer Black and Myron Scholes advanced a model for valuing call options on securities such as common stock.¹ Their model has since become widely accepted and used by financial market participants. The authors showed that the value of a call option depends on five parameters: (1) the price of the underlying stock, denoted S , (2) the strike price of the option, denoted E , (3) the time remaining to the expiration of the option, denoted t , (4) the level of interest rates, denoted r , and (5) the volatility of the price of the underlying stock, denoted v . The stock price S and the option strike price E are measured in dollars per share and the time t remaining to expiration is measured in years or fractions thereof. The interest rate r is usually taken as the rate on high-quality commercial paper having a maturity comparable to the expiration date of the option. The stock price volatility v is measured as the variance per year of the natural logarithm of the stock price.

The Black-Scholes model for the dollar value C of a call option is:

$$C = S \cdot N[d_1] - E \cdot N[d_2] \cdot e^{-rt}$$

where:

$$d_1 = \left\{ \ln[S/E] + (r + v/2)t \right\} / \left\{ vt \right\}^{1/2}$$

$$d_2 = d_1 - \left\{ vt \right\}^{1/2}$$

$$N[x] = (2\pi)^{-1/2} \int_{-\infty}^x e^{-u^2/2} du$$

Chart 1 shows the predicted values of call options on IBM stock computed from the Black-Scholes model for three different values of t . In that chart, option values are expressed as a percentage of the strike price of the option, *i.e.*, as the ratio C/E . The stock price is also expressed as a percentage of the strike price, or as the ratio S/E . The interest rate was set at 8.5 percent per annum, or $r = 0.085$. This is approximately the rate on high-quality commercial paper that prevailed at the beginning of September 1978.

The only unobservable variable in the Black-Scholes model is the stock price volatility, v . This variable can be estimated by computing the value of v which leads to a predicted option price equal to the actual market price of the option.² When this was done for the twelve call options on IBM on September 1, 1978, the average v came out to be .0372. This implies that there was about a 66 percent chance that the price of IBM stock would vary in one day by less than 1 percent of its previous closing price.³ The value of $v = .0372$ was used to compute the option values shown in Chart 1.

The volatility parameter can also be estimated from the historical price volatility of a stock if one is willing to assume that the future price volatility will be like the historical volatility.

Clifford Smith has pointed out that the Black-Scholes option pricing model may be interpreted as the expected intrinsic value of an option, on its expiration date, times a discount factor which converts that future value to a present value.⁴ The expected future intrinsic value depends on the probability that the option will expire in-the-money, and hence depends on the volatility of the underlying stock. Other things being equal, options on more volatile stocks have a higher probability of expiring with a greater in-the-money value than options on more stable stocks. Thus, the value of an option increases with stock volatility.

The Black-Scholes pricing model is frequently used by market participants to estimate the hedge ratio and the elasticity of an option. The hedge ratio is defined as the ratio of simultaneous dollar changes in option and stock prices. It can be shown that the hedge ratio of an option is $N[d_1]$. This result was used to compute the entries of Tables 5 and 7 and the curves of Chart 2. The elasticity of an option is defined as the ratio of simultaneous percentage changes in option and stock values. From the Black-Scholes model, this ratio is $S \cdot N[d_1]/C$. This result was used to compute the entries of Table 6. The values of the hedge ratio and elasticity of an option both depend on the volatility parameter. Because that parameter cannot be estimated without error and because a particular estimate depends on the method of estimation, the computed hedge ratio and elasticity can only be viewed as imperfect estimates of the true values.

¹ Fischer Black and Myron Scholes, "The Pricing of Options and Corporate Liabilities", *Journal of Political Economy*, 81 (May/June 1973), pages 637-54.

² This method of obtaining the volatility parameter is discussed by Richard Schmalensee and Robert Trippi, "Common Stock Volatility Expectations Implied by Option Premia", *Journal of Finance*, 33 (March 1978) pages 129-47.

³ The variance of the log of the price of IBM stock is 0.0372 per year, or .000102 per day (.000102 = 0.0372/365). The standard deviation of the change in the log of the stock price over a one-day interval is therefore .0101 (.0101 = (.000102)^{1/2}), or about 1 percent. The probability that a normally distributed variable will be less than one standard deviation from its mean is about 66 percent, so the probability that the price of IBM will change by less than 1 percent in value in one day is about 66 percent.

⁴ Clifford Smith, Jr., "Option Pricing: A Review", *Journal of Financial Economics*, 3 (January/March 1976) pages 3-51, at footnote 22.

Are State and City Corporate Income Taxes Stifling Investment in New York?

In recent years, the intertwined economies of New York State and New York City have undergone a marked deterioration. Symptomatic of economic conditions, private nonfarm employment in New York peaked toward the end of the 1960's and has behaved feebly since then. Nobody has come up with an altogether convincing explanation for what specifically precipitated this debilitating turn of events, but most observers seem fairly confident that New York's lofty taxes must have been a key contributing factor. In this connection, the ones most criticized are New York's corporate income taxes, personal income taxes, and property taxes. While all of these taxes along with many other economic factors influence industrial-location choices, the focus of this study is on the corporate income taxes.

Corporate income is taxed at an exceptionally high rate in New York. Inasmuch as New York's tax rates are among the highest in the nation, it is often taken for granted that businesses find it unqualifiedly unprofitable to invest or to locate there. Some businesses may indeed shun New York because of its reputation for having such high taxes. Objectively, however, the matter turns out to be more complicated. Just as the state and local corporate tax rates vary between New York and elsewhere, so do the statutory provisions concerning taxable income and permissible deductions. In what ways and to what extent, then, do the New York State and New York City corporate income taxes distort the profit incentives for goods-producing companies to undertake investments in New York?

Answering these questions turns up some interesting, and sometimes surprising, conclusions about the profitability of investments in New York. The problem

with New York's corporate tax laws is really not just the high taxes overall but their severe bias against long-lived investments. Indeed, for such investments, New York's tax laws depress the rate of return far below what it is elsewhere. Much less onerous taxes, however, apply to shorter lived investments. For those with service lives of ten years or less, the corporate tax burden turns out to be no heavier in New York—and is sometimes actually lighter there—than it is elsewhere.

Business income taxes and the rate of return on investment

In principle, business firms will choose to locate their operations where they stand to earn the highest aftertax rate of return. In this regard, location decisions are no different from decisions about what price to charge, what combination of inputs to use, and how much output to produce. Accordingly, state and local business income taxes will affect investment-location decisions only to the extent that they impinge on the rate of return earned by businesses on their investments. It is vital, then, to understand how business income taxes affect this rate of return.

The aftertax rate of return

Just how do corporate income taxes affect the rate of return that businesses earn on their investments in fixed capital? In two ways, it turns out.¹ First, the tax

¹ There is a technical appendix in which the economic logic of this result, as well as of others, is spelled out in more detail. Copies of this appendix are available upon written request to the author.

siphons off a certain proportion of the income from the investment project and channels it to the government. Second, by allowing businesses to deduct depreciation expenses and to claim an investment tax credit, the government reduces its tax take and thereby lowers the effective cost to businesses of buying capital goods. In looking at the problem in this way, however, it is assumed that businesses earn profits large enough to enable them to take full advantage of all the depreciation deductions and investment tax credits for which they are eligible.² As a practical matter, this assumption is much more likely to hold for established companies than it is for new companies that are solely dependent on the profits from the newly undertaken project.

Businesses deduct depreciation expenses from receipts in figuring their taxable incomes. Under the Federal tax laws, for example, firms have some latitude in choosing the allowable service lives for different kinds of capital goods. These service lives do tend to vary considerably among asset categories—ranging, for example, from three years for automobiles to six years for trucks, eight years for office computing and accounting machinery, eighteen years for engines and turbines, and twenty-five years for structures. Firms may also choose which depreciation-accounting convention they will use—i.e., straight-line, sum-of-years-digits, or double-declining-balance. Although all three methods amortize the nominal purchase price of capital goods over the statutory service life, each one does so according to its own unique time schedule for amortization.

For each dollar spent on capital goods, there will be a stream of tax-reducing depreciation deductions which cumulate to one dollar over the statutory lifetime of the capital goods. Arrayed in the upper half of Table 1 are the present values of a dollar's worth of depreciation expenses, given the Federal tax laws along with a number of alternative assumptions. Consider, for instance, the case where the statutory service life is ten years, the discount rate is 5 percent, and the straight-line method is used. Each dollar of investment outlay then affords a lump sum of 81 cents in tax-deductible depreciation expenses. If the tax rate were 50 percent, this 81 cents worth of depreciation deduction would represent a tax saving of 40.5 cents. Since this tax saving applies to each dollar of investment outlay, the aftertax cost of the capital goods turns out in this

case to be only 59.5 percent of the nominal purchase price of these goods. The above calculations illustrate the general rule that the tax saving derived from depreciation write-offs amounts in effect to a lump-sum offset against the nominal purchase price of capital goods.

Similarly, the tax saving from investment tax credits represents another partial offset. An investment tax credit allows businesses to deduct a specified proportion of the initial cost of newly purchased capital goods from their tax bill. Even when this credit is taken, businesses are still permitted to compute depreciation expenses based on the full initial cost of the capital goods—just as they normally would.

In the event that the tax offsets were to reduce the cost of investments by proportionally more than the tax bite from gross profits, the business income tax laws would then raise the rate of return on investment above what it was before taxes. This paradoxical result only occurs, however, under unusual but not impossible circumstances: The extra income taxes that businesses owe out of the gross income from an investment project have to add up to less, in terms of present values, than do the depreciation deductions and the investment tax credits derived from the project. Businesses can then use these "surplus" deductions to offset any other taxes they owe on the income from past investments. Insofar as companies are able to take advantage of these surplus deductions, the tax offsets actually amount to an investment subsidy. It is this tacit subsidy that raises the aftertax rate of return in relation to its before-tax counterpart.

Overlapping business income taxes

Many businesses face overlapping income taxes levied by the Federal, state, and even some local governments. How do these *multiple* business income taxes affect the rate of return on investment?

Since the tax bases are pretty much alike, the Federal, state, and local corporate income taxes all operate in essentially the same two ways: In each case the "take-home" profits of businesses are reduced, but so are the "out-of-pocket" costs involved in undertaking investments.

The tax bases do differ among state and local governments, however, according to whether the Federal income taxes are a deductible expense for the other income taxes. Under the Federal tax code, businesses are always allowed to deduct the amount of their state and local income taxes from their taxable incomes. In contrast, only in a few states are businesses allowed to deduct their Federal income taxes from their taxable income for purposes of computing state and local income taxes. The more common of the two tax rules

² The question arises then as to what happens when profits are so low that businesses cannot take full advantage of their tax offsets. Under the tax statutes, businesses have some latitude in carrying the unused portion of an investment tax credit either forward or backward in time. Depreciation allowances, however, must be used as they accrue or else be lost.

—by which businesses are not permitted to deduct their Federal corporate income tax payments in figuring their taxable state income—is the one that applies to New York State.

Income from corporate investments in New York City is taxed by the city as well as by the state and Federal governments. The following four tax rules govern the deductibility of Federal, New York State, and New York City corporate income taxes from one another: (1) New York State and New York City corporate income taxes are deductible expenses for Federal taxes. (2) Federal corporate income taxes are not deductible for the New York State or New York City corporate taxes. (3) The New York City corporate income tax is a deductible expense for the New York State tax. (4) The New York State corporate tax is not a deductible business expense for the New York City corporate tax.

These rules are, in effect, hierarchical. Businesses located in New York City are allowed to deduct the taxes they pay to a political body only in figuring their taxable income for higher governments. This situation, then, is really just an extension of the one that applies to those states in which Federal tax payments are treated as nondeductible.

State and local corporate income taxes

Before New York's corporate income taxes can be evaluated, they must be compared with those levied elsewhere. Such a comparison, of course, requires detailed rundowns of the corporate tax laws of other states. This information was collected for the ten states besides New York that are listed in Table 2. In selecting them, the one systematic criterion was that there be two or three states from each of the four main regions of the country.

The corporate tax codes were examined for all eleven states, plus New York City. Four separate tax matters had to be reviewed to determine how the state or local corporate income tax impinges on the rate of return to investment:

- (1) At what rate is corporate income taxed by the state?
- (2) Are Federal income taxes deductible for the state's income taxes?
- (3) How are depreciation expenses computed for the state's income taxes?
- (4) Does the state have its own investment tax credit?

How the states handle each of these matters is summarized in Table 2.

One noteworthy feature is how high New York's corporate tax rates were in 1977.³ Indeed, New York State's stiff 12 percent corporate tax rate ranked then as the highest in the nation.⁴ In addition, there was New York City's 10 percent corporate tax. Businesses located within the city's boundaries had to pay a marginal state and local tax rate that exceeded 20 percent, although the *net* tax rate amounted to only about half as much since state and local corporate income taxes are deductible expenses for Federal taxes. In the other states, the gross marginal corporate tax rates were then clustered in the range of 4 to 6 percent. Since 1977, however, New York State has reduced its corporate tax rate to 10 percent while New York City has reduced its rate to 9 percent.

According to the tax codes of most states, businesses are allowed to claim the same depreciation deductions that they take for their Federal taxes. There are exceptions, however. The New York City tax laws permit businesses to take up to twice the Federal depreciation deduction, so long as the cumulative depreciation deduction does not exceed the initial cost of the capital good being amortized. This double-depreciation provision has been in force since the inception of New York City's corporate income tax in 1966; it applies to all kinds of production and manufacturing facilities but not to headquarters structures. Listed in the bottom half of Table 1 are the present values of a dollar's worth of depreciation allowances under the New York City tax laws. These present values turn out to be much higher than the corresponding ones for the Federal tax laws, inasmuch as New York City's double-depreciation provision reduces the effective service lives of capital goods by more than half in the case of accelerated depreciation.

Michigan's tax treatment of depreciation is also very unusual.⁵ There, businesses are allowed to deduct the full amount of their expenditures on capital goods in the same period that the purchases are made. (In Table 2, this is referred to as the 100 percent write-off policy.) Under this plan, businesses are allowed to take

³ For New York State and New York City, the corporate tax laws specify four alternative tax bases, and a business must choose the one that entails the highest tax obligation. The tax base that is most commonly used, and the one that is described in the text, is the so-called entire net income. The other three tax bases are the business and investment capital basis, the entire net income plus compensation basis, and the minimum flat fee (\$250) basis.

⁴ Minnesota's corporate tax rate was also 12 percent.

⁵ Actually, Michigan's entire approach to taxing businesses is unusual. A uniform value-added tax is applied there to all businesses. (For details, see the recent report published by the Advisory Commission on Intergovernmental Relations, *The Michigan Single Business Tax: A Different Approach to State Business Taxation*, M-114, dated March 1978.)

Table 1

**Present Values of Business Depreciation Allowances
Per Dollar of Investment Outlays**

Discount rate*	Straight-line method			Sum-of-years-digits method			Double-declining-balance method		
	5 years	Service lives of		5 years	Service lives of		5 years	Service lives of	
		10 years	20 years		10 years	20 years		10 years	20 years
Federal tax laws									
0.05	0.91	0.81	0.65	0.94	0.87	0.75	0.94	0.86	0.72
0.10	0.83	0.68	0.47	0.89	0.77	0.60	0.89	0.75	0.57
New York City tax laws									
0.05	0.96	0.91	0.81	0.98	0.95	0.90	0.99	0.96	0.89
0.10	0.93	0.83	0.68	0.97	0.92	0.81	0.98	0.92	0.81

* The rate of return used to capitalize the stream of depreciation allowances.

Table 2

**Corporate Tax Laws in Selected States and
New York City, 1977**

Location	State or local tax rate on corporate income (percent)	Tax-deductible depreciation expense	Federal income tax deductible	State investment tax credit (percent)
New York State	12	Federal depreciation rules apply	No	2
New York City	10	Twice the Federal deduction	No	....
New Jersey*	7.5	Federal depreciation rules apply	No	....
Connecticut	10	Federal depreciation rules apply	No	....
Alabama	5	Federal depreciation rules acceptable	Yes	....
Georgia	6	Federal depreciation rules apply	No	....
North Carolina	6	Federal depreciation rules apply	No	....
Oklahoma	4	Federal depreciation rules apply	No	....
Michigan	2.35†	100 percent write-off policy	No	....
Illinois	4	Federal depreciation rules apply	No	....
Arizona	10.5‡	Federal depreciation rules apply	Yes	....
Colorado	5	Federal depreciation rules apply	No	....

* In addition, corporations must pay a tax on their net worth.

† This is a value-added tax which is applied uniformly to all businesses within the state.

‡ This is the top rate of a graduated tax scale, and it applies for taxable income in excess of \$6,000.

Sources: *Facts and Figures on Government Finance, 1977* (Tax Foundation, Inc.); selected issues of the Commerce Clearing House tax reporters for state taxes.

their depreciation deductions all at once, instead of having to stretch them out over the allowable service lifetime, and the present value of these deductions is accordingly equal to one.

Two other features stand out in Table 2. First, among the states listed there, only Arizona and Alabama allow businesses to deduct their Federal income taxes in computing their taxable state income. Second, New York State is the sole state giving an investment tax credit to businesses. New York State's investment tax credit had initially been pegged at 1 percent in 1968, but it was increased to 2 percent in 1974, to 3 percent in 1978, and to 4 percent in 1979. While the Federal tax credit applies only to purchases of equipment and specifies a \$100,000 per year ceiling on the amount of used equipment eligible for the tax credit, the New York State tax credit applies to both structures and equipment which have been constructed or acquired on or after January 1, 1974.

New York corporate income taxes: an economic appraisal

The above analysis can be used to assay the strengths and weaknesses of New York's corporate tax laws: In view of New York State's generous investment tax credit and New York City's liberal amortization schedules, is the rate of return on investment higher or lower in New York than it is elsewhere?

The aftertax rates of return in New York

Consider a corporation which is planning to undertake a new investment project and must decide where to situate it. Other things being equal, the choicest location will be the one where the highest aftertax rate of return can be earned.

To keep the analysis concrete, the following assumptions are invoked. Economic depreciation is assumed to occur at a constant, geometric rate. The discount rate used in capitalizing the stream of depreciation deductions is assumed to be given. Since, according to the results for Federal taxes listed in Table 1, the present value of the depreciation deductions is always largest for the sum-of-years-digits method, it is assumed that firms use this method in amortizing their investments in fixed capital.⁶ The locations being con-

sidered are taken to be alike in all respects but one—*viz.*, the applicable state and local corporate income taxes. Necessarily, then, the rate of return would be the same no matter where the investment were located, were it not for the state and local taxes. In addition, the Federal corporate tax rate is taken to be 48 percent, and the Federal investment tax credit is assumed to be 10 percent for capital goods with service lives of ten years or less but equal to zero for capital goods with service lives of twenty years. (In fact, the Federal investment tax credit amounts to 10 percent for equipment and to zero for structures.)

The choice of where to start the analysis is to some extent arbitrary. It was decided, therefore, to begin with the assumption that the project's rate of return *after* Federal taxes but *before* state and local corporate income taxes—designated the “before-tax” rate of return—is 1 percentage point higher than the discount rate. With given values assigned to the before-tax rate of return and the discount rate, it is then possible to calculate the corresponding hypothetical aftertax (*i.e.*, net of *all* income taxes) rate of return. The difference between the aftertax and the before-tax rates of return is the result of state or local corporate income taxes.

Listed in the upper portion of Table 3 are the hypothetical aftertax rates of return for New York State and New York City. Each one has been obtained by invoking specific assumptions about the discount rate, the before-tax rate of return, the rate of economic depreciation, and the tax-allowable service life. Two alternative values have been used to represent the discount rate—5 percent and 10 percent. Since the discount rate is in principle a nominal aftertax yield, this range probably encompasses the actual values applicable to most companies. At the current high rate of inflation, the discount rate for some firms might well be above 10 percent, but there are probably very few others for which the discount rate is below 5 percent.

One noteworthy feature of Table 3 is the variability of the effective corporate tax burden in New York, evident in the widely ranging differences between the aftertax and before-tax rates of return. Upon undertaking fixed investments, businesses earn state and local tax offsets equal to the present values of the depreciation deductions and of the investment tax credit. The amount of these tax offsets tends to vary from one fixed investment to another. In general, the higher the tax offsets, the lower the *effective* tax burden, and the higher the aftertax rate of return in relation to its before-tax counterpart.

If the service life were short enough or if the discount rate were low enough, the rate of return on fixed investments could end up higher after taxes than it was beforehand. For this to happen, however, the tax off-

⁶ For all industries across the nation, only 18.3 percent of the purchases of machinery and equipment made in 1971 was depreciated by the straight-line method, according to data compiled by the Office of Tax Analysis (OTA) in the United States Department of the Treasury. (See Thomas Vasquez, “The Effects of the Asset Depreciation Range System on Depreciation Practices”, OTA Paper 1, May 1974, page 37.) Since the marginal tax rate is higher in New York than elsewhere, it is likely that businesses located there use the straight-line method even less often than the national average.

Table 3

Hypothetical Marginal Aftertax Rates of Return: A Comparison of New York State, New York City, and Alternative Locations, 1977

In percent

Locations	Discount rate (5 percent)*			Discount rate (10 percent)*		
	5 years	Service lives of 10 years	20 years	5 years	Service lives of 10 years	20 years
<i>After Federal taxes, but before state and local corporate income taxes</i>	6.0	6.0	6.0	11.0	11.0	11.0
New York State outside New York City	7.24	6.34	5.53	11.81	10.71	9.92
New York City	7.90	6.44	5.10	12.19	10.41	9.08
New Jersey	6.23	5.89	5.57	10.94	10.49	10.17
Connecticut	6.31	5.86	5.42	10.92	10.31	9.88
Alabama	5.89	5.85	5.85	10.77	10.70	10.71
Georgia	6.18	5.92	5.66	10.95	10.60	10.34
North Carolina	6.18	5.92	5.66	10.95	10.60	10.34
Oklahoma	6.12	5.95	5.78	10.97	10.74	10.57
Michigan	6.12	6.04	5.94	11.09	10.99	10.88
Illinois	6.12	5.95	5.78	10.97	10.74	10.57
Arizona	5.75	5.66	5.67	10.50	10.33	10.37
Colorado	6.15	5.93	5.72	10.96	10.67	10.45

These aftertax rates of return were calculated in accordance with formulas which are derived in the technical appendix. In doing so, it has been assumed that there is an exact correspondence between the rates of economic depreciation and the tax-allowable service lives—i.e., that the rate of depreciation is 25, 15, or 8 percent as the service life is five, ten, or twenty years. The results listed in this table were obtained by substituting the actual values of the tax parameters and alternative hypothesized values for certain other parameters into these formulas. See the technical appendix for a step-by-step example.

* The rate of return used to capitalize the stream of depreciation allowances.

sets have to exceed the amount owed in taxes on the incremental gross income. Since the excess can be used by businesses to reduce their other income tax liabilities, it amounts in effect to a subsidy. Consider, for instance, the case in Table 3 where the discount rate is 5 percent and the service life is ten years. As can be seen, while the before-tax rate of return is 6 percent, the aftertax rate of return is 6.34 percent for New York State and is 6.44 percent for New York City. Businesses are evidently getting tacit subsidies on these investments. (Of course, for these subsidies to be effective, businesses must have other income tax liabilities against which to apply the "surplus" offsets.) In these two examples, the subsidy can be traced to two special tax provisions: New York State's generous investment tax credit and, to a lesser extent, New York City's liberal amortization schedules.

Another interesting finding in Table 3 is that the

aftertax rate of return in New York tends to fall as the service life of the capital goods is lengthened, especially in New York City. Essentially, then, short-lived investments wind up being subsidized by the stiff income taxes levied on long-lived investments. Consequently, the corporate tax systems of New York State and New York City embody pronounced biases against long-lived investments.⁷

What accounts for this bias? Under the current New York State and New York City tax laws, the present value of depreciation allowances falls off sharply as the service life of the capital goods being amortized is lengthened (cf. Table 1). Here is the problem. These

⁷ A similar bias is embodied in the Federal corporate income tax laws. Since, however, the bias in the Federal laws applies uniformly across the nation, it does not influence the location choices of businesses. Nor, then, is it necessary to take this bias into account in the current analysis.

allowances make up the bulk of the tax offsets against the nominal purchase price of the capital goods. Insofar as the present value of depreciation allowances falls as the service life of the goods is lengthened, businesses wind up paying for a larger share of the cost of the investment—even though the fraction of the income from this investment that goes to taxes is unchanged. Thus, the aftertax rate of return declines.⁸

The relative standings

As a general rule, businesses will locate their investments wherever they stand to earn the highest aftertax rate of return. Accordingly, in assessing how New York's corporate income taxes distort investment-location decisions, what matters is how onerous these taxes are in relation to those levied elsewhere.

Aftertax rates of return were calculated for alternative locations (Table 3). In looking at the results, it is evident that the bias of the tax laws against investments in long-lived capital goods is by no means unique to New York—though it does appear to be especially pronounced there. No less interesting, however, is the fact that this bias is absent in Alabama and Arizona.

In Alabama and Arizona, businesses are allowed to deduct their Federal income taxes in computing their taxable state income. This indeed is the tax provision that neutralizes the state corporate tax system's bias against long-lived capital goods. To understand why this is so, recall that the bias occurs insofar as the amount of the state income taxes owed by businesses tends to rise as the service life of the investment lengthens, other things being the same. When, however, state and Federal taxes are mutually deductible, the two separate taxes are interdependent. Consequently, as the amount of the state income taxes owed by businesses increases, as it does when the service life is lengthened, businesses wind up owing less Federal income taxes—and vice versa. It is this interdependence that accounts for the tendency of the aftertax rate of return in Alabama and Arizona to remain invariable for different lengths of service lives of capital goods.

How did the aftertax rates of return for New York stack up in 1977 against those for other places? Contrary to conventional wisdom, New York's corporate

income taxes were not invariably more onerous than those levied elsewhere. This is evident from the results in Table 3. For those fixed investments with service lives of ten years, the corporate tax burden in New York is comparable to that elsewhere. Moreover, for service lives of five years, the aftertax rate of return is higher in New York than in the other states examined. At the same time, however, New York was a much less profitable location for long-lived capital goods with service lives of twenty years. For these goods, New York City ranks in last place, with the rest of the state being not too far ahead.

To some extent, then, New York's reputation as a high-tax location has been exaggerated—at least in regard to corporate income taxes. Never does the differential between the rates of return for New York and elsewhere exceed 20 percent of the discount rate. True, the largest differentials work to the competitive disadvantage of New York. But they apply only to longer lived investments and are offset to some extent by the differentials for short-term investments which work in New York's favor. Furthermore, New York has lately undertaken to improve its business tax climate. Last year, for example, New York City cut its corporate tax rate to 9 percent. Similarly, New York State cut its corporate tax rate to 10 percent and doubled its investment tax credit to 4 percent. New York is intent on making itself a more hospitable industrial location.

Conclusions

Out of this study comes an appreciation for how and to what extent the New York State and New York City corporate income taxes have distorted the profit incentives by which goods-producing companies choose where to locate their new investments. Nowhere were state and local corporate tax rates higher in 1977 than in New York. Their stifling impact on fixed investment was mitigated, however, by New York State's generous investment tax credit and New York City's liberal double-depreciation provision. The problem with these New York tax laws, it turns out, is not so much the high taxes overall as it is their severe bias against long-lived investments.

As a result of the bias, the aftertax rate of return tends to vary with the length of the service life of the capital goods. For long-lived investments, New York's tax laws drive the aftertax rate of return far below what it is in other places. However, for shorter lived investments with service lives of about ten years, the corporate tax burden happens to be no heavier in New York than it is elsewhere. For service lives as low as five years, the corporate tax burden is actually lighter in New York than elsewhere.

In view of how differently New York's corporate in-

⁸ Inflation tends, moreover, to exacerbate this bias. In response to a higher rate of inflation which is expected to persist, there will be a similarly higher nominal required rate of return. Consequently, the present value of depreciation allowances will decline, and the decrease will be larger (*i.e.*, in absolute value), the longer the service life of the capital goods. As a result of this decline, according to the argument in the text, the corporate tax laws end up shrinking the aftertax purchase price of capital goods by less than they would have if the rate of inflation were smaller—thereby lowering the aftertax rate of return earned by businesses.

come tax laws have affected the rates of return on short-lived and long-lived investments, it appears to be a fairly safe bet that these laws have distorted the composition of investment spending. New York's corporate tax laws favor capital goods with short service lives over those with long service lives. By the same token, however, it is unclear to what extent these laws have affected the level of total investment spending in New York. Nor is it clear to what extent New York's corporate income taxes have contributed to the region's recent economic distress.

One thing is sure, however. Inasmuch as the corporate tax rates have been reduced and the investment

tax credit has been doubled over the past year, New York's corporate income taxes are less burdensome today than they were in 1977. Now, in fact, New York's corporate tax system in effect subsidizes fixed investments with service lives of ten years or less even when the discount rate is as high as 10 percent. Moreover, for longer lived investments with service lives of twenty years, the corporate tax burden has been reduced to the point where the aftertax rate of return is now 40 to 60 basis points higher than it would have been had the tax laws not been changed. Indeed, New York City and the rest of the state are making progress in improving their business tax climates.

Leonard Sahling

United States Export Performance

Following a prolonged period of stagnation, the volume of United States exports registered one of its sharpest surges ever between January and November 1978. Export volume increased at nearly a 25 percent annual rate. That compares with an average increase of less than 1 percent per annum over the preceding three years.

The marked reversal in export performance requires explanation. Why did United States exports remain so weak up through early 1978? And why has the subsequent turnaround in exports been so pronounced?

Providing thoroughly convincing answers to these questions may be impossible. Over recent years this country's exporters—and potential exporters—have been faced with significant changes in dollar exchange rates, with sharply differing economic growth rates here and abroad, and with diverse trends in national inflation rates. In those circumstances, the profit incentives to export have undergone considerable change from one year to the next. And, in an atmosphere of continuing uncertainty, the varied responses of exporters to those changes in incentives have been unusually hard to foresee on the basis of simple statistical relationships drawn from the past.

Nevertheless, based on the initial results of empirical research in progress at the Federal Reserve Bank of New York, a number of conclusions can be made:

- Much of the weakness of United States export volume after the 1974-75 recession stems from the coincidence of slow growth of import demand in our major markets abroad, especially Japan and Canada, and relatively rapid economic growth in this country.

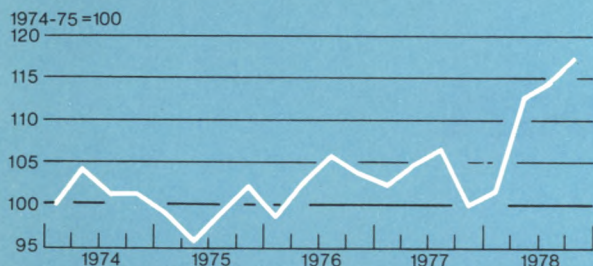
- The United States share of world markets deteriorated substantially in 1976 and 1977, largely because of a major erosion of the price competitiveness of our exports that occurred during the recession years.
- Price competitiveness has been restored by the exchange rate changes of the past two years. But it takes about two to three years for exports to respond significantly to improved profit opportunities, and those lags may have even lengthened as a result of the relative cyclical behavior of United States and foreign economies.
- Based on current patterns of adjustment, further substantial improvement in United States export volume—on the order of 10 to 15 percent—may be expected over the coming months.

The export slump

In 1977 the value of this country's exports was about 18 percent higher than the average during the 1974-75 recession. But, after taking inflation into account, this amounted to an increase in export volume of less than 2 percent, or an average rise of less than 1 percent per year (Chart 1). This performance was poor relative to our own historical experience; export volume had increased about 5½ percent a year throughout the preceding decade. And it was poor by international comparison. Other industrial countries increased their export volume by about 13 percent between 1974-75 and 1977.

An emphasis on export *volume*, rather than on *value*,

Chart 1

United States Export Volume

Latest plotting is an average for October and November.

Source: United States Department of Commerce.

requires some justification. The choice of a measure of export performance depends on the problem to be examined. Export value is an appropriate broad measure of the impact of trade flows on national income, since an increase in volume brings little economic gain when accompanied by a great drop in export prices relative to the general level of prices. Fortunately, the United States does not often find itself in such a situation. Because this country sells a wide range of goods abroad, the average level of our export prices is not much affected by price swings for a few commodities. By the same token, however, this means that, in order to achieve much of a reduction in the United States trade deficit, export volume must increase considerably.

There is another important reason to focus on export volume: it provides a more appropriate measure than export value for comparing the United States performance with that of other countries. Such a comparison is normally made in terms of the share of each country's exports in total world trade. But evaluating performance by value shares has drawbacks. The calculation of value shares requires that all export flows be translated into a common currency at current exchange rates. This immediately reduces the share of a country whose currency has depreciated. Value shares can, therefore, give a misleading indication of underlying performance. A country's export volume share may actually be improving during a given period in response to a previous depreciation of its currency even as its value share is still declining. For this reason, volume shares are preferred for cross-country comparisons of export performance.

Finally, changes in export volume are the appropriate measure for assessing the impact of foreign sales on domestic employment.

Business cycle effects

Following the 1974-75 recession, United States exporters faced slower growing export markets than did producers from other major industrial countries (Table 1). By and large, in this period as in the past, a high rate of export volume growth among industrial countries has been associated with relatively faster growing foreign markets. These differences in market growth rates account for only part of the differences in export performance among countries; other factors, such as price competitiveness, are also important. However, the impact is not negligible. For example, had United States export markets grown at the same rate as those for Japan over the period, the rate of increase in foreign sales volume for this country would have more than doubled, even assuming the United States suffered the same loss of relative market share that actually occurred. That would have translated into an extra \$3 billion of exports in 1977 (or 2½ percent of the total recorded).

That crude estimate, however, provides only a lower bound to the actual impact on our exports of slower foreign growth. Supply-side influences aggravated the effects on United States export performance of relatively weak demand in foreign markets. If foreign producers who compete directly with United States firms had faced more buoyant markets in their own countries, they might have run into constraints on supplying exports to third markets or they might have competed less aggressively for new business abroad, concentrating instead on meeting demand at home. This would have made it relatively easier for United States producers to compete both in other industrial countries and in the developing countries. Similarly, had the United States economy grown less rapidly than it in fact did, American firms would have found the export market relatively more attractive and competed there with more vigor.

The pattern of global recovery from the 1974-75 recession was particularly adverse for United States exports. Economic expansion in this country was vigorous by any yardstick. The actual rate of growth not only exceeded the economy's longer term potential growth rate, but it also exceeded the average growth rate achieved in recoveries from earlier postwar recessions.

The United States experience contrasts sharply with that of other industrial countries (Table 2). For them, economic recovery from the recession has been weak. Actual growth rates have been below historical recov-

Table 1

Trade Volume and Market Shares for Selected Countries

Exporting country	Own export volume growth 1974-75 to 1977 (percentage increase)	Rest-of-world import volume growth* 1974-75 to 1977 (percentage increase)	Average market share†		Marginal market share‡	Competitiveness ranking measures§ (ratio)
	(1)	(2)	1974-75 (percent)	1977 (percent)	(percent)	(6)
United States	1.8	13.6	15.1	13.5	2.0	0.1
Canada	17.9	16.1	4.4	4.5	4.9	1.1
Japan	33.6	16.4	7.2	8.3	14.8	2.1
France	14.4	15.5	7.0	6.9	6.5	0.9
Germany	12.7	14.8	12.5	12.3	10.8	0.9
Italy	21.5	15.9	4.4	4.6	5.9	1.3
United Kingdom	15.0	16.6	5.8	5.7	5.3	0.9

* Based on world import volume minus that of the country for which the calculation is made.

† Ratio of each country's export volume index to the rest-of-world volume index.

‡ The change in each country's export volume between its 1974-75 average and its 1977 level divided by the change in rest-of-world import volume over the same period.

§ Column 5 divided by column 3.

Sources: International Monetary Fund: *International Financial Statistics and Direction of Trade*.

Table 2

Import Volume and Real Domestic Growth

Country	Import volume growth 1974-75 to 1977			Import Income elasticity	Gross national product growth at annual percentage rates			
	Actual (percentage increases)	Normal* (percentage increases)	Ratio of own to rest-of- world‡ (as a percentage)		Growth from 1974-75 to 1977	Actual recovery rate‡	Historic recovery rate	Long- term potential rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
United States	28.2	26.7	31.3	2.6	3.9	5.6	4.4	3.8
Canada	4.8	15.2	1.4	1.7	3.5	4.1	6.5	5.2
Japan	3.7	16.4	2.5	1.3	4.9	5.3	8.0	6.5
France	16.4	15.9	7.6	1.9	3.2	3.0	6.2	5.5
Germany	23.2	15.5	15.4	2.1	2.9	4.1	6.0	4.8
Italy	7.8	10.8	2.5	1.9	2.2	2.4	5.7	4.8
United Kingdom	1.8	4.9	0.8	2.1	0.9	2.3	3.3	3.0

* Each country's import income elasticity times its annual growth rate (column 5) compounded over the two and one-half year period from the 1974-75 base to the end of 1977.

† Rest-of-world import volume defined as in Table 1.

‡ Actual rates of recovery are calculated from the trough quarter of the recession (which differs for each country) through the fourth quarter of 1977.

Source: Staff estimates, Federal Reserve Bank of New York.

Table 3

Export Penetration of Four World Market Areas

Exporting country	Market share 1974-75 (percent)	Market share 1977 (percent)	Marginal market share* (percent)	Competitiveness measure* (ratio)	Competitiveness Rank
Industrial country markets†					
United States	12.6	11.4	7.4	0.6	5
Japan	3.8	4.7	11.1	2.9	1
Germany	12.0	11.6	9.2	0.8	4
France	6.4	6.4	6.7	1.0	3
United Kingdom	4.2	4.6	6.3	1.5	2
Other European markets					
United States	9.4	7.9	-11.4	-1.2	5
Japan	2.8	4.4	23.6	8.4	1
Germany	3.8	12.1	- 9.4	-0.7	4
France	6.2	6.1	5.1	0.8	3
United Kingdom	9.2	9.1	7.8	0.9	2
Oil exporting country (OPEC) markets					
United States	17.5	16.6	15.5	0.9	4
Japan	13.2	14.7	16.6	1.3	1
Germany	12.0	13.5	5.1	1.3	1
France	8.6	7.0	9.0	0.6	5
United Kingdom	8.7	8.8		1.0	3
Other less developed country (LDC) markets					
United States	20.4	16.0	- 6.3	-0.3	5
Japan	11.6	12.8	18.8	1.6	1
Germany	6.6	5.8	1.8	0.3	3
France	5.5	6.0	8.1	1.5	2
United Kingdom	5.0	4.4	1.5	0.3	3

* Defined as in Table 1.

† A rest-of-industrial-market definition is used with respect to each country listed in the stub.

Sources: International Monetary Fund: *International Financial Statistics* and *Direction of Trade*.

ery rates. And they have even been below longer term potential growth rates. In other words, growth was not fast enough to reduce significantly unemployed resources or to stimulate substantial import demand.

As a result, the United States market was exceptionally attractive to all producers. To foreign producers, the American economy provided nearly one third of the additional demand for "foreign" goods that was provided by the rest of the world combined. To American producers, faced with a buoyant home market and slack markets abroad, the incentives favored sales at home. Export efforts could be relaxed and domestic marketing became easier. Since less than 10 percent of United States gross national product (GNP) is exported, even a small shift in mar-

keting effort by United States producers can have a major impact on exports.

A particular consequence of the slow expansion abroad was a general weakness in world investment demand. Since capital goods form a substantial part of United States exports (30 percent over the past 14 years), weak investment spending had a major adverse effect on our foreign sales during the recovery period. The United States was the only industrial country in which the growth rate of real investment expenditure exceeded real income growth. German investment grew at the same rate as the economy in general. Italy suffered a 5½ percent decline, while real investment spending in the United Kingdom was but ½ percent above its 1974-75 level by the end of 1977. In Japan,

real investment spending rose by 2 percent, compared with cumulative real growth of 13 percent. Under these circumstances, the volume of United States capital goods exports rose less than 1 percent between 1974-75 and the beginning of 1978, compared with an average annual increase of about 8 percent per year over the previous decade.

Another major reason for our weak export performance can be found in the particular sluggishness of imports by Canada and Japan, two of our major markets. Over the last fourteen years, fully 30 percent of United States exports have been sold in Canada and Japan. Those two countries historically tend to increase their imports proportionately less than most industrial countries as their domestic economies expand. In technical terms, their "income elasticities of demand" are relatively low (Table 2). To make matters worse, in this recovery both Canada and Japan drew in far fewer imports than would be expected on the basis of past experience. For these countries, actual import volume growth turned out to be more than 10 percentage points below the growth that would have occurred had the historical relationships between import growth and income growth been maintained. Indeed, a closer look at Japanese import patterns shows an actual decline of about 10 percent in import volume from all industrial countries. United States export volume to Japan fell by a slightly larger proportion. Had Canadian and Japanese import volumes registered normal growth in relation to their income over the period, that alone would have added nearly \$4 billion to United States exports in 1977.

Decline in market shares

The weakness of United States exports over the recovery period is underscored by the severe drop in our share of foreign markets. The overall market share fell from about 15 percent for the 1974-75 average to under 14 percent in 1977 (Table 1). That means that at the margin less than 2 percent of the increase in world import volume outside the United States was met by American goods.

Comparisons with other countries are instructive. Japan improved its market share dramatically. At the margin, nearly 15 percent of the increase in world import volume outside Japan was met by Japanese goods. As a result, Japan's share of world markets rose from about 7 percent to around 8 percent. For other industrial countries, market shares did not change very much. Italy and Canada experienced small increases, while Germany, France, and the United Kingdom had minor declines in market shares.

These market share comparisons are based on aggregate rest-of-world imports, but obviously a country may do better or worse in different regional markets.

Table 3 provides information on selected regional markets that shows an across-the-board decline in United States market shares. In a number of areas there were even absolute declines in United States export volume. Japan, in contrast, increased its shares in all these areas dramatically. The German performance lies somewhere in between.

Rough orders of magnitude can be attached to the effects of declining market shares on United States export volume. Take the actual rate of foreign market growth faced by the United States and suppose that our market shares had remained constant, rather than falling as they actually did. Under those assumptions, United States export volume growth for the period would have been over 13 percent instead of about 2 percent. Supposing the same price increases that actually occurred, export value for 1977 would have been \$14 billion higher. In short, the fall in market shares is the most disturbing aspect of the export slump and accounts for nearly half of the \$31 billion merchandise trade deficit in 1977.

Prices and exchange rates

How much of this market share loss can be attributed to a deterioration in price competitiveness? Conversely, how much reflects the strength of the United States market and the relative weakness of other industrial country markets or the various nonprice influences on overall competitiveness—such factors as delivery delays, inadequate export financing facilities, or the effects of various government policies? Any answers to these questions must be viewed as highly tentative and subject to a considerable margin of uncertainty. Nevertheless, some preliminary estimates can be made.

Price competitiveness of exports depends on both the actual prices of goods produced here and abroad and the exchange rates for the dollar against other currencies. As illustrated in Chart 2, the price competitiveness of United States exports has fluctuated widely over recent years. Chart 3 breaks out the component parts: the ratio of national price levels and the weighted average or "effective" exchange rate of the dollar. It shows that, after exchange rates began to float in March 1973, our price competitiveness initially improved—at first because the dollar depreciated and then because inflation was lower here than abroad. The peak in price competitiveness in this period was reached in the second quarter of 1974. Then an acceleration of United States inflation led to a deterioration of our competitive position through mid-1975. An appreciation of the dollar extended that trend until late that year. By mid-1976, however, the loss of competitiveness was reversing as United States inflation

slowed relative to that abroad. This began to restore price competitiveness despite further appreciation of the dollar's weighted average exchange value. The improvement in price competitiveness gathered momentum during 1977 as the dollar fell sharply in the exchange markets. By 1978, domestic inflation had worsened but the dollar's continued depreciation more than compensated for the adverse competitive consequences. Even after the dollar's recovery in the exchange markets after November 1, United States price competitiveness was still around levels comparable to the 1974 peak.

The erosion in price competitiveness of United States exports between mid-1974 and early 1976 progressively depressed foreign demand for products made in this country. The adverse effect did not take place all at once, but only gradually as decisions were made at the margin whether to buy goods from the United States or from a competing firm located in another industrial nation. As a result, foreign goods were more frequently chosen whenever price was the determining factor. What is worse, the process con-

tinued long after the erosion of price competitiveness had begun to be reversed.

Economists concerned about international trade flows have sought to estimate statistically how and over what time period these factors affect exports. Our results suggest that adjustment lags extending two or three years after a major change in price competitiveness appear to be characteristic of United States exports. In other countries, for which capital goods exports are a less important component of total foreign sales, the time lags seem to be shorter.

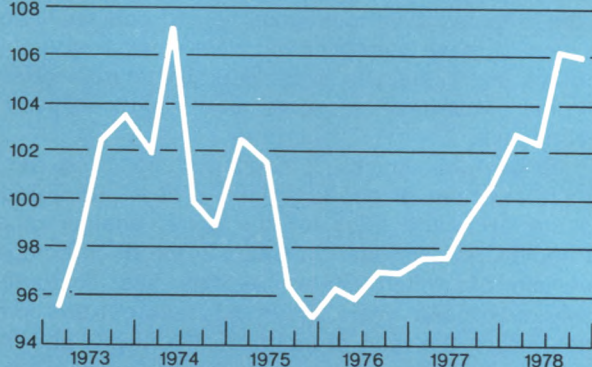
By 1977, those lagged effects were having their maximum depressing effect on exports. Over half of the decline in the United States export market share is estimated to have resulted from the erosion in price competitiveness between mid-1974 and early 1976. In other words, for 1977, United States export volume might have been about 8 to 9 percent greater than it was had the erosion not occurred.

To be sure, that leaves much of the decline in market share unexplained. In particular, a large part of that residual may reflect aggressive efforts by ex-

Chart 2

United States Export Competitiveness

Average for
period=100

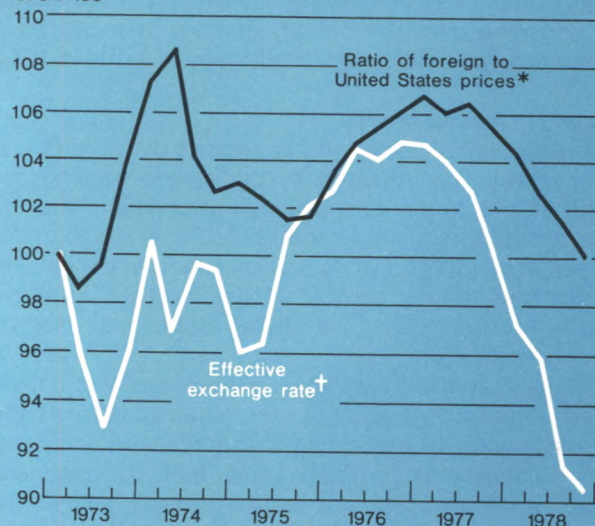


This indicator of changing price competitiveness of United States exports is a ratio of wholesale prices, measured in dollar terms, of the major trade competitors of the United States--Canada, France, Germany, Italy, Japan, and the United Kingdom--to United States wholesale prices. An increase in the ratio suggests an improvement in United States competitiveness, a decline, a worsening. Foreign prices and exchange rates for each country are weighted by the average of the shares derived from, first, 1977 United States bilateral exports to each country and, second, 1977 exports of each country to markets other than the United States.

Chart 3

Components of United States Export Competitiveness

1973=100



*Prices are wholesale prices. Foreign prices are those of the six countries listed in the footnote to Chart 2 and are weighted in the manner described in that footnote.

†Exchange rates are in terms of foreign currency units per dollar. The effective rate is constructed by weighting dollar exchange rates for the currencies of the six foreign countries in the manner described in the footnote to Chart 2.

porters of some countries to develop and to expand market penetration at a time when domestic growth prospects in their countries looked weak and, at the same time, relative indifference by many American companies to export opportunities.

Adjustment lags

Just as the slump in United States export volume growth took time to materialize, a favorable response of export volume to improved price competitiveness after 1975 also came with a long delay. Before detailing the character of last year's export surge, it is worthwhile to discuss further why the adjustment lags are so long.

Generally, producers in economies that are relatively dependent on exports will be less prone to shift sales patterns between domestic and foreign markets in response to what they feel are transitory factors. When the export sector is large relative to the domestic sector, many producers may find a swift change in sales patterns to be excessively disruptive and undesirable. Therefore, exporters in export-dependent countries have an incentive to maintain their market shares by cutting profit margins. That behavior seems to have had a major effect in slowing adjustment to the changes in price competitiveness as they occurred.

In addition, our statistical analysis suggests that market participants may react fairly quickly to changes in prices of United States goods relative to foreign goods when such changes result from differing domestic inflation rates. But they may react comparatively slowly to changes in prices of United States goods relative to foreign goods when such changes result from movements in exchange rates.

A reason for these differential rates of response may be this. It is likely that domestic exporters and foreign purchasers will not alter their behavior in response to price incentives that they consider to be temporary. Changes in price competitiveness resulting from changes in domestic currency prices of manufactured goods may be viewed as relatively permanent. From experience, firms appear to be uneasy committing themselves to new listed prices only to retract the changes soon thereafter. But exchange rates are known to fluctuate widely over short periods of time. Thus, exporters and importers may take account of exchange rate changes only after rates have appeared to stabilize. That kind of behavior might result in lengthening the observed lag between exchange rate changes and changes in export volume.

The delay in responding may be even longer if exchange market expectations of United States exporters and foreign importers are conflicting. For example, when the dollar began to decline in 1977, United States

businesses may have expected an early rebound and may not have taken steps immediately to expand export sales. By contrast, many foreigners might have been willing to purchase United States goods as soon as they became "cheap enough", but held back orders in anticipation of still better prices later on should the dollar decline further.

Another complicating factor tends to lengthen the adjustment lags following an improvement in price competitiveness. Shifting sources of supply involves costs, and buyers may be willing to incur those costs only after they feel a price advantage will be permanent. Take, for example, a commodity like lumber, for which there is a uniform world price. Any depreciation of the dollar makes lumber cheaper to foreign purchasers in terms of their local currency. But lumber purchasers may decide to switch to American lumber only after the depreciation has become large enough to offset whatever adjustment costs are perceived, and the new rate is broadly expected to be sustained.

Suppliers, too, may have to incur additional costs by changing the focus of their sales effort. This is particularly true for products which, unlike lumber, are not uniform in nature, such as industrial machinery or computers. Such products may require a special sales effort because they have distinctive characteristics differing among national producers or because they are built to specification. This may necessitate a substantial marketing expenditure by the producer or the producer's sales agent which, in some cases, may include educating the prospective consumer as to the potential benefits of the product. The existence of these start-up costs when penetrating new markets also explains exporters' reluctance to bear new costs until they are sure that those costs can be recouped.

Finally, the response of exporters and potential exporters to a change in profit incentives to export may be conditioned by the nature of domestic inflationary pressures at the time. An initial improvement in price competitiveness resulting from a depreciation of the dollar may generate substantial foreign orders. For goods already in inventory, both buyer and seller could profit from a quick sale. But for goods that take time to produce, the incentives are more ambiguous if increased inflation is expected to accompany the depreciation. In that case, the exporter, faced with the prospect of higher costs, would tend to raise future delivery prices—and perhaps enough to discourage the potential buyer altogether. It may be that exporters are willing to make firm contracts for future delivery only after the depreciation clearly has gone far enough to compensate for anticipated inflation.

Indeed, a clear increase in sales abroad was delayed until the second quarter of 1978, when it was widely

felt that neither a sharp rebound for the dollar nor any likely acceleration in United States inflation would wipe out the existing profit potential to export.

The export surge

Between January and November of last year, United States foreign sales volume increased at a 25 percent annual rate and the share of our exports in world markets recovered significantly.

The increases occurred across virtually all groupings of commodities sent to all areas of the world. The volume of agricultural exports rose at an annual rate of 18 percent, compared with 27 percent for nonagricultural export volume. Exports to Latin America and other developing countries have rapidly accelerated, in large measure because of exceptionally high agricultural purchases. Consumer goods exports to the nonindustrialized world have also risen substantially. Increased absorption by Western Europe of industrial materials and supplies indicates both the improvement in United States price competitiveness and the somewhat stronger growth of European economies. These changes have also led to mounting purchases of United States capital goods.

Based on our empirical research, about half of the increase in nonagricultural exports can be traced to the improvement in United States price competitiveness since the beginning of 1976 and about half to cyclical developments and other factors. For agricultural commodities, estimating the impact of the dollar's depreciation is more difficult, but it certainly contributed to the sudden strength of agricultural export volume early last year.

Relatively favorable price competitiveness can be expected to continue in the months to come, although it will be eroded somewhat to the extent that inflation here is faster than abroad. Nonetheless, a further gain of 10-15 percent in United States export volume is a reasonable anticipation, given an outlook for somewhat stronger growth of demand in foreign countries.

Looking to the longer term prospects for United

States exports, one clear challenge is to increase the number of firms that regularly do business abroad. The export promotion package announced by the Administration last September seeks to accomplish that as one of its objectives. The plan envisages increases in Export-Import Bank loan authorizations and expanded efforts to heighten producer awareness of foreign sales opportunities. In addition, it proposes elimination of the requirement that exporters must file environmental impact statements, a move that can help reduce delays in realizing new export opportunities. The extent to which other broad government policies—including those on human rights in foreign countries, on nuclear non-proliferation, on the Arab boycott, and on special business payments to foreign importers—may be impeding the growth of United States exports remains unclear.

Another major challenge is to improve United States productivity, a fundamental determinant of United States comparative advantage, by developing ways to strengthen business capital spending and research and development efforts. The latter, in particular, play an important role in opening up opportunities to export, and in the United States such expenditures have been lagging of late. As a percentage of GNP, United States expenditures on research and development have fallen from 2.7 percent in 1962 to 2.2 percent in 1978. Over approximately the same period such expenditures by Germany and Japan have risen 1 percentage point and ½ percentage point to 2.3 percent and 2.0 percent of GNP, respectively.¹

Finally, United States export performance is likely to depend crucially on the outlook for world investment spending. The share of investment in GNP has declined in a number of important countries in recent years. A reversal of that trend would provide a significant underpinning for stronger United States exports in the future.

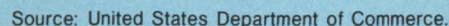
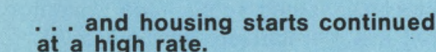
¹ National Science Board, *Science Indicators 1976* (Washington, D.C.: National Science Foundation), September 30, 1977.

Robert Brusca

The business situation

Current developments

Retail sales rose strongly in late 1978 . . .



While caution, even apprehension, characterized attitudes toward the future, most indicators of business conditions were moving decisively higher as 1978 drew to a close. For example, retail sales rose strongly during October and November (Chart 1), and year-end

holiday buying was brisk. This spending apparently surpassed the relatively rapid growth of personal income, suggesting a further decline in the rate of personal savings from the already low 5.2 percent of disposable income that was saved in the third quarter. Such a low savings rate is not likely to be sustained for long in the face of the declining confidence reflected in surveys of consumer sentiment, especially in light of the historically high debt burdens that consumers bear in relation to their incomes. Thus, some retrenchment of consumer spending in coming months is likely.

Another sector that appears headed for a slowdown is residential construction. The demand for housing has remained surprisingly robust in the face of record high mortgage interest rates. Private housing starts continued in November at an annual rate of 2.1 million

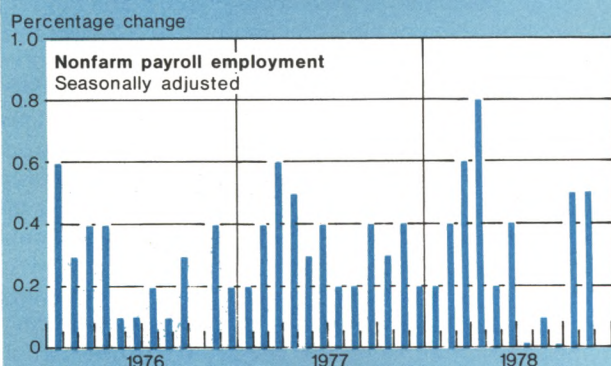
units, the rate that has generally prevailed since mid-1977 (Chart 1). The availability of credit to finance home purchases has been maintained at a high level with the help of some financial innovations. For example, the six-month certificates with yields tied to the six-month Treasury bill rate, authorized beginning last June, have enabled thrift institutions to avoid the disintermediation that marked previous episodes of high interest rates. The expansion of the secondary market for mortgages, through such innovations as mortgage-backed securities, also has facilitated the flow of funds into the housing sector. However, mortgage interest rates have risen to such levels that legal rate ceilings may cause a slowdown in commitments of funds to residential mortgages in at least one third of the states. Furthermore, high financing costs are likely to temper demand for housing in coming months.

The crosscurrents of strong current activity against a doubtful future come into sharp focus in the business investment sector. New orders for nondefense capital goods were booked at a rapid pace during the three months, August through October. Despite a sharp drop in November, such orders were 26 percent above the year-earlier rate, and backlogs of unfilled orders were up 24 percent to almost \$105 billion. Similarly, contracts for commercial and industrial buildings, measured in floor space, rose 29 percent in the year ended in November, according to the F. W. Dodge Division of the McGraw-Hill Information Systems Company. In spite of these strong near-term commitments, responses to surveys of capital spending plans display considerable caution. The most recent one, the Commerce Department's survey of plant and equipment spending plans for the first half of 1979, is broadly consistent with earlier private surveys that indicated little increase in planned outlays in real terms during 1979. Inventory investment decisions also continue to be dominated by cautious attitudes. While there may still be excess stocks in some retail lines, inventory-sales ratios overall are at relatively low levels.

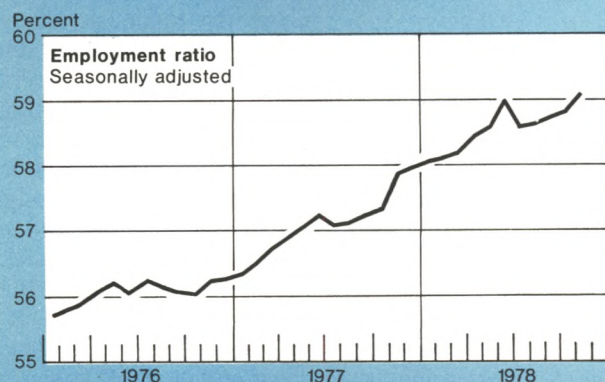
The quickening tempo of economic activity late in 1978 generated jobs at an impressive pace. Nonfarm payroll employment, after barely inching upward during the summer, rose 0.5 percent in October and again in November (Chart 2). Employment growth was especially rapid in the goods-producing sectors—manufacturing, construction, and mining—and was widespread among industries. Of 172 nonagricultural industries surveyed, about three quarters reported increased employment in October and November. Over the twelve months ended in November, almost 3.5 million persons were added to nonfarm payrolls, representing a 4.2 percent growth. The unemployment rate dropped to 5.8 percent of the civilian labor force in

Chart 2

Employment surged in the autumn . . .



. . . and the proportion of the population with jobs rose to a new record high.



Source: United States Bureau of Labor Statistics.

October and held at that rate in November. Except for an aberrant 5.7 percent last June, that was the lowest rate of unemployment since August 1974. Perhaps a better measure of the tautness in the labor market is reflected in the record high 59.1 percent of the population that had jobs in November (Chart 2).

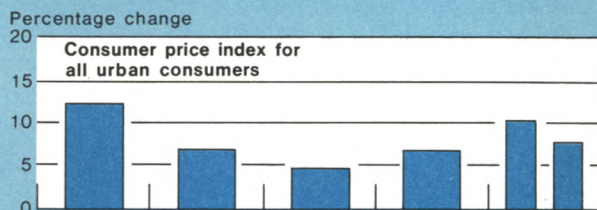
The rapid growth of employment helped to boost incomes and to stimulate spending, but it bodes ill for labor productivity. The growth of productivity has been lagging seriously of late. In the year ended with the third quarter of 1978, there was virtually no gain in output per hour worked in the private business sector. Consequently, the 9 percent increase over that period in compensation per hour resulted in a similar rise in labor costs per unit of output. Given the dominance of labor costs in overall costs of production in most industries, it is not surprising that consumer prices also rose at an annual rate of about 9 percent from the beginning of 1978 through November, compared with 6.8 percent over the course of 1977 and 4.8 percent during 1976. The overall rate of inflation slowed somewhat after the middle of 1978, but the slowdown was confined to food prices, which had escalated sharply during the first half of the year (see Chart 3). Prices of nonfood goods and services continued to rise at a rapid rate.

The forces exerting upward pressure on prices will be powerful in 1979. The acceleration of consumer prices in 1978 will spawn wage adjustments for several million workers under cost-of-living agreements (COLA) of collective bargaining contracts as well as catch-up raises for many more workers who are not covered by a formal COLA. The increases in the minimum wage and in social security taxes that took effect on January 1 will directly increase labor costs. Energy prices will be augmented by the 14.5 percent increase in imported crude oil prices (to be effected in four steps in 1979) that was agreed upon by the Organization of Petroleum Exporting Countries, as well as the measured steps toward decontrol of natural gas prices stipulated in the energy bill that was finally enacted late in 1978. Continuing adjustments to the depreciation of the dollar during the year ended last October also are likely to exert significant upward pressure on domestic prices for some time.

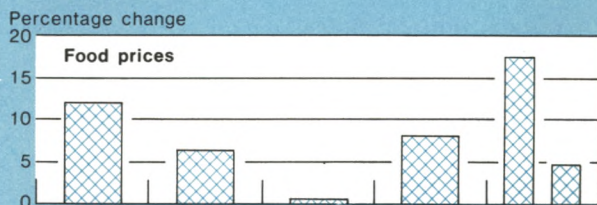
Thus, the near-term price outlook remains worrisome. Eventually, however, a stronger and more stable dollar will provide a significant check to inflation, both psychologically and in the form of lower import prices. The outlook may also be brightened considerably by widespread cooperation in the spirit of the President's anti-inflation program. The key to the program is moderation of labor cost increases, and 1979's heavy collective bargaining calendar will put the program to a

Chart 3

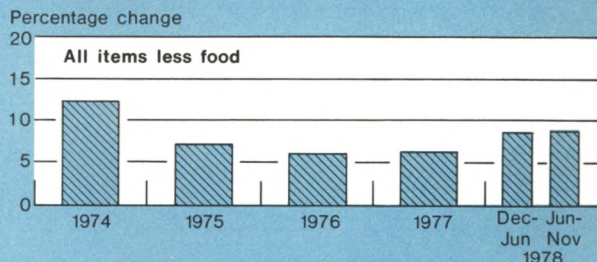
Inflation slowed in the second half of 1978 . . .



. . . but the slowing was confined to food prices . . .



. . . while prices of other goods and services continued to rise rapidly.



Annual data are expressed as the change from December of the preceding year to December of the year shown. Data for 1978 are expressed at seasonally adjusted annual rates.

Source: United States Bureau of Labor Statistics.

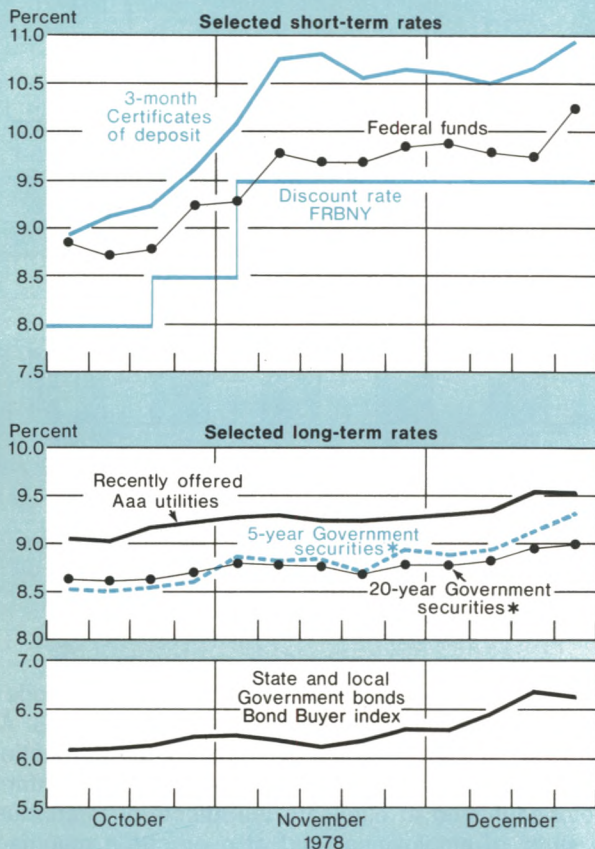
severe test. There was, in fact, apparently some moderation of wage increases in the latter part of 1978. As measured by average hourly earnings of production and nonsupervisory workers in the private nonfarm sector (adjusted to eliminate the effects of interindustry shifts of employment and of overtime in manufacturing), the rate of wage increases slowed from an annual rate of 8.5 percent during the first half of 1978 to about 7.5 percent in the second half. A continuation of that trend, in cooperation with the President's program, would do much to slow down inflation and to lessen the risks of serious economic instability.

The financial markets

Current developments

Recent Interest Rates

Weekly



* These yields are adjusted to five- and twenty-year maturities and exclude bonds with special estate tax privileges.

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

Financial market developments in the closing months of 1978 were dominated by United States initiatives aimed at strengthening the foreign exchange value of the dollar. The initial reaction in the domestic markets was quite positive as the large uncertainties prevailing in the markets about inflation and the future of the dollar were alleviated. Subsequently, however, long-term bond yields ratcheted upward and, with short-term interest rates continuing to rise, by the close of the year most Treasury issues were at record-level yields. The rise in interest rates was accompanied by a marked slowing in the rate of growth of the monetary aggregates. While a slowing in the growth of M_1 was widely expected because of the introduction of automatic transfer accounts, growth of the more broadly defined aggregates also slackened.

On November 1, 1978, President Carter, the Federal Reserve, and the Treasury announced a series of actions aimed at correcting the excessive decline of the dollar in the foreign exchange markets. The program included a number of domestic monetary policy actions (for further discussion of this program, see the article beginning on page 63). Among the announced actions were a 1 percentage point increase in this Bank's discount rate—the largest increase since 1920—to a record level of 9½ percent (chart). The other Reserve Banks raised their discount rates shortly thereafter. In addition, a 2 percentage point increase in reserve requirements was imposed on large-denomination time deposits. The increase in reserve requirements was intended to help moderate the expansion in bank credit and to raise the incentive for member banks to borrow abroad, thereby strengthening the dollar by improving the demand in Euro-markets for dollar-denominated assets. Finally, in accordance with these measures, the Federal Open Market Committee (FOMC)

raised the upper end of its range for the Federal funds rate and instructed the Trading Desk to seek a higher rate. By the end of the year, Federal funds were trading around 10 percent.

Prior to the November 1 initiatives, short-term interest rates had already been steadily rising, after a brief period of stability that ended in mid-August. By the close of October, the rate on Federal funds had risen to around 9¼ percent. Other short-term interest rates had also risen, responding to the further tightening in the Federal Reserve policy stance, to increased concern over the falling foreign exchange value of the dollar, and to inflation. In November and December, the rise in rates continued. Rates on commercial paper and bankers' acceptances generally closed the year around 150 basis points higher than in mid-October. Sharp increases in CD rates had started to occur toward the end of October and initially were more pronounced than for other short-term interest rates as banks aggressively issued certificates of deposit (CDs). By mid-November, secondary market rates on three-month CDs had risen 158 basis points over their level four weeks earlier. Subsequently, however, these rates declined slightly before rising in the closing weeks of 1978. The volume of large negotiable CDs outstanding at weekly reporting banks jumped by more than \$5 billion in November, substantially above the \$1.6 billion average increase of earlier months. Responding to the rising cost of funds, commercial banks lifted their prime lending rate in several steps. By the end of the year, the prime rate stood at 11¾ percent, ¼ percentage point below its 1974 peak.

The rise in short-term interest rates weakened market sentiment in the longer term taxable markets in late October. Additionally, the markets' pessimistic assessment of the probability of the success of the President's program of wage-price restraint, which was announced on October 24, resulted in sharp upward rate adjustments. In the atmosphere of a deteriorating market, the Treasury, as part of its November refunding, auctioned \$2.5 billion of 3½-year notes on October 31 at an issuing rate of 9.36 percent. The 9¼ percent coupon established on the notes was the highest since the Civil War. The policy initiatives launched on November 1 were viewed positively by the market, leading to large yield declines for intermediate- and longer term securities. The rate declines accelerated, as many participants acted to cover short positions which, in the process, generated a powerful bond market rally. The rally soon faded, however, as evidence of a higher rate of inflation, coupled with the continued increase in short-term interest rates, led to the reemergence of upward rate pressures. Incoming business data, which pointed to greater than expected strength in the econ-

omy, also contributed to the yield rise. Rates on intermediate- and long-term Government issues ended the year around 80 and 35 basis points higher, respectively, than in mid-October. In the corporate sector, AAA-rated bond yields posted increases similar to those in the long-term Government markets.

In the tax-exempt markets, yields on municipal bonds rose in the closing months of the year. Most of the yield increase occurred in December, when larger supplies contributed to a weakening in market tone. Although offerings in recent months were well below the borrowing bulge that preceded the September 1 tightening in Treasury regulations concerning interest rate arbitrage by state and local governments, new bond issues remained surprisingly large. In the closing weeks of 1978, the Bond Buyer index of twenty municipal bonds rose by some 32 basis points. In mid-December, dealers' inventories as advertised in the Blue List rose above \$1 billion, the largest volume in a half year. Although the market generally viewed the default by the city of Cleveland on \$15 million of notes as an isolated event, cuts in Federal funds to state and local governments under the CETA program, as well as other factors such as the large financing gap of New York City, appeared to raise investors' quality consciousness. Increases in yields on lower quality offerings generally exceeded those on yields of higher quality issues. However, the spreads between yields on high- and lower quality issues remained far below the record levels reached in the summer of 1976.

In contrast to the heavy supplies of municipal bonds, the Treasury reduced its marketable offerings. Net marketable issues offered in the closing quarter were substantially below the pace of earlier months. Large numbers of nonmarketable offerings to official foreign institutions and a foreign borrowing by the United States, which were related to support of the dollar, met much of the Treasury's new cash needs in the fourth quarter. Responding to the market imbalance created in short-dated bills by strong foreign demand, the Treasury enlarged the proportion of three-month bills in the regular weekly auctions. In December, the Treasury raised the equivalent of \$1.6 billion through its first public offering of foreign-currency-denominated notes. These notes were sold through the Bundesbank to West German investors. The three- and four-year mark-denominated notes were enthusiastically received and oversubscribed, at a yield comparable to that on issues of the West German government. The Treasury subsequently "warehoused" the marks with the Federal Reserve, obtaining dollars which added to its cash balances. The Treasury has announced its intention to offer a Swiss franc-denominated issue early in 1979.

After many quarters of rapid growth, there was

a marked slowing in the growth of the monetary aggregates. Based on the available data, the growth of the narrowly defined money stock— M_1 —slowed to an annual rate of about 4.3 percent in the fourth quarter, well below the 7.6 percent annual rate of growth posted in the previous quarter. M_1 grew more moderately in October following the bulge in September and then actually declined slightly in the November-December period. Some slowing in the growth of M_1 in November and December had been widely expected as a result of the November 1 introduction of automatic transfer accounts. These accounts enable depositors to authorize their banks to transfer funds automatically between checking and interest-bearing savings accounts. In view of the prospective shift of funds from checking accounts to savings accounts, the FOMC at its October meeting lowered the range of growth of M_1 for the four quarters ending in the third quarter of 1979 to 2 to 6 percent from the range of 4 to 6½ percent in the preceding period (second quarter 1978 to second quarter 1979). The new accounts appear to have reduced the annual rate of growth of M_1 for November and December by roughly 2 to 3 percentage points. For the fourth quarter as a whole, therefore, M_1 growth was lowered by about 1 percentage point.

Because of the difficulty posed by the introduction of automatic transfer service in interpreting M_1 data, and in view of the widening role in financial transactions played by savings deposits, the FOMC staff constructed a new aggregate, M_1 plus. This aggregate includes M_1 and savings accounts at commercial banks, NOW accounts, demand deposits at mutual savings banks, and credit union share drafts. In the fourth quarter, M_1 plus is estimated to have grown 2.4 per-

cent at an annual rate, compared with 5.3 percent in the third quarter.

Primarily as a result of the slowing of M_1 , M_2 also rose more slowly in the final three months of 1978 than in recent quarters. The growth of M_3 , which adds deposits of thrift institutions to M_2 , appears to have slowed slightly from the third quarter. The FOMC reestablished the ranges of M_2 and M_3 at 6½ to 9 percent and 7½ to 10 percent, respectively, for the year ending in the third quarter of 1979.

The growth of the broader monetary aggregates slowed despite a step-up in the sales of the six-month money market certificates in October and November. It appears that the new instrument, which probably added significantly to the growth of thrift institutions' deposits in the summer months, more recently represented a shifting from other types of time and savings deposits, rather than a net addition to such deposits. Whatever the effect on deposit growth, the new instrument has raised the cost of funds to issuing thrift institutions. The average issuing yield on six-month Treasury bills, to which the ceiling rate is tied, has risen more than 200 basis points since this instrument was first introduced in June. These cost pressures will be intensified as maturing issues are renewed.

The rising cost of thrift deposits has played a role in the increase in mortgage interest rates. The rates charged on mortgage closings have crept up and are at historical highs. Moreover, the rates charged on commitments to make new mortgages point to continuing upward pressures on the mortgage market. The going commitment rate on a single-family conventional mortgage of twenty-five years with a 25 percent downpayment posted a sharp increase in December to 10.36 percent.

Treasury and Federal Reserve Foreign Exchange Operations

During the three-month period under review, market pessimism toward the dollar deepened. As selling pressure intensified, dollar rates plunged to record lows against several currencies, exceeding any levels justified by underlying economic conditions. On November 1, the United States authorities reinforced earlier measures to bolster the United States external position and to curb inflation by mounting a major new effort, in coordination with the authorities of several other industrial countries, to correct what President Carter termed "the excessive decline of the dollar". The November 1 package was broadly well received, and good two-way trading was soon restored with the dollar at levels significantly above the end-October lows.

The market's pessimism during the August-October period reflected the persistence of serious economic imbalances among major industrial nations. For some time, market participants and government officials alike had expressed concern over the differential rates of economic growth between the United States, which had posted a solid expansion since 1975, and most other industrial countries, where growth had been disappointingly slow. This difference in growth performance, coupled with special factors such as the earlier jump in the United States oil import bill, had

contributed to a massive imbalance in trade and current accounts among the industrial countries, with the United States in substantial deficit and others, such as Japan, Germany, and Switzerland, in substantial surplus.

The dollar exchange rates against the currencies of these countries had already declined substantially over the previous year, but the effects of these changes on trade balances had not yet fully materialized. Moreover, the dollar's decline was contributing to the quickening of inflation in this country. By contrast, in other countries price performance was improving, particularly where the appreciations of currencies lowered import costs.

Many market participants had become skeptical that these disparities in price trends would be reversed in the near term and perceived a considerable downside risk for the dollar. Professional dealers therefore became reluctant to buy and hold dollars whenever the dollar came on offer. Trading in dollars became increasingly one way. Some market participants found that they could profit by selling dollars short, while others sought to protect themselves against further erosion of the value of their assets by shifting into foreign currencies and into commodities such as gold. Beginning in September, the tensions in the dollar market were compounded by a renewed burst of speculation over a possible realignment of currencies within the European Community (EC) "snake" as a prelude to the broader European Monetary System under negotiation by EC members. The German mark was revalued against the other snake currencies on Octo-

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ber 15, but the reversal of the earlier positions had barely begun by the month end.

By late summer-early fall, however, underlying conditions were beginning to improve and there was reason to expect that the improvement would continue. Economic expansion in Germany and Japan was more solidly based, and the governments were introducing additional stimulative measures. For Japan, export and import volumes were beginning to respond to the exchange rate change. At the same time, the growth of the United States economy was moderating. Following the bulge in the United States trade deficit early this year, import demand was beginning to slacken while exports were expanding rapidly. Moreover, further stabilization measures were being taken by the United States authorities. Monetary and fiscal policies were progressively tightened. The Congress passed the long-awaited energy bill. On October 24, President Carter announced a comprehensive anti-inflation program, including additional budgetary restraints and the introduction of voluntary wage and price guidelines.

Throughout the three-month period, the Treasury and the Federal Reserve continued to intervene to counter disorderly conditions in the New York market in operations conducted by the foreign exchange Trading Desk of the Federal Reserve Bank of New York. These

operations were mainly in German marks, on behalf of both the Federal Reserve and the Treasury, using balances acquired from correspondents or drawing on the respective swap arrangements with the German Bundesbank. The Desk also intervened in New York in Swiss francs both for the Federal Reserve, drawing on the swap line with the Swiss National Bank, and for the Swiss National Bank. In all, the Desk operated on 31 of the 64 business days during the period, selling on behalf of the United States authorities a total of \$2,204.4 million equivalent of German marks and \$294.2 million equivalent of Swiss francs.

By the end of October, however, the decline of the dollar had clearly been excessive against a number of major currencies. From the early-August levels, the dollar had fallen by a net 18 percent against the German mark, 17 percent against the Swiss franc, and 7 percent against the Japanese yen. Moreover, the dollar had declined generally *vis-à-vis* other major European currencies: against the French franc by 10 percent, the pound sterling by 8 percent, and the Italian lira by 6 percent. And, in view of the prevailing mood and trading conditions in the exchange markets, few expected the dollar's slide to stop on its own or be reversed over the short run.

For the United States, the dollar's decline threatened

Table 1

Federal Reserve Reciprocal Currency Arrangements

In millions of dollars

Institution	Amount of facility October 31, 1978	Increases effective November 1, 1978	Amount of facility November 1, 1978
Austrian National Bank	250		250
National Bank of Belgium	1,000		1,000
Bank of Canada	2,000		2,000
National Bank of Denmark	250		250
Bank of England	3,000		3,000
Bank of France	2,000		2,000
German Federal Bank	4,000	2,000	6,000
Bank of Italy	3,000		3,000
Bank of Japan	2,000	3,000	5,000
Bank of Mexico	360		360
Netherlands Bank	500		500
Bank of Norway	250		250
Bank of Sweden	300		300
Swiss National Bank	1,400	2,600	4,000
Bank for International Settlements:			
Swiss francs-dollars	600		600
Other authorized European currencies-dollars	1,250		1,250
Total	22,160	7,600	29,760

to undermine the effort to curb inflation, including the newly announced voluntary wage and price control program. It also threatened to undercut the efforts of the Japanese, German, Swiss, and other governments to stimulate domestic growth. Consequently, by late October the United States authorities were in close consultation with their counterparts in other countries, and the essential elements of a coordinated approach to correct the situation were in place by the month end.

On the morning of November 1, President Carter, the United States Treasury, and the Federal Reserve announced various actions to be taken. The President emphasized the link between this program and the broader anti-inflation policies of the United States Government as well as the fact that the program had been developed and would be implemented in close cooperation with major governments and central banks abroad. The program featured a further tightening of monetary policy, including a 1 percentage point increase in the Federal Reserve discount rate to a historic high of 9½ percent and a \$30 billion package of foreign currency resources to finance United States participation in coordinated intervention in the exchange markets. For the Federal Reserve, this comprised a \$7.6 billion increase in the swap network through increases in the swap arrangements with the German Bundesbank by \$2 billion to \$6 billion, with the Bank of Japan by \$3 billion to \$5 billion, and with the Swiss National Bank by \$2.6 billion to \$4 billion. The Federal Reserve also announced the activation of the swap arrangements with the Bank of Japan. For its part, the Treasury announced that it would draw \$3 billion from the United States reserve position with the International Monetary Fund (IMF) and sell \$2 billion equivalent of special drawing rights (SDR) to mobilize balances of German marks, Japanese yen, and Swiss francs. The Treasury also announced that it would issue foreign-currency-denominated securities up to \$10 billion equivalent.

The Desk followed up the announcements with active intervention in the New York market in German marks, Swiss francs, and Japanese yen. These operations were fully coordinated with intervention by other central banks in their own markets and in New York for their own account. The dollar rebounded sharply, and there were similar favorable responses in United States financial markets generally. Over the next days the central banks occasionally found it necessary to respond forcefully. Gradually, however, the market came into better balance, with good two-way trading at levels well above the late-October lows. The technical conditions alone favored a firm dollar, as the covering of previous short positions and unwinding of commercial leads and lags began to bolster the demand for dollars.

But the central banks remained prepared to intervene quickly and in size whenever renewed selling pressure on the dollar threatened to erupt. By November 30, the dollar had advanced by 11¼ percent against the German mark, 15½ percent against the Swiss franc, and 11½ percent against the Japanese yen.

As indicated, in intervention operations during the August-October period, the Desk of the Federal Reserve Bank of New York sold German marks and Swiss francs on behalf of the United States authorities. Of the \$2,204.4 million equivalent sales of German marks, \$1,318.4 million was for the account of the Federal Reserve and \$886.0 million for the Treasury. Of the Federal Reserve's sales, \$1,157.5 million equivalent was financed by drawings under the swap line with the Bundesbank. The rest was financed by balances acquired from correspondents. However, the Federal Reserve was able to liquidate a total of \$551.9 million of swap debt in marks from other acquisitions of marks from correspondents during the three-month period. Consequently, net drawings by the System in marks for the period amounted to \$605.6 million equivalent, raising the total to \$1,256.1 million equivalent by October 31.

Similarly, the Treasury financed \$796.9 million of its intervention in marks by drawings on its swap arrangement with the Bundesbank, with the rest coming from balances. The Treasury's repayment of previous swap debt amounted to \$343.5 million equivalent during the three-month period. Total debt under the Treasury's swap line rose by a net of \$453.4 million equivalent to \$650.4 million equivalent at end-October.

In Swiss francs, the Federal Reserve sales of \$294.2 million equivalent were financed by further drawings on the swap arrangement with the Swiss National Bank. The System's swap debt for current operations in Swiss francs rose from \$22.9 million of francs in early August to \$317.0 million equivalent on October 31.

In addition, the Federal Reserve and the United States Treasury continued with the program agreed to in October 1976 for an orderly repayment of pre-August 1971 Swiss franc-denominated liabilities still outstanding with the Swiss National Bank. The Federal Reserve liquidated \$91.9 million equivalent of special swap debt with the Swiss central bank, leaving \$186.9 million equivalent of indebtedness still outstanding as of October 31. These repayments were financed with francs purchased directly from the Swiss National Bank mainly against dollars, but also against marks. The Treasury used Swiss francs purchased directly from the Swiss central bank to repay \$137.5 million equivalent of franc-denominated securities, leaving \$712.9 million equivalent of these obligations still outstanding as of October 31.

In view of the dollar's depreciation, repayments of

Table 2

Federal Reserve System Drawings and Repayments under Reciprocal Currency Arrangements

In millions of dollars equivalent;
drawings (+) or repayments (—)

Transactions with	System swap commitments July 31, 1978	August through October 31, 1978	System swap commitments October 31, 1978
German Federal bank ..	650.5	{ +1,157.5 — 551.9	1,256.1
Swiss National Bank ...	22.9	+ 294.2	317.0
Total	673.3	{ +1,451.7 — 551.9	1,573.1

Because of rounding, figures may not add to totals.
Data are on a transaction-date basis.

Table 3

Federal Reserve System Repayments under Special Swap Arrangement with the Swiss National Bank

In millions of dollars equivalent

System swap commitments July 31, 1978	August through October 31, 1978	System swap commitments October 31, 1978
278.8	—91.9	186.9

Data are on a transaction-date basis.

Table 6

Net Profits (+) and Losses (—) on United States Treasury and Federal Reserve Foreign Exchange Operations

In millions of dollars

Period	Net profits (+) and losses (—) related to current operations		Net profits (+) and losses (—) on liquidations of foreign currency debts outstanding as of August 15, 1971	
	Federal Reserve	Exchange Stabilization Fund	Federal Reserve	Exchange Stabilization Fund
August 1, 1978 through October 31, 1978	—15.3	—3.2	—92.8	—129.7

Table 4

United States Treasury Drawings and Repayments under Swap Arrangement with the German Federal Bank

In millions of dollars equivalent;
drawings (+) or repayments (—)

Amount of commitments July 31, 1978	August through October 31, 1978	Amount of commitments October 31, 1978
197.0	{ +796.9 — 343.5	650.4

Data are on a transaction-date basis.

Table 5

United States Treasury Securities Foreign Currency Series Issued to the Swiss National Bank

In millions of dollars equivalent;
issues (+) or redemptions (—)

Amount of commitments July 31, 1978	August through October 31, 1978	Amount of commitments October 31, 1978
850.4	—137.5	712.9

Data are on a transaction-date basis.

earlier obligations in German marks and Swiss francs led to realized net losses for the Federal Reserve and the United States Treasury in operations during the August-October period. For the Federal Reserve, these amounted to \$15.3 million on current operations and

\$92.8 million on liquidations of the longer term Swiss-franc indebtedness. For the Treasury, the realized net losses amounted to \$3.2 million on current operations and \$129.7 million on liquidation of the longer term Swiss-franc indebtedness.

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