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The Choice of Short-Run Targets for Monetary Policy

Part I: A Theoretical Analysis

By Gordon H. Sellon, Jr., and Ronald L. Teigen

In the day-to-day conduct of monetary policy, the Federal Reserve operates directly in financial markets to purchase and sell securities which in turn affects interest rates, bank reserves, and the money supply. Viewed over a longer time horizon, these daily activities in financial markets are less important in themselves than in their impact on the longer run goals of monetary policy, such as the attainment of full-employment output and the maintenance of stable prices.

An important issue in recent discussion of monetary policy is the Federal Reserve's choice of short-run policy targets. The role of these targets is to connect Federal Reserve actions in financial markets with its ultimate goals. That is, policymakers hope to influence national output and prices by controlling the variables selected as short-run targets. In recent years, controversy has developed over the choice of interest rates versus money and reserve aggregates as short-run targets. At the same time, actual Federal Reserve targeting procedures also have undergone considerable development.

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The purpose of this article is to examine the Federal Reserve's choice of short-run policy targets. The first section discusses the role that short-run targets play in monetary policy, the distinction between intermediate and operating targets, and the nature of the controversy over the use of interest rate or aggregates targets. In the following section, an analytical framework is developed that connects Federal Reserve actions, the choice of short-run targets, and the ultimate policy goals—prices and real output. In this framework, four types of exogenous disturbances may affect economic activity, causing prices and output to differ from their desired levels. The appropriate choice of intermediate and operating targets depends critically on the type of disturbance affecting the economy. In Part II, to be presented in a subsequent issue of this *Review,* the theoretical framework developed here is used to discuss the historical evolution of Federal Reserve targeting procedures from 1951 to the present.

THE ROLE OF POLICY TARGETS

In considering the role of short-run monetary targets, it is important to analyze the relationship between goal variables, such as real output and prices, and Federal Reserve actions. Federal Reserve actions have an indirect rather than a direct or immediate impact on output

and prices. Generally speaking, real output and the average level of prices are determined by the aggregate demand for and the aggregate supply of goods and services.

The Federal Reserve influences the longer run goal variables by using its policy instruments—open market operations and the discount rate—to directly affect money and credit markets. The influence of Federal Reserve policy actions on money and credit markets is transmitted to the goal variables through the effects of changes in market interest rates on aggregate demand. For example, suppose that the Federal Reserve wishes to moderate inflationary pressures. By reducing bank reserves through the sale of government securities, the Federal Reserve slows monetary growth and places upward pressure on interest rates. Higher interest rates, in turn, cause a reduction in the demand for goods and services, lowering real output and placing downward pressure on prices.

In this framework, the need for short-run monetary targets arises from two sources: a lack of timely and accurate information on the longer run goals of output and prices, and a recognition that it takes time for Federal Reserve policy actions to have an impact on these ultimate objectives. At any point in time, policymakers may be uncertain about both the current state of the economy and its future course.

It is important to recognize that while the Federal Reserve has an important effect on economic activity, other factors may prevent the attainment of the long-run goals. Unexpected shifts in consumer, business, or government spending, or shifts in the demand for money, may cause aggregate demand to be greater or less than desired. Similarly, changes in the costs of production or in the productivity of labor and capital may cause shifts in aggregate supply. To wait for additional clarifying information on the source of these disturbances runs the risk of delaying too long in taking appropriate policy actions and so possibly exacerbating the underlying economic problems. For these reasons the Federal Reserve frames its actions not in terms of the longer run goals but in terms of short-run targets such as interest rates, money, and bank reserves which can be observed and affected over a short time span.

The Federal Reserve's choice of short-run monetary policy targets can be divided conceptually into two stages. First, policymakers choose a short-run "intermediate target," a variable that is thought to be closely linked to real output and inflation but which is not controlled precisely over a short period of time. For example, the Federal Reserve might choose a monetary aggregate as an intermediate target and establish a desired three-month growth path for the aggregate. Second, the Federal Reserve chooses a short-run "operating target" that is closely linked to the intermediate target and over which policymakers can exercise quite close control.[1] For example, the Federal Reserve might establish weekly or monthly targets for a short-term interest rate or a reserve aggregate. The aim of Federal Reserve policy is to maintain the operating variable near its targeted value so as to control the intermediate variable. By controlling the intermediate variable it is hoped that the ultimate goal variables of prices and output can be maintained at their desired levels.

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[1] A good discussion of this two-stage process can be found in B. Friedman, "Targets, Instruments, and Indicators of Monetary Policy," *Journal of Monetary Economics,* October 1975, pp. 443-73. Friedman and others have questioned the efficiency of using this two-stage targeting procedure. See also Friedman, "The Inefficiency of Short-Run Monetary Targets for Monetary Policy," *Brookings Papers on Economic Activity,* 2:1977, pp. 293-335, and R. Bryant, *Money and Monetary Policy in Interdependent Nations,* Brookings Institution, 1980, especially pp. 278-333.

As an illustration, suppose the Federal Reserve chooses a monetary aggregate such as M1-A as an intermediate target and the interest rate on Federal funds as an operating target. The aim of monetary policy, then, is to use the purchase and sale of securities by the Federal Reserve to maintain the Federal funds rate near its target value. Ideally, this action would also keep monetary growth within its targeted range over a longer time horizon and would ultimately lead to the achievement of the long-run goals.

The Federal Reserve's choice of short-run monetary policy targets is quite controversial. The key issue is whether policymakers should use price variables such as interest rates or quantity variables like monetary and reserve aggregates as intermediate and operating targets.[2] If the structure of the economy were determinate and known so that policymakers could accurately forecast the behavior of the goal variables, the ultimate goals could be reached using either type of target.[3] However, spending and investment decisions in the economy always involve chance elements or disturbances that can cause unexpected shifts in aggregate demand. In addition, unanticipated external shocks such as energy price increases may adversely affect the domestic economy. These disturbances can cause the goal variables to deviate from their desired values.

Unfortunately, there is no one set of policy targets that will be successful in offsetting the impact of these disturbances. Control of interest rates may work well for some disturbances, while control of money and reserves may be superior in other cases. Any analysis of the Federal Reserve's choice of monetary policy targets, then, must be based on an understanding of the types of disturbances causing inflation and unemployment problems and the impact of these factors on financial markets.

THE CHOICE OF INTERMEDIATE AND OPERATING TARGETS

The Federal Reserve's choice of short-run targets can be analyzed using the framework shown in Figure 1. In Figure 1a, the price level, P, and real output, Y, are determined by the aggregate demand, AD, for and aggregate supply, AS, of goods and services. Factors influencing aggregate demand are the planned spending decisions of consumers, firms, and the government, the public's planned holdings of money balances, the money supply behavior of depository institutions, and the amount of nonborrowed reserves supplied by the Federal Reserve. Changes in these factors cause the aggregate demand curve to shift, resulting in changes in prices and output. Factors influencing aggregate supply are the productivity of labor and capital and the costs of inputs to the production process. Changes in productivity, wages, and other input prices shift the aggregate supply curve, again leading to changes in prices and real output.[4]

The choice of an intermediate target is shown in Figure 1b. The interest rate, r, and the quantity of money, M, are determined by the

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2 The analysis of the choice of an intermediate target was developed by W. Poole, "Optimal Choice of Monetary Policy Instruments in a Simple Stochastic Macro Model," *Quarterly Journal of Economics,* 84 (May 1970), pp. 197-216. The extension of this analysis to the choice of an operating target can be found in J. Pierce and T. Thomson, "Some Issues in Controlling the Stock of Money," in *Controlling Monetary Aggregates II: The Implementation,* Federal Reserve Bank of Boston, 1972, pp. 115-36.

3 For a discussion of this point, see Poole, p. 200.

4 The analysis focuses on a short-run situation in which there is a tradeoff between inflation and real output growth. The positive slope of the aggregate supply curve reflects an underlying assumption of downward wage rigidity or incomplete adjustment of inflationary expectations.

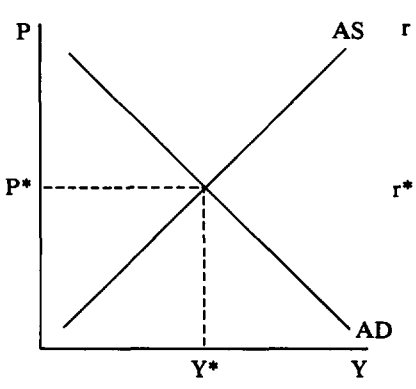

Figure 1a
POLICY GOALS

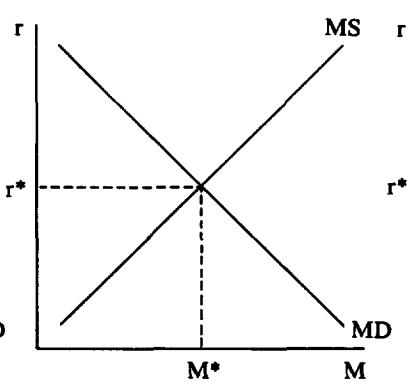

Figure 1b
INTERMEDIATE TARGETS

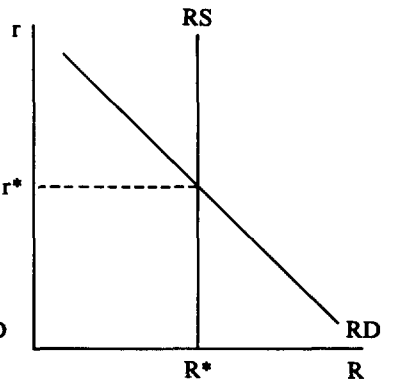

Figure 1c
OPERATING TARGETS

public's demand for money and by the amount of money supplied by depository institutions and the Federal Reserve. The demand for nominal money balances is assumed to depend upon nominal income, the interest rate, and the public's preference between money and other assets. The supply of money is determined by the desired holdings of reserves by depository institutions and by the quantity of nonborrowed reserves provided by the Federal Reserve.[5] Figure 1c illustrates the operating target problem. The demand for nonborrowed reserves, R, is determined by depository institutions' demand for required, excess, and borrowed reserves. The supply of nonborrowed reserves is determined by the Federal Reserve through its open market operations.

In this analysis, policymakers are assumed to have two goals: achieving a level of real output consistent with full employment of resources and maintaining an acceptable price level. The initial equilibrium values of the goal variables, Y* and P*, are taken to be at levels desired by policymakers.[6] Corresponding to the desired levels of the two goal variables are values for the prospective intermediate targets, r* and M*, and for the operating targets, r* and R*. Initially, there is no policy problem as the goal variables are consistent with either interest rate or aggregate targets. However, if disturbances cause aggregate demand or aggregate supply to shift in Figure 1a, the goal variables will differ from their desired values. These disturbances will also cause shifts in the money demand or money supply curves in Figure 1b and in the demand for reserves in Figure 1c, leading to changes in interest rates and monetary growth. At this point, the Federal Reserve has to decide whether to attempt to maintain the original interest rate or quantity of money and whether to maintain the original supply of nonborrowed

[5] The money supply curve is constructed under the assumptions of an interest-sensitive demand for free reserves by depository institutions and a given quantity of nonborrowed reserves. The analysis abstracts from the complications introduced by multiple monetary aggregates.

[6] This is clearly a simplifying assumption. If one or more goal variables are not initially at their desired levels, the analysis is considerably more complex. A detailed discussion of the form of the policymakers' "loss function" or the weights attached to the goal variables is beyond the scope of this article.

reserves. The appropriate choice of targets depends on the type of disturbance affecting the economy.[7]

Spending Disturbances

The first type of disturbance to be considered is a "spending disturbance," which is typically an unanticipated change in consumer or investment spending or perhaps an unplanned change in government spending or taxes. An unanticipated increase in spending, for example, causes aggregate demand for goods and services to expand, raising real output but also causing upward pressure on prices. Without timely information on these output and price changes, the Federal Reserve uses financial market information and control over its short-run targets in an attempt to offset this disturbance. The key question is whether interest rate or aggregates targets are better able to accomplish this objective.

Consider, first, the problem of choosing an intermediate target. As shown in Figure 2a, an increase in spending shifts the aggregate demand curve from AD to AD′ raising both prices and real output. The rise in prices and output increases nominal income so that there is a corresponding increase in the public's demand for nominal money balances. In Figure 2b, there is an outward shift in the money demand curve from MD to MD′. As a result, the interest rate rises to r′ and money growth accelerates to M′, as depository institutions finance additional loans by reducing their holdings of excess reserves and increasing their borrowings from the Federal Reserve.

If the Federal Reserve uses the interest rate as an intermediate target, it will increase the supply of money to try to reduce the interest rate to its original level. In Figure 2b, this action shifts the money supply curve to MS′ which increases the money stock to M′′ and restores the original interest rate, r*. By accommodating the increase in money demand resulting from the spending disturbance, the use of an interest rate target actually amplifies the impact of the spending disturbance on the goal variables. As shown in Figure 2a, the Federal Reserve policy actions cited above induce an increase in aggregate demand, shifting the AD′ curve out to AD′′. Real output increases to Y′′ and prices rise to P′′ so that the goal variables move further from their desired levels.

Alternatively, the Federal Reserve could use a monetary aggregate as an intermediate target. In this case, it would respond to the spending disturbance by returning the money stock to its original level, M*. In Figure 2b, such a decrease in the money supply is shown by a shift in the money supply curve from MS to MS′′, which restores the original quantity of money. By offsetting rather than accommodating the increased demand for money, these policy actions lead to additional upward pressure on interest rates. The increase in the interest rate from r′ to r′′ tends to reduce the investment component of aggregate demand. In Figure 2a, the Federal Reserve policy actions of restoring the original quantity of money would shift the aggregate demand curve from AD′ back toward AD. Thus, for a spending disturbance, a monetary aggregate intermediate target tends to offset the effects of the disturbance and moves real output and prices back toward their desired levels.

Over a shorter time horizon, the Federal Reserve also must choose an operating target

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[7] It is important to note that this article is concerned with the implications of policymakers' setting and attempting to achieve short-run targets. As new information about the economy is received, policymakers may react to this information and change the values of the short-run targets. Thus, an operating variable such as an interest rate or a reserve aggregate may be a target over one time period and an instrument over a longer time period. The analysis in this section is restricted to the time frame in which policymakers set and attempt to hit the initial short-run targets.

SPENDING DISTURBANCE

Choice of an Intermediate Target

Figure 2a

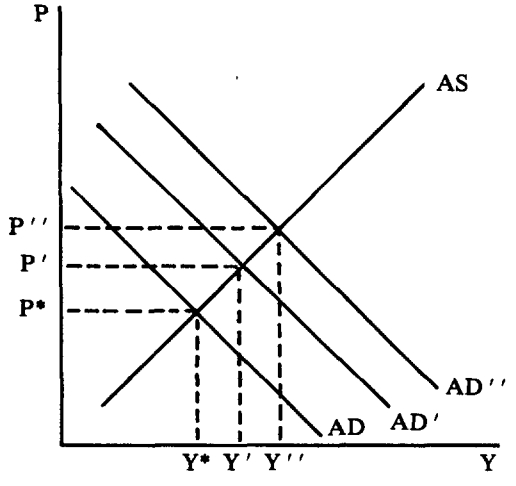
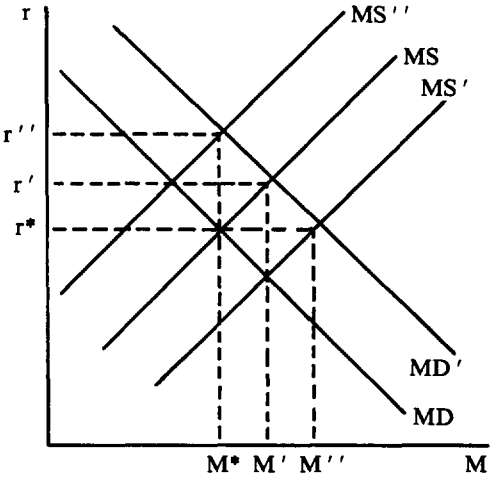


Figure 2b



Choice of an Operating Target

Figure 3a

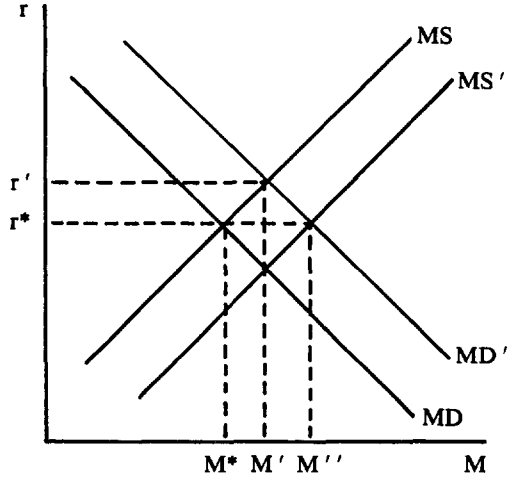
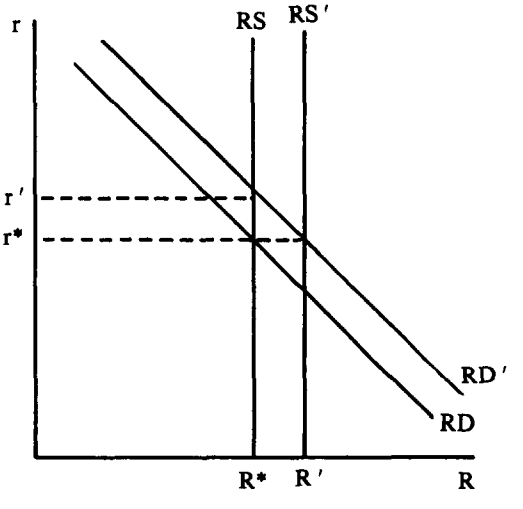


Figure 3b



that will be most successful in keeping M near M*. In this endeavor, the choice is between an interest rate target and a reserve aggregate target. As shown in Figure 3b, the increase in money demand associated with the spending disturbance increases financial institutions' demand for nonborrowed reserves, shifting the demand curve from RD to RD'. With an interest rate operating target, the Federal Reserve will accommodate the increased demand for reserves by an increase in reserve availability. An increase in nonborrowed reserves shifts the RS curve to RS' in Figure 3b and shifts the money supply curve from MS to MS' in Figure 3a. While this action restores the original interest rate, r*, money growth rises to a level, M'', which is further from the desired level. In contrast, with a nonborrowed reserve operating target, the Federal Reserve will maintain the original supply of nonborrowed reserves. As a result, there is no shift in either the RS curve or the MS curve in Figures 3a and 3b. Such policy action leads instead to a higher interest rate, r', and money growth, M'. However, this money growth is closer to the desired level, M*, than that achieved using an interest rate target.[8]

In summary, when a spending disturbance is the source of undesirable changes in real income and prices, a monetary aggregate intermediate target and a reserves operating target are superior to interest rate targets. In this situation, aggregates targets tend to offset the impact of the spending disturbance on the goal variables, while interest rate targets tend to amplify the effects of the disturbance.

[8] It is important to note that a policy of maintaining the initial supply of nonborrowed reserves will not restore money growth to target. To restore money growth to target requires a reduction in nonborrowed reserves. For this type of disturbance, however, a policy of holding nonborrowed reserves constant will result in money, output, and prices being closer to their desired levels than under an interest rate operating target.

Portfolio Disturbances

The second type of disturbance is termed a "portfolio disturbance." In a simple framework where investors have the choice between holding money and an interest-bearing bond, unanticipated shifts between these assets are portfolio disturbances. For example, suppose that investors decide to hold more money and less bonds. This increased portfolio demand for money tends to lower bond prices and raise interest rates. In Figure 4b, an increase in the demand for money is shown to shift the MD curve to MD', leading to a higher interest rate, r', and a greater quantity of money, M'.[9] The increase in the interest rate, in turn, tends to depress the investment spending component of the aggregate demand for goods and services. In Figure 4a, the portfolio disturbance results in a shift in the aggregate demand curve from AD to AD'. As a result there is a decrease in real output to Y' and a fall in prices to P'. Note, however, that the drop in real output and prices occurs at the same time that interest rates and money growth are increasing. This is in sharp contrast to the spending disturbance illustrated in Figure 2, where rising income and prices are associated with higher interest rates and faster money growth.

What is the appropriate choice of an intermediate target for a portfolio disturbance? Consider first the interest rate approach. To return the interest rate to its original level, r*, in the face of an increase in the demand for money, the Federal Reserve would need to increase the money supply. In Figure 4b, the increase in the money supply shifts the MS

[9] Note that this shift in money demand occurs without an initial change in nominal income, unlike the previous case of a spending disturbance. Once again, the increase in money growth is a result of depository institutions reducing their demand for free reserves as the interest rate increases.

PORTFOLIO DISTURBANCE

Choice of an Intermediate Target

Figure 4a

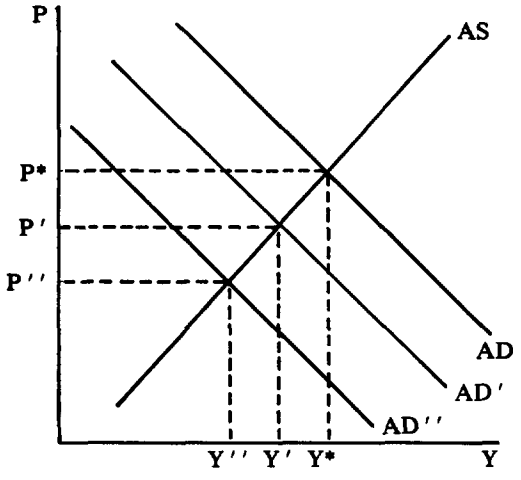
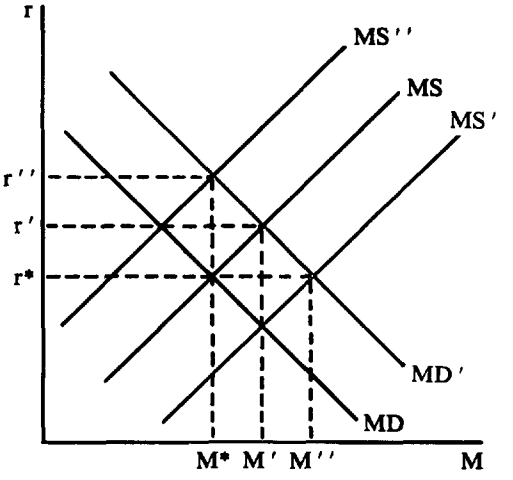


Figure 4b



Choice of an Operating Target

Figure 5a

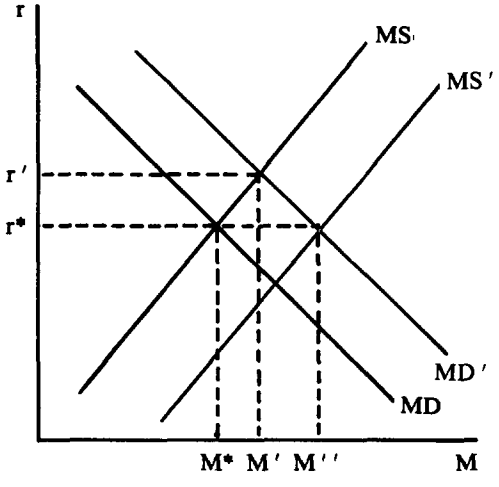
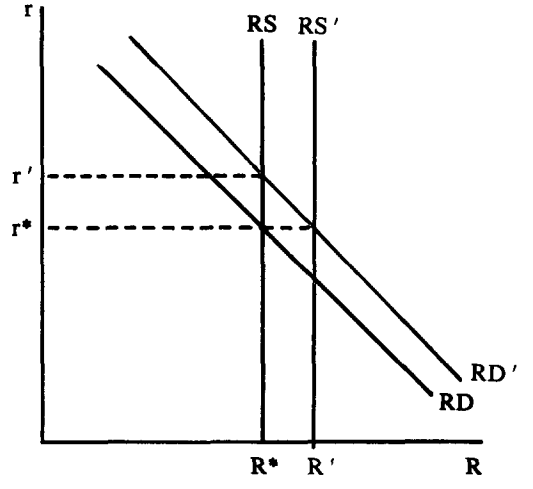


Figure 5b



curve to MS′, which restores the original interest rate but leads to still faster money growth. By returning the interest rate back down to its initial level, this action has a beneficial effect on the goal variables. In Figure 4a, the Federal Reserve's policy actions induce an upward shift in the aggregate demand curve from AD′ back to AD. Thus, both output and prices are moved back to their desired levels. In contrast, with a monetary aggregate intermediate target, a restrictive policy in terms of output and prices is required to offset the increase in money demand. In this case, policymakers would reduce the money supply, shifting the MS curve to MS′′ in Figure 4b. The higher interest rates resulting from this action tend to reduce investment spending and lower the level of economic activity. In Figure 4a, the Federal Reserve's actions shift the aggregate demand curve downward from AD′ to AD′′ so that both real output, Y′′, and prices, P′′, are even further below their desired levels.

For a portfolio disturbance, an interest rate is also the preferred choice as an operating target. In the example above, a portfolio disturbance increases the demand for money and also raises depository institutions' demand for nonborrowed reserves. In Figure 5b the demand for reserves shifts from RD to RD′ so that the interest rate rises to r′. If the interest rate is used as an operating target, policymakers will accommodate the increased demand for reserves and money. In this situation, they will increase the supply of nonborrowed reserves which shifts the RS curve to RS′ in Figure 5b and the money supply curve from MS to MS′ in Figure 5a. By restoring the initial interest rate, r*, this policy also shifts the aggregate demand curve from AD′ to AD in Figure 4a so that price and output are moved back to their desired levels. In contrast, if the Federal Reserve uses a nonborrowed reserve operating target, it will maintain the original quantity of nonborrowed reserves, R*. In this case there is no shift in the RS curve in Figure 5b or the MS curve in Figure 5a, and the interest rate rises from r* to r′. Using a nonborrowed reserve operating target, therefore, implies that the portfolio disturbance is not actively offset so that price and output remain below their desired levels.

In summary, when a portfolio disturbance is the source of undesired changes in real income and prices, interest rate targets are superior to aggregates targets. In this situation the use of interest rate targets prevents the transmission of portfolio disturbances to the real sector of the economy.

Money Supply Disturbances

The third type of disturbance, a "money supply disturbance," is a change in the desired holdings of excess reserves or a change in discount window borrowings by depository institutions. In Figure 6b, a reduction in desired holdings of excess reserves or an increase in desired borrowings leads to an increase in the money supply curve from MS to MS′. As a result of this disturbance, interest rates fall while money growth increases. Lower interest rates tend to stimulate investment spending and the level of economic activity. In Figure 6a, this disturbance is reflected by an outward shift in the aggregate demand curve from AD to AD′. As a result, real output rises to Y′, and prices increase to P′.

For a money supply disturbance, it does not matter whether an interest rate or a monetary aggregate is chosen as an intermediate target. Whether the Federal Reserve attempts to restore the original interest rate or the original quantity of money, either approach reduces the supply of money, thereby shifting the money supply curve from MS′ back to MS in Figure 6b and the aggregate demand curve from AD′ back to AD in Figure 6a. Either intermediate target offsets the money supply disturbance and

MONEY SUPPLY DISTURBANCE

Choice of an Intermediate Target

Figure 6a

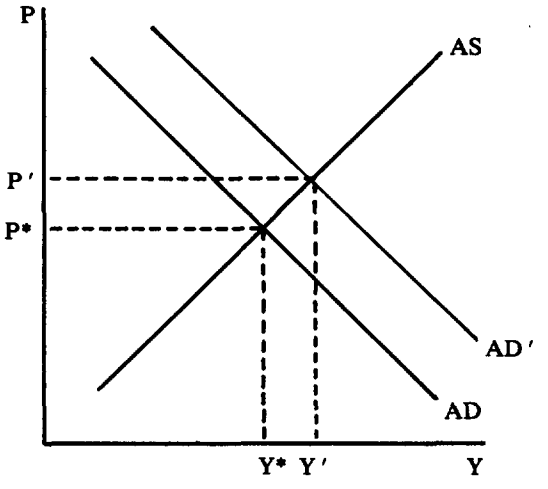
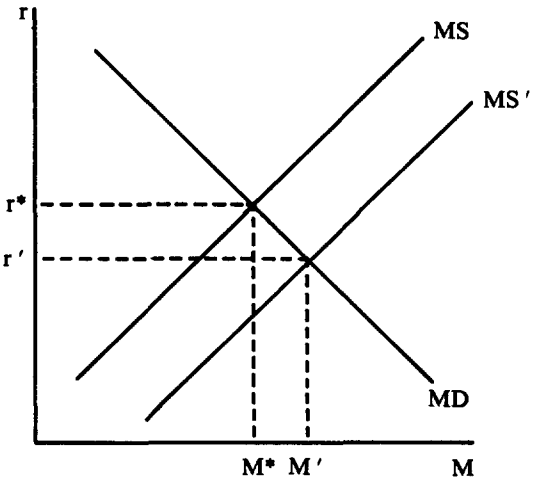


Figure 6b



Choice of an Operating Target

Figure 7a

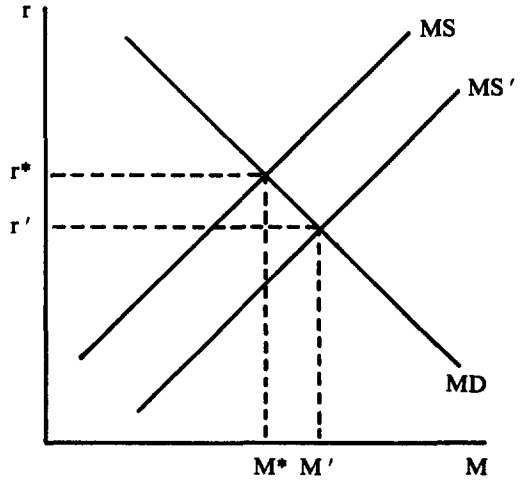
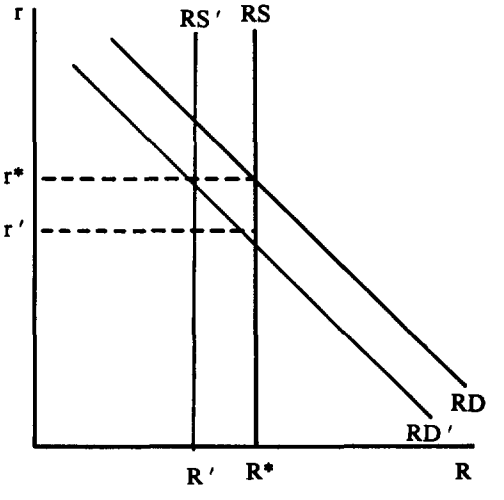


Figure 7b



prevents it from affecting prices and income.

At the operating level, however, an interest rate strategy generally works better than a reserves approach when there is a money supply disturbance. In the example above where a money supply disturbance tends to lower the interest rate and increase money growth, there will be a decreased demand for nonborrowed reserves as depository institutions reduce their desired holdings of excess reserves or increase their discount window borrowings. In Figure 7b, the RD curve shifts to RD ′. If policymakers maintain the existing supply of nonborrowed reserves, they do little to offset the expansionary impact of the lower interest rate. In contrast, if an interest rate is used as an operating target, policymakers offset the disturbance by reducing the supply of nonborrowed reserves. This action shifts the RS curve to RS ′ in Figure 7b and the MS ′ curve to MS in Figure 7a. In this way the impact of the money supply disturbance on prices and output is neutralized.[10]

In summary, the conflict between interest rate and aggregates targets may not arise under money supply disturbances. The objective of the policymaker is to prevent money supply disturbances from being transmitted to real output and prices. At the intermediate target level, either an interest rate target or a money supply target will accomplish this objective. At the operating level, though, an interest rate target is generally preferred to a reserves target.

Supply-Side Disturbances

The fourth type of disturbance is a "supply-side disturbance." Factors such as increases in oil or other energy prices, agricultural shortages, or wage increases in excess of productivity gains may cause a decline in real output while at the same time putting upward pressure on prices. This result is illustrated in Figure 8a where a supply-side disturbance shifts the aggregate supply curve backward from AS to AS ′, leading to higher prices, P ′, and lower real output, Y ′. In the money market, a supply-side disturbance results in higher nominal demand for money. Thus, in Figure 8b, an increase in money demand shifts the MD curve to MD ′ so that the interest rate rises to r ′ and money growth increases to M ′.[11]

It is important to note that a supply-side disturbance has very different policy implications from the three types of disturbances considered previously. Spending, portfolio, and money supply disturbances all lead to a shift in the aggregate demand curve rather than the aggregate supply curve. When the aggregate demand curve shifts, prices and real output move in the same direction. In contrast, when the aggregate supply curve shifts, prices and real output move in opposite directions. As a result, when a supply-side disturbance occurs, policymakers are immediately faced with a worsening of both policy goals as real output falls, while prices increase.

The appropriate choice of an intermediate target for a supply-side shock depends critically on the relative weight that policymakers assign to real output and inflation. If the Federal Reserve chooses an interest rate target, it will accommodate the increased demand for money by increasing the money supply. This action shifts the money supply curve from MS to MS ′ in Figure 8b, so that the interest rate falls from r ′ to r* and shifts the aggregate demand curve from AD to AD ′ in Figure 8a. The increase in

10 A nonborrowed reserve operating target will give results that are equivalent to an interest rate operating target if money supply disturbances take the form of changes in operating factors such as float and the Treasury balance.

11 These results are based on a model which does not incorporate wealth effects. When wealth effects or tax changes caused by inflation are included, interest rates and money growth need not increase.

SUPPLY-SIDE DISTURBANCE

Choice of an Intermediate Target

Figure 8a

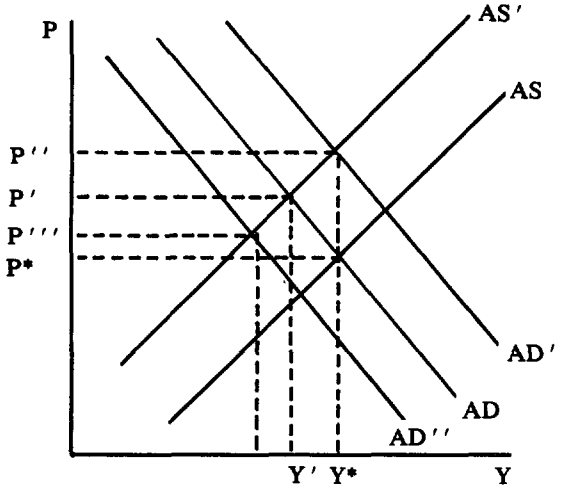
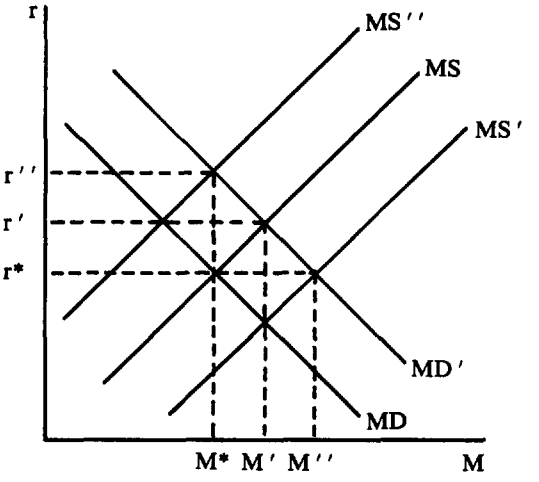


Figure 8b



Choice of an Operating Target

Figure 9a

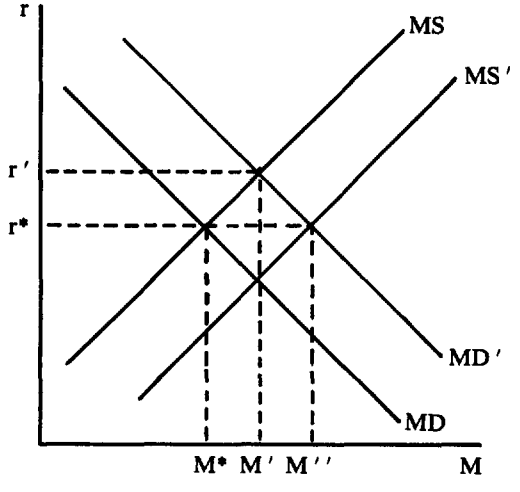
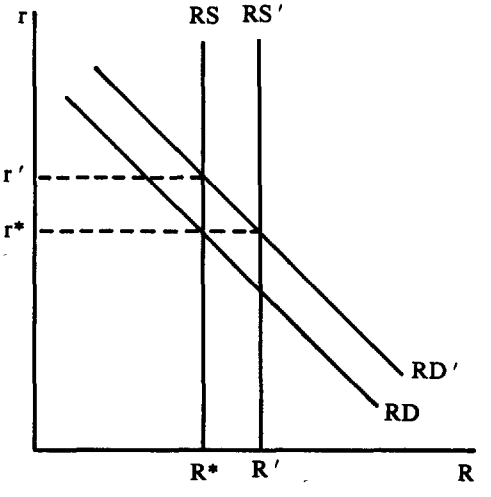


Figure 9b



aggregate demand offsets the negative impact of the supply disturbance on real output as output increases from Y′ back to Y*. At the same time, however, this expansion in real output intensifies the inflation problem as prices rise from P′ to P′′. In contrast, if the Federal Reserve attempts to control money growth, it will reduce the supply of money to offset the increase in money demand resulting from the disturbance. This policy action shifts the money supply curve from MS to MS′′ in Figure 8b and increases the interest rate from r′ to r′′. As a result, aggregate demand is reduced, as shown by a shift in the AD curve to AD′′ in Figure 8a, so that the price level is lowered from P′ back toward P* and output falls further to Y′′. Thus, while the reduction in aggregate demand tends to improve the inflation situation, it exacerbates the decline in real output caused by the supply-side disturbance.

The choice of an operating target follows a similar pattern. The increased demand for nominal money balances resulting from the supply-side disturbance leads to a greater demand for nonborrowed reserves. In Figure 9b, the RD curve shifts to RD′. If policymakers maintain the initial supply of nonborrowed reserves, the rise in interest rates tends to reduce spending which dampens inflationary pressures at the expense of a decline in real output. In contrast, if the interest rate is used as an operating target, policymakers will increase reserve availability to accommodate the increased demand. This policy action shifts the RS curve to RS′ in Figure 9b and the MS curve to MS′ in Figure 9a. By preventing the rise in interest rates, policymakers protect real output but worsen inflationary pressures.

In summary, when there is an adverse supply-side disturbance, policymakers are faced with a worsening of inflation and a reduction in real output. They can respond to the fall in real output by choosing interest rate targets at both levels. Doing so, however, worsens inflation. Alternatively, policymakers can respond to the inflation problem by targeting money and reserve aggregates. In this case, the gains against inflation must be balanced against further deterioration in real output.

SUMMARY AND CONCLUSIONS

This paper has examined the choice of short-run targets for monetary policy in the context of a model in which policymakers are concerned with both real output and inflation.

Table 1
THE CHOICE OF SHORT-RUN TARGETS

Type of Disturbance	Appropriate Intermediate Target	Appropriate Operating Target
Spending Disturbance	Monetary Aggregate	Reserves Aggregate
Portfolio Disturbance	Interest Rate	Interest Rate
Money Supply Disturbance	Monetary Aggregate or Interest Rate	Interest Rate
Supply-Side Disturbance	a) Monetary Aggregate for Inflation Goal b) Interest Rate for Real Output Goal	a) Reserves Aggregate for Inflation Goal b) Interest Rate for Real Output Goal

In general, the choice of interest rate targets versus aggregates targets depends upon the types of disturbances affecting the economy. Table 1 contains a summary of the results. For a spending disturbance, aggregates targets are superior to interest rate targets at both the intermediate and operating levels. In contrast, interest rate targets are preferred in the case of portfolio disturbances. For money supply disturbances, either an interest rate or a monetary aggregate may be used at the intermediate level, while an interest rate is generally superior at the operating level.

In the case of a supply-side disturbance, the analysis is more complicated. If policymakers are primarily concerned with stabilizing real income, interest rate targets are superior to aggregates targets. In contrast, if inflation is the dominant concern, aggregates targets are preferred at both the intermediate and the operating levels.

Federal Reserve targeting procedures have undergone considerable development in the post-World War II period. In the next issue of the *Economic Review,* the analytical framework presented in this article will be used as a basis to describe the evolution of these targeting procedures from 1951 to the present.

U.S. Investment in Foreign Equity Markets

By Richard K Abrams and Donald V. Kimball

During the 1970s, transactions by U.S. investors in foreign stock markets have increased nearly ninefold, approaching a level of $18 billion in 1980. While this volume is less than one-twentieth of that in the New York Stock Exchange, foreign equity investments by U.S. citizens are expanding rapidly and gaining increased attention.

U.S. investors have diversified internationally for two reasons. Some have done so in an attempt to increase their returns —i.e., because they believed that specific foreign stocks, or even specific foreign markets, would yield higher returns than the investment alternatives available in domestic markets. Others have diversified in an attempt to reduce the overall riskiness of their portfolio. Since many foreign stock market price movements exhibit a low correlation with U.S. stock price movements, it has been possible for investors to reduce the expected price volatility of their overall portfolio by diversifying into foreign equities.

This paper provides an overview of investment in foreign equity markets from the perspective of the individual U.S. investor. Stock markets in six foreign countries—Australia, Canada, Japan, Switzerland, the United Kingdom, and West Germany—are examined. In 1980, these markets accounted for 80 per cent of the foreign stock transactions by U.S. investors.

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U.S. INVESTMENT IN FOREIGN STOCKS

U.S. investors sharply increased their buying and selling of foreign stocks in the 1970s. Gross transactions by U.S. investors in foreign equities rose from $2 billion in 1970 to $18 billion in 1980, with most of the expansion occurring since 1977 (Table 1). In 1980 alone, gross transactions rose about $8 billion, or almost 80 per cent.

The largest share of U.S. foreign equity transactions has been in Canadian stocks, with Japanese and British stocks the next most popular. During the 1970s, these three countries typically accounted for 60 to 75 per cent of all U.S. overseas activity in equities. The Swiss market accounted for 5 to 7 per cent of the total, and the West German share ranged from less than 1 per cent to over 5 per cent. Historically, U.S. investors have almost ignored the Australian market, but in 1980, U.S. activity in Australian equities increased nearly fourfold.

Along with the rise in gross transactions, U.S. investors increased their net holdings of foreign stocks in the 1970s. Net purchases totaled $2.7 billion during the decade, as net sales in the first part of the period were more

than offset by large acquisitions over the 1975-80 time span (Table 2). In 1980 alone, U.S. investors added $2.2 billion to their holdings of foreign stocks.

U.S. investor attitudes toward Canada, Japan, and the United Kingdom seemed to shift during the 1970s. Investors were net sellers of Canadian stocks during the 1970-74 period, but were net purchasers from 1975 through 1980. Japanese stocks were out of favor throughout the decade, except in 1980, when U.S. investors made large net purchases. From 1970 through 1977, U.S. investors generally accumulated British stocks, but have been net sellers since 1978. Australia was the only country in which U.S. investors increased their stock holdings throughout the 1970s, while West Germany was the only country in which U.S. investors almost continuously liquidated their positions. Investment in Switzerland showed no discernible time pattern, although on balance investors were net sellers of Swiss stocks.

FOREIGN STOCK EXCHANGES

Market Structure

The general structure of most national equity markets is similar to that of the United States.

Table 1
GROSS TRANSACTIONS ON FOREIGN EXCHANGES BY U.S. INVESTORS
(In millions of dollars)

	Australia	Canada	Japan	Switzer-land	U.K.	West Germany	Other	Total Foreign
1970	6	813	293	132	239	57	666	2,206
1975	4	768	653	202	587	140	915	3,269
1976	7	1,288	975	219	431	216	1,055	4,191
1977	11	1,225	1,349	216	993	87	1,038	4,919
1978	14	1,845	1,942	450	1,249	131	1,171	6,802
1979	40	4,510	1,404	613	1,443	173	1,833	10,016
1980	156	6,819	2,705	1,526	2,735	459	3,578	17,978

Table 2
NET PURCHASE OF STOCK ON FOREIGN EXCHANGES BY U.S. INVESTORS
(In millions of dollars)

	Australia	Canada	Japan	Switzer-land	U.K.	West Germany	Other	Total Foreign
1970-74	+ 5	− 549	−341	− 82	+582	−35	− 337	− 757
1975-80	+89	+2,150	+ 89	−126	+148	−36	+1,108	+3,422
1970-80	+94	+1,601	−252	−208	+730	−71	+ 771	+2,665
1975	0	+ 100	+ 9	− 50	+ 7	−30	+ 155	+ 191
1976	+ 5	+ 14	− 37	+ 41	+ 87	−18	+ 235	+ 327
1977	+ 1	+ 199	−309	+ 12	+303	− 1	+ 204	+ 409
1978	+ 2	+ 139	−376	− 92	− 61	−15	− 127	− 530
1979	+ 8	+ 912	− 24	− 63	−171	+23	+ 101	+ 786
1980	+73	+ 786	+826	+ 26	− 17	−22	+ 567	+2,239

Most countries have one dominant market that accounts for 50 to 80 per cent of the total transactions, plus four to seven secondary markets. The Canadian, Japanese, and Swiss markets are dominated by the Toronto, Tokyo, and Zurich exchanges, respectively. Frankfurt is by far the largest of the eight West German stock exchanges, and Sydney is the largest of Australia's six exchanges. The United Kingdom is an exception; in 1973, the London Stock Exchange—the nation's largest—joined with the six other exchanges in the British Isles to form The Stock Exchange.

The stringency of reporting requirements varies markedly from country to country. While most countries have balance sheet reporting requirements which must be met before a stock is listed, nowhere are the requirements as rigorous as in the United States. In Canada and Japan, the requirements are thorough, and information on stocks in these markets is of high quality. Information on stocks listed on the United Kingdom's stock exchange is also considered to be good and improving. At the other extreme, information on the West German and Swiss exchanges is limited. Also, Germany permits trading on inside information prior to its announcement.

Countries also differ with regard to national regulations and attitudes toward foreign ownership. Of the six countries studied, only the United Kingdom and West Germany have no formal restrictions on foreign ownership of stocks. Swiss companies issue two types of shares—registered, which may be held only by Swiss citizens, and bearer shares, which are unrestricted. Australia requires formal approval by its Foreign Investment Review Board before a foreign resident may acquire over 15 per cent of a domestic corporation. Canada requires a similar approval before a foreign resident gains control of a domestic corporate entity. Japan has recently been dismantling its restrictions, but percentage ownership limitations continue to be placed on a number of corporations deemed important to national security.

Market Size and Activity

To better compare the various aspects of the six foreign stock markets with the U.S. market, comparable data were obtained from Capital International of Geneva, Switzerland.[1] The data indicate that while foreign stock markets have grown rapidly in the last decade, as shown in Table 3, they remain small relative to the New York Stock Exchange (NYSE). The Japanese stock market is the largest foreign market and also has expanded the most rapidly in recent years. The value of the Japanese market as a percentage of the NYSE increased from 7.5 per cent in 1970 to 28.6 per cent in 1979. The stock markets of the other countries are considerably smaller than Japan's and have grown much less rapidly. However, all markets have grown more rapidly than the U.S. market except for Australia.

Annual turnover—the gross value of sales and purchases of equities on an exchange—has followed a pattern similar to the growth of exchanges. Between 1970 and 1979, turnover on the Japanese exchange increased as a percentage of NYSE turnover, from 23.6 per cent in 1970 to 63.4 per cent in 1979. Other major foreign exchanges accounted for a smaller, but relatively stable, portion of stock transactions (Table 4).

The Japanese markets had the highest turnover rate of the seven markets studied. The high turnover occurred because institutions in Japan use the stock market as an instrument of

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1 The Tokyo Exchange, the Sydney Exchange, and the New York Stock Exchange—each carrying out over 80 per cent of their country's total stock transactions—represent the Japanese, Australian, and U.S. markets, respectively. Of the remaining foreign markets examined, coverage encompasses all the national exchanges.

cash management. In 1979, the turnover rate on the Tokyo Stock Exchange was 52 per cent, roughly twice as active as the NYSE. In 1979, the turnover rates on the other markets ranged from 22 per cent in Canada to 7 per cent in Australia.

Yields and Price/Earnings Ratios

The dividend yield—the ratio of dividends to stock prices—on the seven exchanges differed considerably during the 1970s, ranging, on average, from 2.7 per cent for the Japanese and Swiss exchanges to 5.2 per cent for the British market (Table 5). The variation in yields reflects differences in corporate dividend policies—as measured by the dividend/earnings (D/E) ratios—as well as differences in price/earnings (P/E) ratios. D/E ratios ranged from a low of 28 per cent in Switzerland to 50 per cent in the United Kingdom to 54 per cent in Australia. The P/E ratios on the exchanges varied within a range of 10 in Switzerland to 17 in Japan.

The dividend yields on most national equity markets increased over the last decade. On average, market yields rose from 3.6 per cent during the early 1970s to 4.2 per cent during the later years. Japan was the only country of the seven where dividend yields declined.

The general increase in dividend yields was

Table 3
VALUE OF EQUITIES
(In billions of U.S. dollars)

	Australia	Canada	Japan	Switzer-land	U.K.	West Germany	U.S.
1970	26	51	43	10	76	28	570
1975	23	50	135	19	78	52	684
1979	39	98	275	44	142	80	960
	(As a per cent of the New York Stock Exchange)						
1970	4.6	8.9	7.5	1.8	13.3	4.9	—
1975	3.4	7.3	19.7	2.8	11.4	7.6	—
1979	4.1	10.2	28.6	4.6	14.8	8.3	—

Table 4
ANNUAL TURNOVER
(As a per cent of the New York Stock Exchange)

	Australia	Canada	Japan	Switzer-land	U.K.	West Germany	U.S.
1970	2.0	4.6	23.6	n.a.	10.3	3.2	—
1975	0.5	4.0	38.3	n.a.	14.6	8.3	—
1979	1.0	7.6	63.4	n.a.	10.2	5.8	—
	(As a per cent of value of equities)						
1970	7.5	9.2	54.9	n.a.	14.1	10.5	18.1
1975	3.2	10.5	38.2	n.a.	26.3	22.4	20.3
1979	7.0	21.6	52.1	n.a.	18.0	17.9	26.4

not the result of an increase in the D/E ratio, for only in Japan and Switzerland did this ratio increase during the period. The rise in yield actually was the result of a general decline in stock P/E ratios. In five of the seven countries, stock P/E ratios declined between the early and the later years. The overall average P/E ratio declined from 14.1 during the early 1970s to 11.2 during the later years.

HISTORICAL PERFORMANCE OF U.S. AND FOREIGN EQUITY MARKETS

This section analyzes the performance of the stock markets of the United States and the six foreign countries included in the study. For this purpose, a comparable set of national stock market indices created by Capital International of Geneva, Switzerland, has been used. Each national index measures the price behavior of a representative group of stocks listed on the major stock exchanges of the country.

Stock Prices

Each of the six national indices is compared with the U.S. index in Chart 1. The indices are shown in both adjusted and unadjusted forms. The adjusted indices are denominated in U.S. dollars and reflect the effects of changes in the exchange rate of the dollar. An exchange rate adjustment was made because foreign equities are denominated in the stock's home currency, but the U.S. investor is interested in the dollar-denominated return on the investment. Since exchange rates have been volatile in recent years, exchange rate movements have often been dominant factors in the returns on foreign investments. For example, between April 1973 and June 1980, the Swiss franc return on Swiss stocks was only 0.2 per cent annually. However, as a result of the Swiss franc's appreciation against the U.S. dollar, the total annual dollar return was 9.6 per cent.

Chart 1 shows that during the 1970s, there was a broad similarity among the countries in the dominant pattern of fluctuation in stock prices. For most countries, stocks rose in the first part of the decade and fell during the 1973-74 period. Then, after recovering from the 1973-74 decline, stock prices either stabilized or rose further during the 1975-80 period.

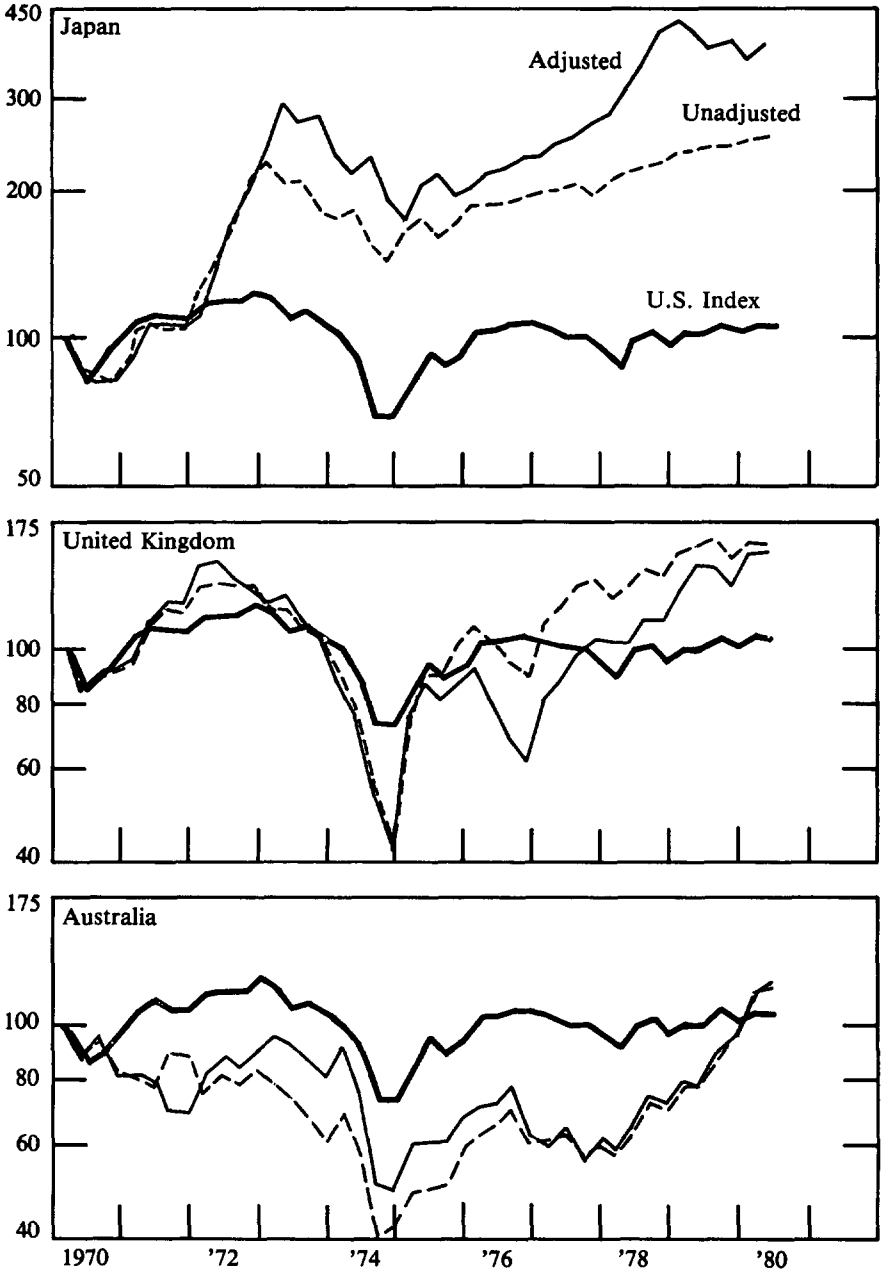
Table 5
GENERAL STOCK MARKET CHARACTERISTICS

	Australia	Canada	Japan	Switzer-land	U.K.	West Germany	U.S.	Average
Dividend Yield								
1970-80	4.3	4.0	2.8	2.7	5.2	4.3	4.2	3.9
1970-74	3.6	3.6	3.3	2.6	4.7	4.0	3.5	3.6
1975-80	5.0	4.4	2.3	2.9	5.8	4.5	4.8	4.2
Dividend/Earnings (D/E) Ratio × 100								
1970-80	53.8	45.0	44.6	27.9	49.8	48.0	48.4	45.4
1970-74	56.5	51.2	43.3	23.9	53.9	49.7	51.8	47.2
1975-80	51.3	39.3	45.7	31.6	46.2	46.5	45.3	43.7
Price/Earnings (P/E) Ratio								
1970-80	13.9	11.8	17.3	10.4	10.6	11.6	12.5	12.6
1970-74	17.8	14.8	14.9	9.6	13.2	12.8	15.6	14.1
1975-80	10.4	9.0	19.5	11.0	8.1	10.6	9.7	11.2

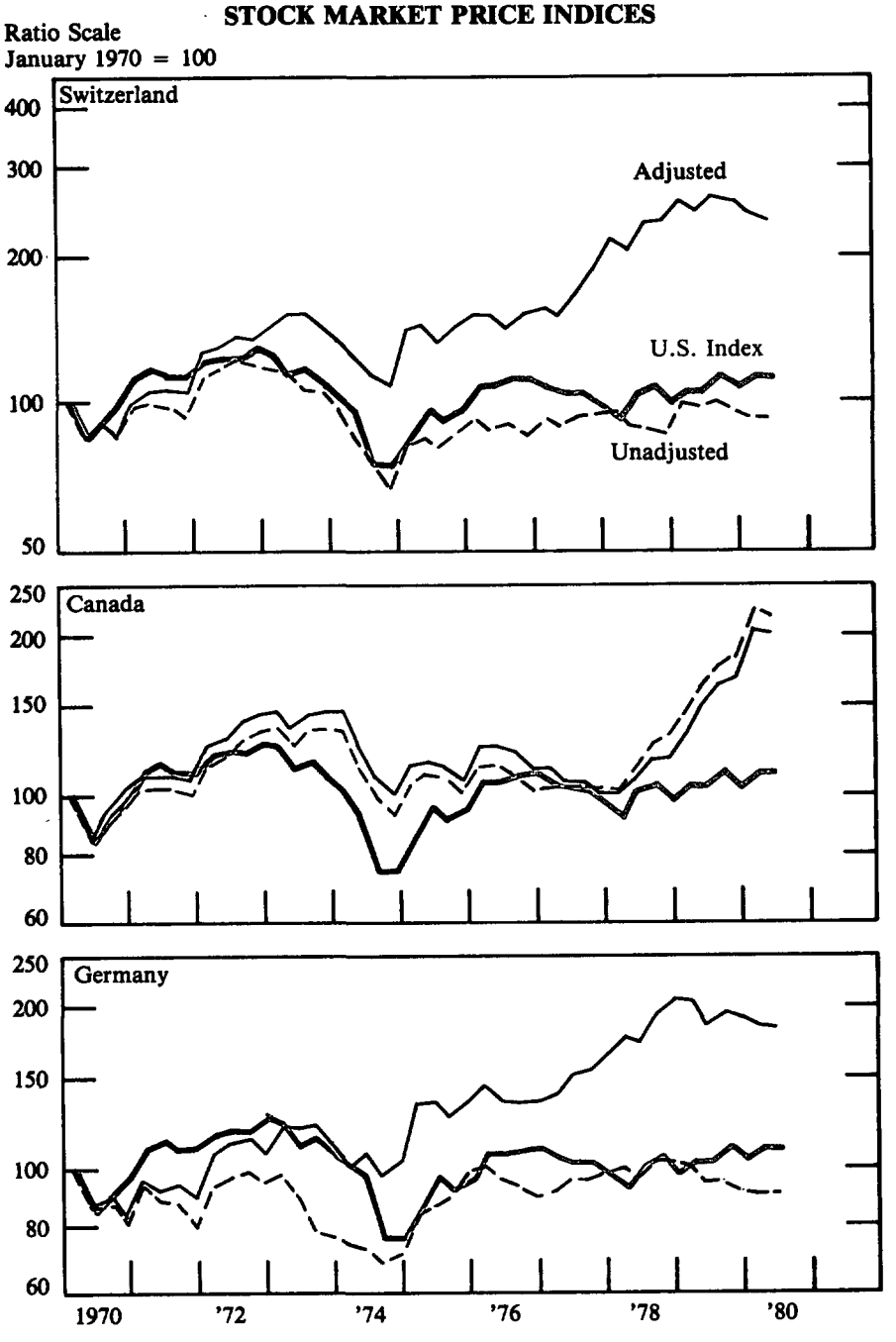
Chart 1

STOCK MARKET PRICE INDICES

Ratio Scale
January 1970 = 100



STOCK MARKET PRICE INDICES



Beyond the general pattern of fluctuations, however, there were important variations in the behavior of the indices. The most significant difference was that for the period as a whole, stock prices rose more in the six foreign countries than in the United States. On an unadjusted basis, only the Swiss and West German indices showed a smaller rise than the U.S. index. Moreover, after adjusting for the exchange rate changes, stock prices in all six foreign markets rose more than prices in the United States.

In the 1970s, Japanese and Canadian stock prices rose, on an unadjusted basis, more rapidly than in the other foreign countries, with a large part of the Japanese increase occurring in the early part of the decade, while Canadian stock prices rose sharply in the 1978-80 period. On an adjusted basis, the Japanese market was by far the strongest of the foreign markets studied, with the Canadian, Swiss, and West German markets also exhibiting moderately strong performances.

Holding Period Yields

In addition to comparing movements in stock prices, it is useful in assessing the relative performance of stock markets to take account of dividends received by stockholders as well as taxes assessed on the returns realized from stock market investments. To account for all factors affecting returns on stock investments, analysts have developed the concept of the "holding period yield." This concept is defined as net return—capital gains plus dividends, net taxes—on a stock (or portfolio of stocks) during a period of time, assuming the stock is purchased at the beginning of the period and sold at the end of the period.

For this study, holding period yields were calculated for the stock markets of the United States and the six foreign countries. In each case, the yields were based on stocks included in the Capital International indices shown in Chart 1. Yields were calculated for a holding period beginning in January 1970 and ending in June 1980. All dividends were assumed to be reinvested. Also, to examine changes over time as well as differences between the periods of fixed and floating exchange rates, yields were calculated for two subperiods—the fixed rate period from June 1970 through March 1973 and the floating rate period from April 1973 through June 1980. Finally, yields for the six foreign countries were calculated on an unadjusted basis and, in addition, were adjusted to reflect changes in the exchange rates between the beginning and end of the holding periods.[2]

The holding period yields show that, in general, the U.S. stock market has performed poorly relative to most other foreign markets. For the 1970-80 period as a whole, before adjusting for exchange rate changes, only Switzerland and Germany had lower yields than the 5.8 per cent annual yield on U.S. stocks (Table 6). More importantly, due to the weakness of the dollar during the period, after adjusting for changes in exchange rates, all six foreign countries had yields noticeably above that of the United States, with annual yields ranging from 7.0 per cent for Australia to 16.7 per cent for Japan.[3]

With regard to differences between the fixed and floating rate periods, the relative

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2 Data on tax rates and dividend yields were obtained from Capital International. Tests examining the effects of dividend taxation on relative returns indicate that while the tax assumption did alter the absolute returns, it did not alter the relative performance of the markets. Because of this, dividend taxation was assumed to be zero. See the appendix for a description of the indices adjusted for taxation and reinvestment of dividends.

3 In addition, a recent study found that for the period 1972 through 1977 the return of holding three-month Eurodeposits and international bonds denominated in dollars was below that on similar foreign currency-denominated assets. See J. D. Hanna, "Why Americans Should Have Diversified," *Euromoney*, March 1980, pp. 48-56.

Table 6
EQUITY PRICE AND EXCHANGE RATE EFFECTS ON NATIONAL MARKET RETURNS

(Annual percentage rate)

	Fixed Rate Period (1970:1-1973:3)			Floating Rate Period (1973:4-1980:6)			Whole Period (1970:1-1980:6)		
	Unadjusted Yield	Exchange Rate Adjustment	Adjusted Yield	Unadjusted Yield	Exchange Rate Adjustment	Adjusted Yield	Unadjusted Yield	Exchange Rate Adjustment	Adjusted Yield
Australia	−6.1	7.5	1.4	12.3	−2.8	9.5	6.7	0.3	7.0
Canada	14.0	2.3	16.3	11.6	−2.0	9.6	12.3	−0.7	11.6
Japan	29.9	9.9	39.7	4.1	2.5	6.6	11.9	4.8	16.7
Switzerland	6.2	9.3	15.4	0.2	9.3	9.6	2.0	9.3	11.3
United Kingdom	9.4	0.9	10.3	10.4	−0.8	9.7	10.1	−0.3	9.8
West Germany	3.6	8.5	12.1	3.3	6.4	9.7	3.4	7.1	10.4
United States	10.1	—	10.1	3.9	—	3.9	5.8	—	5.8

performance of the U.S. market, before adjusting for exchange rates, ranked somewhat higher during the fixed rate period. After adjusting for exchange rates, the Australian market was the only one that the U.S. market outperformed in the fixed rate period. During the floating rate period, the annual average return on the U.S. market trailed all other markets after they were adjusted for exchange rates. In general, however, there was little correspondence between the relative performance of different stock markets in the two periods. In fact, for the seven markets, the correlation between the adjusted yields in the fixed and floating periods was a statistically insignificant −0.279. Moreover, there was no systematic correlation between adjusted yields in any given year and yields in the previous year. These yearly correlations had a median value of −0.110, and ranged from −0.730 for 1976 and 1975 to 0.655 for 1974 and 1973. While four of the yearly correlations were significant, the signs of these significant correlations varied.[4]

This absence of systematic correlation between the relative yields over time indicates that knowledge of the relative performance of a country's stock market during any particular time period would not be helpful in predicting that market's relative performance during other time periods.

In absolute terms, the performance of all the national stock markets was generally poorer in the floating rate period than in the fixed rate period, due in part to a worldwide rise in oil prices. With the exception of Australia and the United Kingdom for unadjusted yields, and with the exception of Australia for adjusted yields, the holding period yields of the seven stock markets were lower in the floating rate period than in the fixed rate period. Japan experienced the sharpest deterioration, with its unadjusted holding period yield declining from 29.9 per cent in the earlier period to 4.1 per cent in the floating rate period, and its adjusted yield showing an even sharper drop. In general, there was very little correspondence over time in the absolute performance of any particular market. The correlation, for any country,

[4] This result is reasonable because the high variance markets, by their nature, are more likely to be near the top or the bottom of the relative performance list one year to the next.

Table 7
STANDARD DEVIATION OF RETURNS ON NATIONAL EQUITY MARKETS

	Fixed Rate Period (1970:1-1973:3)	Floating Rate Period (1973:4-1980:6)	Whole Period (1970:1-1980:6)
Australia	70.0	91.6	85.4
Canada	52.8	73.3	67.6
Japan	69.4	61.7	65.6
Switzerland	57.5	84.8	77.4
United Kingdom	59.6	111.2	98.2
West Germany	61.5	60.6	60.7
United States	44.5	58.7	54.7

between the yield in any year and the yield in the previous year was statistically insignificant for each of the seven countries. This indicates that the absolute performance of a country's stock market during any particular period would not be helpful in predicting performance in any other period.[5]

Volatility of Holding Period Yields

While the returns on foreign equities during the 1970s were generally higher than on U.S. stocks, the risks faced by U.S. investors in acquiring foreign stocks were also greater. Throughout the period, the volatility of the return on equity investments—as measured by the standard deviation of the dollar value of the monthly returns on the stock market indices—was higher for each of the six foreign countries than for the United States (Table 7).[6] The volatility of foreign stock prices also increased in four of the six foreign markets between the fixed and the floating rate period. However, only in the case of the United Kingdom was this increase statistically significant.

Even if returns in a market exhibit high volatility, the addition of assets from that market to an existing portfolio may, on average, reduce the volatility of the portfolio's returns if the returns on the two markets are not closely correlated. While the returns on the various markets were positively correlated during the 1970s, the correlation coefficients were considerably less than 1 (Table 8). Due to this low correlation, international diversification could have markedly reduced the volatility of a U.S. investor's return on his portfolio.[7] Diversifying by equity market share, or equally across markets, would have reduced the standard deviation of the investor's portfolio about 15 per cent below the standard deviation on the U.S. market index.[8]

[5] Tests were made to see if any market's own movements were correlated one month to the next over the period. Five of the seven monthly correlations across the whole period were insignificantly different from zero, while the two significant correlations were low, 0.187 for Japan and 0.214 for the United Kingdom. These results lend general support to the efficient-markets hypothesis.

[6] While the volatility of the dollar value of stock prices was estimated to be higher in all six foreign markets, the difference was statistically significant only for Australia, Switzerland, and the United Kingdom.

[7] Given the actual or expected returns on a group of assets and the actual or expected variances and covariances of those assets, it is possible to derive the minimum variance portfolio for a given desired rate of return. See W. F. Sharpe, *Portfolio Theory and Capital Markets*, New York: McGraw Hill Book Co., 1970, chapter 5.

[8] With a uniformly diversified portfolio, the standard deviation during the floating rate period would have been 52.2 and the annual yield 8.3 per cent, while with a

Table 8
CORRELATION OF MONTHLY RETURNS WITH MONTHLY U.S. RETURNS

	Country					
	Australia	Canada	Japan	Switzerland	United Kingdom	West Germany
Fixed Rate Period (1970:1-1973:3)	0.315*	0.794‡	0.292*	0.402‡	0.374†	0.192
Floating Rate Period (1973:4-1980:6)	0.535‡	0.707‡	0.399‡	0.450‡	0.520‡	0.424‡
Whole Period	0.488‡	0.724‡	0.366‡	0.442‡	0.493‡	0.364‡

*Significant at 90 per cent confidence level.
†Significant at 95 per cent confidence level.
‡Significant at 99 per cent confidence level.

RISKS AND PROBLEMS IN FOREIGN EQUITY INVESTMENTS

Although many investors foresee potentially profitable opportunities in foreign equity markets, they often forego these investments because there are a number of risks and problems which are not present in domestic corporations. The risks may result from exchange rate variation, exchange and capital controls, and country-specific problems (country risk). Problems may also arise because of the minimal reporting requirements on many foreign stock markets. Foreign dividends and capital gain are also subject to taxation by the host country.

As was shown in the previous section, exchange rate fluctuations may have an important impact on foreign investment returns and their variability. However, the risks do not end there. Holding foreign-denominated assets also exposes the investor to risks from the potential imposition of exchange and capital controls. The most damaging controls usually arise when a country's currency is weak but the government does not want to allow it to be devalued. When this situation occurs, restrictions may be placed on the convertibility of the currency which may inhibit the investor's ability to repatriate dividends or to liquidate investments.

Some governments also impose capital controls on national equity markets for reasons of national security, either restricting or prohibiting foreign ownership of domestic equities. The effects of these controls on domestic stock prices are indeterminate. Limiting the potential pool of investors will tend to depress prices in that market. On the other hand, if, at a given price, foreign demand for a restricted stock exceeds the available supply, a two-tiered market may develop. In this case, foreigners may buy shares only from other foreigners, and so the price for foreign-owned shares could exceed the price for

portfolio weighted by market share, the annual yield would have been 6.2 per cent and the standard deviation, 49.9

Furthermore, average correlations of foreign market returns with U.S. equity tend to be generally low and highly variable one year to the next. This result implies that the use of any market correlations should probably be based on observations over a period of years.

domestically owned shares.

Country-specific risks may also be important. Some countries are not as politically secure as the United States, and hostile actions may result in the destruction or expropriation of assets in a country. Further, the indirect threat of hostility, or even potential hostilities near a foreign country, may adversely affect the exchange rate or market prices. Revolutions, governmental collapses, and major shifts in a government's political stance may all endanger foreign assets.

Government attitudes toward foreign investment may also change. When this occurs, expropriation of foreign investments or the forced sale of foreign holdings in the domestic market may take place. Fortunately, this problem rarely arises with stable governments, and when it does, it is more likely to be directed at foreign direct investment than at foreign equity holdings.

Many foreign stock markets also have less rigorous reporting requirements on listed companies than is present within the United States. Accounting standards and national attitudes toward profits also differ. The resulting lack of quality published information causes many foreign stocks to be out of conformance with state blue-sky laws within the United States. Blue-sky laws were enacted to prevent fraud in the sale and disposition of stocks, bonds, and other securities. These laws prohibit brokers from soliciting the sale of any security which is out of compliance with the state's blue-sky laws. An individual may, however, request the purchase of a nonconforming security.

Foreign equities also expose the investor to the tax laws of the foreign country. Tax laws vary markedly between countries. Most impose a withholding tax on dividends to foreigners. Capital gains may also be taxed, with the period necessary for long-term capital gains treatment generally varying from one year upward, while the tax rate on long-term capital gains generally ranges from zero to about one-half the foreign income tax rate. However, within limits, these expenses may be offset by the Foreign Tax Credit.

ALTERNATIVES TO DIRECT INVESTMENT IN FOREIGN EQUITY MARKETS

An investor desiring to invest in business activities abroad, but wary of direct participation in foreign markets, has two alternatives. He may buy shares in a domestic multinational firm (MNF), or he may purchase shares in a foreign corporation whose stock is listed on a domestic stock exchange. A key question, however, is whether these types of investments provide a degree of diversification approaching that which could be achieved by purchasing the shares on foreign stock exchanges.

Domestic MNF's may allow the investor to avoid some of the problems of direct foreign equity investments. Domestically listed stocks are generally cheaper and easier to invest in than foreign stocks, and they avoid dealing directly in foreign currencies. The MNF's also handle foreign taxation internally, and they generally are in compliance with state blue-sky laws.

MNF's, however, have many of the same risks of foreign equities. First, capital controls may inhibit a company's ability to repatriate its foreign earnings. Second, the company's foreign holdings may be subject to expropriation. In fact, direct foreign holdings are more likely to be seized than foreign equity holdings. Third, foreign-denominated transactions are subject to exchange risk. These risks affect the investor through the price of the company's shares.

The important question though is, does investing in U.S. MNF's allow an investor to reduce the variance of his portfolio by an amount approaching that which could be

achieved by direct foreign equity purchases? Unfortunately, the answer appears to be no.[9] While domestic MNF's do allow the investor international diversification into sales and cash flows, they do little to improve the portfolio's diversification in terms of reducing the expected variance.

Rather than investing directly in a foreign equity market, an investor may purchase the shares of foreign firms listed on stock exchanges within the United States. These stocks may be listed in two ways. First, shares may be listed directly, following the same procedures as a U.S. corporation. This is usually done by Canadian companies. Secondly, a stock already listed on a foreign exchange may also be traded on U.S. exchanges as an American Depository Receipt (ADR).[10] Before a stock's ADR's may be traded, the firm must agree to provide sufficient regular information to comply with the stock exchange's reporting requirements.

There are 80 foreign corporations listed on U.S. stock exchanges (Table 9). However, the number of national markets represented is limited. Over half the stocks are Canadian, and the stocks of many major countries, including West Germany, Switzerland, Australia, and France, are not represented. Most of the corporations are either large international conglomerates or are involved with energy- or natural resource-related activities. These stocks also have the same country and market-related risks of other shares in a foreign market.

Table 9
NATIONALITIES OF FOREIGN STOCK LISTED ON U.S. STOCK EXCHANGES

Country	Number of Companies Listed
Bahamas	3
Bermuda	3
Canada	43
Greece	1
Israel	3
Japan	6
Mexico	1
Netherlands	4
Panama	1
Philippines	5
Puerto Rico	3
South Africa	1
United Kingdom	5
Zambia	1
TOTAL	80

SOURCE: U.S. Securities and Exchange Commission, *SEC Corporation Index—Active Companies: As of April 30, 1980,* "Foreign Governments and Foreign Private Issuers," and *Fact Book 1980,* 25th edition, New York Stock Exchange.

Shares in these foreign corporations may allow some degree of international diversification without forcing the investor to endure many of the problems of foreign investment. Two sets of tests were made to see if these stocks behave more like other foreign stocks or more like U.S. equities. First, the prices of several of these stocks were correlated with the U.S. market index and their exchange rate adjusted national index. Second, changes in each stock's price were regressed against changes in both the U.S. and the national stock price indices. Eleven Canadian, British, and Japanese stocks were used.[11] The tests were made using monthly data across the floating

[9] A study by B. Jacquillat and B. Solnik found that by adding shares of domestic MNF's to a purely domestic portfolio, the standard deviation of an investor's portfolio could only be reduced by about 10 per cent. The reduction possible by moving to a truly international portfolio was estimated to be between 50 and 70 per cent. "Multinationals are Poor Tools for Diversification," *Journal of Portfolio Management,* Winter 1978, pp. 8-12.

[10] Once listed, the actual shares were warehoused in a bank, and ADR's representing those shares are traded. Each ADR constitutes a fraction, or multiple, of a share of the stock. International arbitrage acts to keep the prices of ADR's and shares on the foreign equity market in tight alignment.

exchange rate period, April 1973 through June 1980.

The correlations of the Canadian, British, and Japanese stocks with their domestic market indices were all at least 0.79, 0.84, and 0.86, respectively, while their correlations with the U.S. market index did not exceed 0.60, 0.51, and 0.56, respectively. In all cases the differences between the individual correlations were statistically significant at the 99 per cent confidence level. The regressions of percentage changes in the U.S. market price of the foreign stock against changes in both the U.S. and the home market all showed stock price changes to be positively and significantly correlated with their national indices. The coefficients on the U.S. index were insignificant, except for a British stock and a Canadian stock whose coefficients were negative. These results indicate that some of the effects of international diversification may be achieved by investing in the shares of foreign companies listed on U.S. stock exchanges.

CONCLUSION

During the 1970s, many U.S. investors began to consider investments in foreign equity markets. On average, investors who chose to diversify internationally did well. Not only did foreign stock markets yield higher returns throughout much of this period, but an internationally diversified portfolio was likely to have exhibited a lower overall price volatility than a similar portfolio of domestic stocks.

Internationally diversified investors, however, have had to accept many risks and problems not present when investing domestically. Foreign investment entails risks from exchange rate variations, and capital and exchange controls have on occasion caused difficulties. The possibility of foreign political or economic upheaval has made these assets riskier than domestic assets. Foreign taxation also has increased the complexity and at times the cost of foreign equity investments.

Different reporting and trading rules have also increased the risks the investor must face in certain markets. Moreover, some markets allow insiders to trade based on unpublished information. Besides increasing these risks, these problems may result in a corporations's noncompliance with state blue-sky laws.

Despite these problems, some investors view the high foreign returns in the past as an indication of higher returns in the future. This will not necessarily be the case. Furthermore, a large proportion of the returns on many foreign markets resulted from the depreciation of the exchange value of the dollar.

One set of relationships between markets seemed to hold throughout the 1970s; these were low but positive correlations between the national equity market returns. While these correlations varied markedly year to year, they seemed rather stable across longer periods. If these relationships continue in the future, an investor could exploit this information to lower the expected variance of his portfolio without reducing the expected yield of his overall portfolio.

Finally, while the stocks of U.S. multinational firms behave very much like other U.S. stocks, foreign stocks listed on U.S. exchanges moved closely with their home market indices. Although these stocks have many of the risks of equities on foreign markets, the companies provide good balance sheet information, and they allow the investor to avoid some of the problems of direct foreign exchange transactions.

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[11] Alcan Aluminum, Canadian Pacific Ltd., Carling O'Keefe Ltd., and Seagram Company were used for Canada; British Petroleum Company, Ltd., Plessey Company, Ltd., Shell Transport, and Unilever, Ltd., for the United Kingdom; and Hitachi, Honda Motor Company, Ltd., and Matsushita Electric Industrial Company for Japan.

Appendix

Market Indices of Capital International

The Capital International stock market indices are calculated as follows:

Base formula

$$I_{t+1/0} = 100 \frac{\sum_{i=1}^{n} P_{it+1} N_{jt}}{\sum_{i=1}^{n-1} P_{it-1} N_{i0} + P_{nt} N_{nt}} \div \frac{\sum_{i=1}^{n} P_{i0} N_{i0}}{\sum_{i=1}^{n-1} P_{it-1} N_{i0} + P_{nt-1} N_{n0}}$$

where

P_{it+1} = all share prices at calculation date $t+1$,

N_{it} = the total number of shares outstanding at the time of calculation corresponding to the number outstanding after the previous capital increase,

P_{i0} = all share prices at base date 0,

N_{i0} = the total number of shares outstanding at base date 0,

$\sum_{i=1}^{n-1} P_{it-1} N_{i0}$ = the market value of all companies (i) which do not require an adjustment for capital increase at date $t-1$ preceding the first adjustment,

$P_{nt-1} N_{n0}$ = the market value of company n which is being adjusted for an increase in capital immediately preceding the first adjustment,

$P_{nt} N_{nt}$ = the theoretical market capitalization of company n which is being adjusted for an increase in capital immediately after this adjustment, at time t.

The yield adjusted stock market indices used in this study are calculated as follows:

Base formula

$$AI_{jt} = AI_{jt-1} (I_{jt}/I_{jt-1}) (1 + T_{jt} D_{jt}/1200)$$

where AI_{jt} = stock index of country j adjusted for reinvestment of dividends at time t,

I_{jt} = Capital International stock market index of country j at time t,

(I_{jt}/I_{jt-1}) = the proportional change due to capital gain or loss,

$(1 + T_{jt} D_{jt}/1200)$ = appreciation of index due to reinvestment of dividends,

T_{jt} = dividend tax rate in country j at time t,

D_{jt} = annual dividend yield in country j at time t.

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