In Brief
Economic Capsules

Corporate Debt-Equity Ratios

Is U.S. business becoming undercapitalized? Since the end of 1983 nonfinancial business corporations, including those involved in mergers, acquisitions, buyouts, stock repurchases, and related activities, have bought far more equities than they have issued. During 1984 companies issued $13 billion in stock but purchased $90 billion worth—a net retirement of $77 billion (Chart 1). This trend has continued into 1985. Since the net reduction of equity capitalization has been mainly debt-financed, the question is whether or not the business sector is becoming too leveraged as a result.

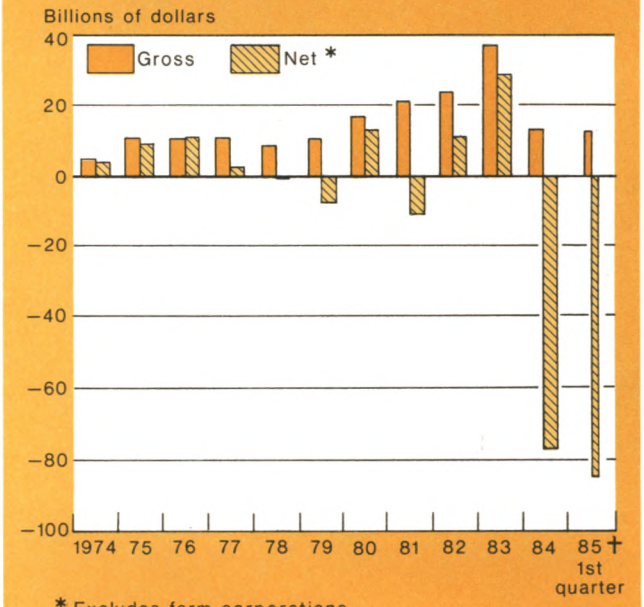
To examine this, we constructed two corporate debt-to-equity ratios. Each compares the market value of corporate debt with a different equity concept. The equity concept in the first ratio is the market value of corporate preferred and common stock. The equity measure for the second ratio is net worth, based on the replacement cost of assets. This second equity measure equals an estimate of the current replacement cost of plant and equipment and inventories, plus the current value of land and other assets, minus our estimate of the market value of corporate debt (box).

These two ratios have differed considerably since the early 1970s (Chart 2). In 1973 and 1974 stock market values fell sharply, driving up the corresponding debt-equity ratio. But over the same period, rising prices of new corporate plant and equipment, inventories, and land caused a drop in the ratio of debt to net worth on the replacement cost basis. This sudden discrepancy between the market and book values of firms is somewhat of a mystery. In part it may have been due to rapid structural change in the economy (*e.g.*, oil prices) or to the interaction of inflation and the tax system. Inflation may also have made it difficult to realistically evaluate corporate assets. In addition, the overall swing in the stock market at the time partly reflected short-run variations in interest rates and earnings, which would not necessarily affect replacement values proportionately. Whatever the full explanation, it is apparent that the

Chart 1

Gross and Net Corporate Equity Proceeds

Nonfinancial corporations



* Excludes farm corporations.

† At annual rate.

Source: Flow of Funds.

causes of the deviation were not all transitory because the difference between the two ratios has persisted into the 1980s.[1]

Which equity measure is better to use in assessing the financial condition of firms? Ideally it is best to know the real economic values of assets and liabilities. It is,

[1]For a discussion of the evaluation of corporate assets, see Franco Modigliani and Richard A. Cohn, "Inflation, Rational Valuation, and the Market", *Financial Analysts Journal*, Volume 35 (March-April 1979), page 25. For a discussion of the tax non-neutrality arguments (inventory valuation, depreciation, housing, etc.) see Marcelle Arak, "Inflation and Stock Values: Is Our Tax Structure the Villain?", this *Quarterly Review* (Winter 1980-81), pages 3-13. The effect of

Footnote 1, continued
structural change in the form of rapid energy price increases, changes in foreign trade flows and defense spending, and the development of environmental and safety regulatory programs is discussed in Martin Neil Bailey, "Productivity and the Services of Capital and Labor", *Brookings Papers on Economic Activity I* (1981), pages 1-50.

Calculation of Debt-Equity Ratios

Two debt-to-equity ratios for the nonfinancial corporate sector were constructed.* The same measure of market debt is used in both, while the definition of equity differs.

The measure of corporate debt includes short-term debt (bank loans, commercial paper, bankers' acceptances, finance company loans, U.S. government loans, profit taxes payable, and trade debt) taken at par value and long-term debt (tax-exempt bonds, corporate bonds, and mortgages) estimated on a market-value basis.

For each year, we calculated a ratio of the market to par value of corporate bonds for U.S. companies listed on The New York Stock Exchange. This ratio was combined with par-value data on all nonfinancial corporations from Flow of Funds to estimate the market value of all nonfinancial corporations' bond debt.

The present value of all mortgage debt (home, multifamily, and commercial) owed by the nonfinancial corporate sector was derived by estimating the mortgages issued (MI) in each year from Flow of Funds mortgage outstanding data (MO).

It was assumed that all mortgage debt was issued with a 10-year—without amortization—maturity at the prevailing Moody's BAA corporate rate.

Mortgage debt retired (MR) in period t is defined as mortgage debt issued in period t − 10.

$$(1)\quad MR_t = MI_{t-10}$$

Mortgage debt outstanding in period t equals the sum of mortgages issued in periods t − 9 through period t.

$$(2)\quad MO_t = \sum_{i=-9}^{0} MI_{t+i}$$

Net mortgage debt issued (NI) is defined as the net change in mortgage debt outstanding.

$$(3)\quad NI_t = MO_t - MO_{t-1}$$

Thus,

$$(4)\quad MI_t = NI_t + MR_t = NI_t + MI_{t-10}$$

Since we know NI, all we need is to estimate MI for the 10 years before 1945, when the Flow of Funds data became available. Mortgage issuance during that period is assumed equal to the level of mortgage debt outstanding in 1945 divided by 10. That is, we assume that an equal amount of the initial mortgage debt is issued each of the 10 years ending with 1945.

Using the mortgage debt issued series, the present value of all mortgage debt outstanding in each period is the sum of present values of all mortgages issued and not yet retired.

$$(5)\quad PV_t = \sum_{i=-9}^{0} \left[\sum_{j=1}^{10+i} \frac{MI_{t+i} r_{t+i}}{(1+r_t)^j} + \frac{MI_{t+i}}{(1+r_t)^{10+i}} \right]$$

r_t = Moody's BAA corporate rate

The first measure of equity, the market value of common and preferred stock† held by nonfinancial corporations, is a residual figure equal to the Security and Exchange Commission's calculation of all equities issued, less the Department of Commerce's estimate of equity issued by foreigners, less the Flow of Funds estimate of all equities issued by the financial sector.

The second concept of equity used, a measure of net worth, was derived by netting out total liabilities (as measured above) from total assets (financial assets, reproducible assets, and land).

Financial assets, based on Flow of Funds data, were taken at face value. Reproducible assets (residential structures, non-residential plant and equipment, and inventories), based on Commerce Department data, were valued on a current cost basis. That is, the assets were valued at the prices that would have been paid in the given period, net of straight line depreciation. The value of land holdings, measured in current market values, is estimated by the Federal Reserve Board.

*The nonfinancial corporate sector includes all private corporations not covered in the financial or farming sectors.

†This figure includes corporate farm equity.

therefore, tempting to rely more on prices in the equity markets. Alternatively, some explanations of the sharp divergence between market and book values in the 1970s focus on the claim that the market has erroneously undervalued firms, in which case the replacement cost net worth measure might be better.[2]

Notwithstanding the great conceptual and quantitative differences between these alternative debt-equity ratios, both tell a similar story about the experience in 1984 (the last year for which data are available). Both ratios have risen, but each remains well within or below the range of experience since the early 1970s.

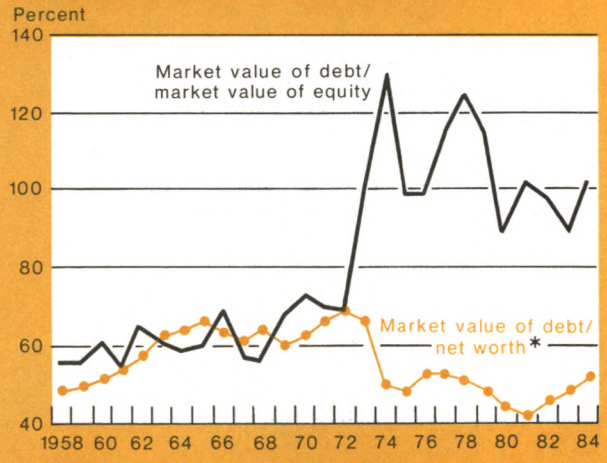
Therefore, at least on this aggregate level, the capitalization of the corporate sector does not appear out of line by past standards. There are important caveats to this, especially the fact that these aggregate debt-equity ratios do not show the variance among individual firms, some of which have increased their debt loads significantly. Moreover, even on an aggregate level, the cost of servicing debt has risen secularly, so that the proportion of gross corporate operating revenues absorbed by interest expenses remains high by historical standards. In addition, the proportion of corporate debt which is short-term has continued to rise steadily.

[2]On the undervaluation of firms, see Modigliani and Cohn, *op. cit.*

Chart 2

Debt/Equity Ratios

Nonfinancial nonfarm corporations



*Current replacement value of assets less market value of liabilities.

Sources: Flow of Funds, The New York Stock Exchange, and the Federal Reserve Bank of New York.

In conclusion, while indicators of corporate financial condition warrant close monitoring, mergers and related activities so far do not appear to have absorbed a disproportionate amount of overall business capital.

Paul Bennett, Anne de Melogue, and Andrew Silver

Capital Goods Sales: Weak Recovery Despite the Spending Boom

Since the trough of the business cycle in 1982 domestic spending on capital goods has surged more than 30 percent in real terms, much more than in any previous postwar expansion and more than twice the pace in an average expansion. Normally such strong growth in capital spending would engender a similar boom in capital goods production. In fact, sales by domestic producers and, consequently output, have grown much slower than spending, well below the pace in an average expansion.

This article examines, at both the aggregated and disaggregated levels, the weakness in domestic sales relative to domestic spending on capital goods and looks at the major factors explaining this divergence. Our analysis indicates that the weakness in sales extends to virtually all capital goods industries. The most important factor behind the significantly slower sales growth is the strong dollar and the associated foreign competition. In the absence of dollar appreciation, our calculations show that domestic capital goods sales would likely have been as much as 15 percent higher in 1984.

A comparison of growth in spending and sales for the current expansion shows that domestic producers have benefited little from the surge in demand. Since the 1982 business cycle trough, sales have increased at less than half the pace of spending (Chart 1). However, even this slow recovery understates the weakness in sales because it followed an unusually sharp decline during the last recession. Sales are still 4½ percent below the 1980 business cycle peak, while capital spending has grown about 19 percent over the same period. Thus, despite the healthy spending picture, capital goods producers have yet to recover the sales lost during 1980-82.

Paralleling this divergence between domestic spending and sales has been the deterioration of the capital goods trade balance—the difference between exports and imports of capital goods.[1] Historically, the United States has been a large net exporter of capital goods. In fact, in every quarter from 1967 to 1979 capital goods exports were at least twice as high as imports, facilitating rapid growth in the U.S. capital goods industry.

In the 1980s, however, this historical pattern began to unravel: with capital exports stagnant and imports rapidly rising, U.S. producers were squeezed from both

[1]Exports are part of sales, but not spending, while imports are part of spending, but not sales.

Table 1

Comparative Growth in Spending and Sales For Four Components of Capital Spending

Percent change in nominal values, 1980-I to 1985-I

Industry (weight)*	Spending	Sales	Ratio of sales to spending
Total (0.26)	43.7	29.8	0.68
Fabricated metals (0.21)	49.9	35.2	0.71
Machinery (0.36)	28.3	17.7	0.63
Electrical machinery (0.34)	56.2	42.0	0.75
Scientific instruments (0.09)	37.6	28.2	0.75

*"Weight" is the ratio of industry sales to total capital goods sales in 1985-I. The weight for "Total" is the share in total manufacturing.

"Total" is calculated using the sum of nominal values for the four components. The table excludes the transportation industry which is dominated by purchases by consumers (motor vehicles) and government (missiles, ships, airplanes, etc.).

Table 2

Growth in Spending and Sales for High Tech versus Other Capital Goods

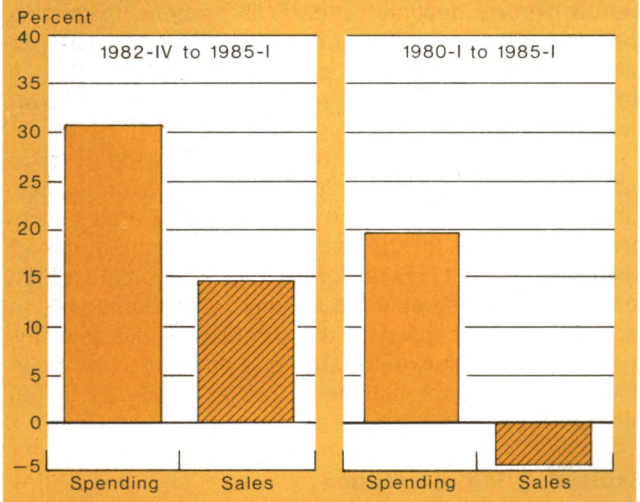
Percent change in nominal values, 1980-I to 1985-I

Industry (weight)*	Spending	Sales	Ratio of sales to spending
High Tech (0.28)			
Computers and office machinery (0.09)	121.8	93.0	0.76
Communications equipment (0.10)	65.5	73.5	1.12
Scientific instruments (0.09)	37.6	28.2	0.75
Other (0.72)			
Fabricated metals (0.27)	49.9	35.2	0.71
Machinery (0.25)	4.5	3.4	0.76
Electric machinery (0.20)	41.7	30.3	0.73

*"Weight" is the proportion of capital goods sales accounted for by each sub-component in 1985-I.

Chart 1

Growth in Capital Goods Spending and Sales*

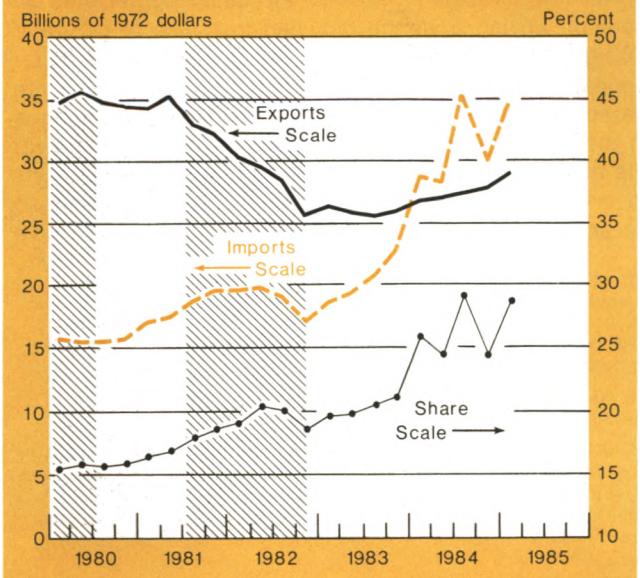


*Constant dollar data, excluding motor vehicles. Sales are estimated using the following (rough) identity: Sales equals Spending plus Exports minus Imports.

Source: National Income and Product Accounts.

Chart 2

Capital Goods Exports and Imports, and the Share of Imports in Spending



Source: National Income and Product Accounts.

sides. From 1980-I to 1985-I imports expanded 121 percent, leading to an 86 percent increase in the import share of the U.S. market (Chart 2). Over the same period exports declined almost 17 percent. Reflecting these developments, the capital goods trade balance moved into a substantial deficit in 1984, following a deterioration of about $26 billion (in 1972 prices) over the preceding three years.

This deterioration of the capital goods trade balance has significantly reduced sales for virtually all industries. For four major categories of capital goods, sales have grown only two-thirds to three-fourths the pace of spending (Table 1). Even for most of the so-called high tech industries, sales have lagged behind spending. In fact, with the exception of the communications industry, the divergence between sales and spending has been about the same for high tech capital goods as for all others (Table 2).

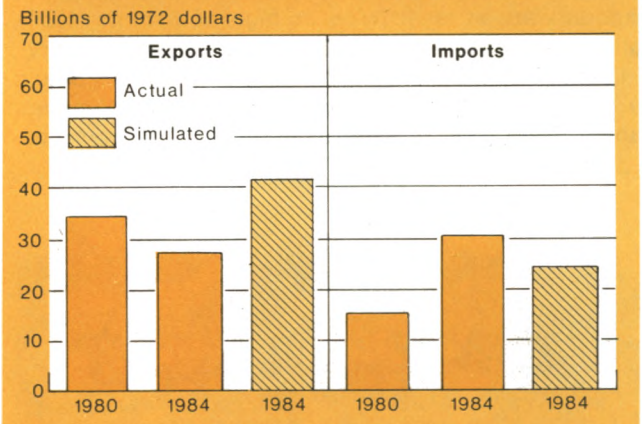
Explaining the divergence

The two major reasons for the "sales-spending gap" are strong growth in real GNP and sharp appreciation of the dollar. From 1980 to 1984 U.S. real GNP grew about three percentage points more than average real GNP for the six largest foreign industrial countries—Germany, France, Italy, the United Kingdom, Japan, and Canada. The weak foreign growth slowed U.S. exports, while the fast cyclical expansion of the U.S. economy led to strong growth of spending and imports.[2]

A more important factor behind the sales-spending gap appears to have been the sharp appreciation of the dollar. From 1980-I to 1984-IV the dollar appreciated 52 percent, driving a wedge between the price of U.S. and foreign capital goods.[3] In judging the impact of dollar appreciation on the sales-spending gap, two factors are particularly important: (1) the degree to which changes in the exchange rate affect purchasers' prices; and (2) the elasticity or responsiveness of imports and exports to price changes. Using plausible estimates of these parameters,[4] we have simulated what would have happened to capital goods imports, exports, and sales from 1980 to 1984 had the exchange rate remained constant.

Chart 3

Capital Goods Exports and Imports With and Without Dollar Appreciation



Source: National Income and Product Accounts.

The results are dramatic, especially for exports. Had the dollar remained flat through 1984, exports would have been about $15 billion higher, and imports would have been about $6 billion lower (Chart 3). Higher exports alone would have pushed sales growth to nearly 9 percent from 1980 to 1984, rather than the actual 3.6 percent decline, closing more than half of the sales-spending gap. Slower imports growth would have narrowed the sales-spending gap further. Firms purchasing fewer imports might have shifted at least part of their spending to domestically-produced goods. In the extreme case, if all of the reduction of imports spending had been switched over to domestic goods, sales would have grown an additional four and one-half percentage points. Of course, these estimates would be higher or lower, using different assumptions or allowing for various indirect effects. For a range of reasonable assumptions, however, the impact of the dollar on sales would be substantial.

In conclusion, the divergence between spending on capital goods and domestic sales of those goods extends to all major industries, and reflects a dramatic deterioration of the capital goods trade balance. Sharp appreciation of the dollar, together with stronger GNP growth in the United States than in other industrial

[2]The effect of relatively slow foreign GNP growth on the sales-spending gap has probably not been large. For example, assuming an income elasticity of 2.0, if foreign GNP had kept pace with U.S. GNP, exports in 1972 dollars would have been only about $2 billion (6 percent) higher in 1984.

[3]The exchange rate used is a GNP weighted average of the value of the dollar for our six largest trading partners.

[4]There are no recently published estimates of the price elasticities of capital goods exports and imports. The assumptions we use here are broadly consistent with recent estimates of exchange rate and price effects on aggregate trade. Specifically, our export and import simulations are based on a "pass through" of 75 percent and a price elasticity of −1.5. In addition, in the export simulation a response lag of two years is assumed. For a recent survey of elasticity estimates see Morris Goldstein and Mohsin S. Khan, "Income and Price Effects in Foreign Trade", in P. B. Kenen and R. W. Jones, eds., *Handbook of International Economics* (1983).

economies, accounts for virtually all of the weakness in domestic sales of capital goods relative to spending. Without dollar appreciation, the rapid recovery in capital spending would have fueled a commensurate boom in the domestic capital goods industry.

Ethan S. Harris

Three Aspects of the Administration's Tax Proposal:

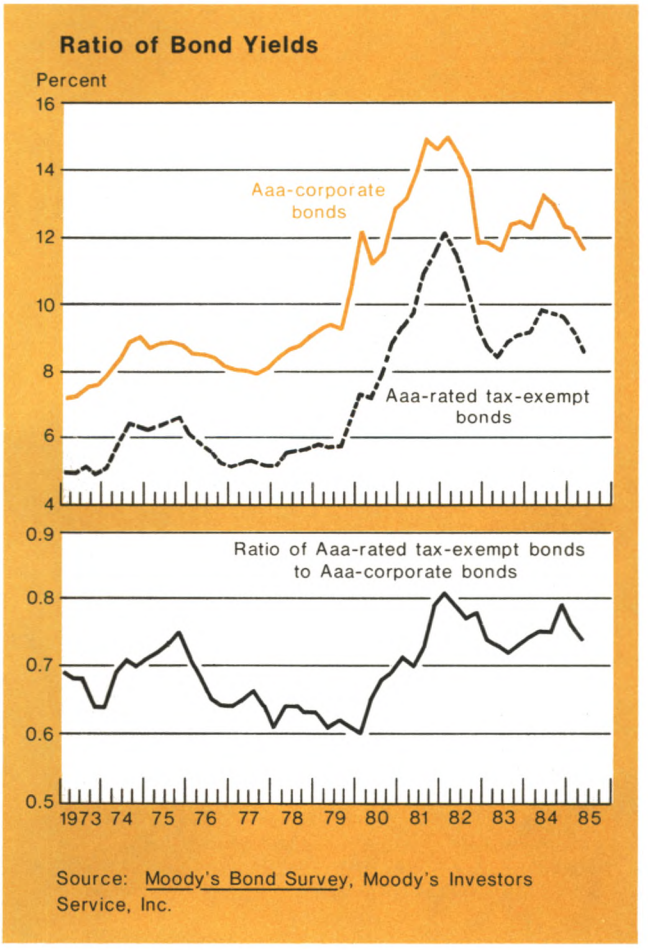
Tax-Exempt Rates

The President's tax reform plan contains a number of provisions that would affect tax-exempt yields relative to taxable yields. Table 1 summarizes the effects of some of these proposals. The first three proposals listed—the reduction of the top marginal tax brackets, the elimination of the 80 percent deduction for commercial banks on interest to carry tax-exempt bonds, and the repeal of the tax exemption for nongovernmental bonds such as industrial development bonds—would probably have the largest effects. We construct estimates of the impacts of each proposal, with a bias toward underestimating those effects that would lower tax-exempt rates relative to taxable rates. Even so, we find that soon after the effective date, the three proposals combined might actually decrease tax-exempt yields by 60 basis points (approximately) relative to taxable yields. However, in the long run, relative tax-exempt rates could rise by as much as 135 basis points if commercial banks respond to the repeal of the interest deduction by allowing their existing holdings of tax-exempts to gradually, but completely, run off.

The effect of the proposed reduction of the highest individual tax rate from 50 percent to 35 percent and of the top corporate tax rate from 46 percent to 33 percent is not likely to be very large because the *marginal* investor in tax-exempts probably would not experience much of a marginal tax rate reduction. In recent years, the ratio of tax-exempt to taxable yields on similarly rated bonds has hovered between 0.70 and 0.80 (chart). Currently, with the ratio at 0.74, one could argue that the marginal tax rate of the marginal investor in tax-exempts is 26 percent.[1] If this were so (and the tax rate consisted only of Federal taxes), approximately the same minimum taxable income would correspond to that tax rate under the current and proposed tax rates.[2] Thus, the change in the tax rates would probably not significantly alter the number of people who would find

[1]If similar ratings imply the same credit risk for tax-exempt and corporate bonds, one would expect that, in equilibrium, the tax-exempt rate would equal the after-tax return from corporate bonds. That is, $(1-t)r_t = r_x$, or $\frac{r_x}{r_t} = 1-t$, where t is the marginal tax rate, r_t is the taxable interest rate, and r_x is the tax-exempt interest rate. Currently $\frac{r_x}{r_t} = 0.74$, so implicitly, $t = 0.26$.

[2]Under the current law, single taxpayers with taxable income over $19,640 have marginal tax rates of a least 26 percent. Under the proposed system, taxable incomes over $18,000 would be taxed at roughly the same rate, 25 percent. For joint returns, taxable incomes over $26,540 and $29,000 under the current and proposed systems, respectively, are taxed at marginal rates of at least 25 percent.



Source: Moody's Bond Survey, Moody's Investors Service, Inc.

Table 1

Summary of Impacts of Administration's Proposals on Tax-Exempt Rates

Proposal	Effect on tax-exempt yield (with taxable yields constant)	Assumptions
Reduction of top marginal tax rates	+100 basis points for long-term issues, more for short-term	1. Current marginal tax rate of marginal investor is 33% 2. No base broadening of taxable income 3. No interest elasticity of supply
Elimination of 80% commercial bank interest deduction for carrying tax-exempts	+8 basis points in short-run +200 basis points in long-run	1. Entire commercial bank (stock) demand is eliminated as existing holdings mature
Repeal of exemption for nongovernmental bonds	−167 basis points	1. Less than half of actual recent flow of nongovernmental bonds is actually eliminated (*i.e.*, total tax-exempt supply reduced by 25 percent)
Elimination of deduction for state and local government taxes	1. Rates might rise some if municipalities were forced to reduce taxes without compensating cuts in expenditures 2. Increases attractiveness of tax-exempt bonds for residents of issuing states, especially those with high tax rates	
Tightening of tax arbitrage provision	1. Less supply, so rates could fall, but less income to states, so risk premiums may rise	
Elimination of advance refundings	1. Reduction of supply could reduce yields, but yields could rise if call protection provisions curtailed	
Base broadening of income	1. For households and property and casualty insurance companies, could mitigate effect of cut in top marginal tax brackets 2. Could reduce risk premiums for those states that tie taxable income to Federal taxable income	

Table 2

Volume of Long-Term Tax-Exempt Bonds by Type of Activity, 1975-84

In billions of dollars

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Total issues, long-term tax exempts*	30.5	35.0	46.9	49.1	48.4	54.5	55.1	84.9	93.3	115.1
Nongovernmental tax exempts	8.9	11.4	17.4	19.7	28.1	32.5	30.9	49.6	57.1	72.5
Housing bonds	1.4	2.7	4.4	6.9	12.1	14.0	4.8	14.6	17.0	20.8
Single-family mortgage subsidy bonds	†	0.7	1.0	3.4	7.8	10.5	2.8	9.0	11.0	13.5
Multi-family rental housing bonds	0.9	1.4	2.9	2.5	2.7	2.2	1.1	5.1	5.3	5.1
Veterans general obligation bonds	0.6	0.6	0.6	1.2	1.6	1.3	0.9	0.5	0.7	2.2
Private exempt entity bonds‡	1.8	2.5	4.3	2.9	3.2	3.3	4.7	8.5	11.7	11.6
Student loan bonds	*	0.1	0.1	0.3	0.6	0.5	1.1	1.8	3.3	1.1
Pollution control industrial development bonds	2.1	2.1	3.0	2.8	2.5	2.5	4.3	5.9	4.5	7.5
Small-issue industrial development bonds	1.3	1.5	2.4	3.6	7.5	9.7	13.3	14.7	14.6	17.4
Other industrial development bonds§	2.3	2.5	3.2	3.2	2.2	2.5	2.7	4.1	6.0	14.0
Other tax-exempt bonds‖	21.6	23.6	29.5	29.3	20.3	22.0	24.2	35.3	36.2	42.6

Totals may not add due to rounding.

*Total reported volume from *Credit Markets* (formerly the *Bond Buyer)* adjusted for privately placed small-issue IDBs.

†$50 million or less.

‡Private-exempt entity bonds are obligations of Internal Revenue Code Section 501(c)(3) organizations such as private nonprofit hospitals and educational facilities.

§Other IDBs include obligations for private businesses that qualify for tax-exempt activities, such as sewage disposal, airports, and docks.

‖Some of these may be nongovernmental bonds.

Source: For data from 1975-83: *The President's Tax Proposals to the Congress for Fairness, Growth, and Simplicity* (May 1985), page 284.
For 1984 data: Office of Tax Analysis, United States Department of the Treasury.

the current tax-exempt rate attractive relative to the after-tax return available on taxable securities.

However, if the marginal Federal tax rate of the marginal investor were higher, say at 33 percent, then it is possible that some current investors in tax-exempts would no longer find it advantageous to invest in them under the proposed law. For example, taxpayers with single returns with taxable incomes of $31,070 are currently taxed at a marginal rate of 34 percent. With joint returns, incomes in excess of $37,980 are taxed at a rate of 33 percent. Under the proposed tax rate structure, those same investors would have marginal tax rates of 25 percent. With current tax-exempt rates at about 8.35 percent, the rates would have to rise by about 100 basis points to remain competitive with taxable instruments yielding 12.46 percent (the taxable equivalent of 8.35 percent tax-free with a 33 percent tax rate).

This is an overestimate of the required increase, for three reasons. First, as noted earlier, the marginal investor's marginal Federal tax rate is likely to be lower than 33 percent, especially after taking into account the possibility that the relevant marginal tax rate might include state and local income taxes.[3] Thus the proposed change in the tax rate structure would probably not significantly alter the number of people who would find tax-exempts more attractive than taxables. Second, some taxpayers could find themselves in higher marginal tax brackets because of the proposed broadening of the definition of taxable income, through such changes as the elimination of the deduction for state and local taxes and the taxation of the inside buildup in the value of life insurance policies. Finally, we implicitly assume a zero interest elasticity of the supply of tax-exempt securities—a negative elasticity would tend to mitigate the necessary interest rate response.

The other proposal tending to raise tax-exempt rates the most relative to taxable yields is the repeal of the 80 percent deduction for commercial banks on interest to carry newly acquired tax-exempt bonds. This proposal would probably completely eliminate bank demand for tax-exempt securities since it would most likely eliminate the spread earned on tax-exempts and would certainly make the spread lower than could be earned on taxable investments.[4]

For example, at the end of May 1985, the cost of three-month large CDs was about 7.6 percent. Tax-exempt notes were paying 4.9 percent during the same period, however. Thus, with the 80 percent interest cost deductibility, banks could have earned 10 basis points after taxes by funding the notes with CDs. But without deductibility, banks would have lost money on such a transaction. If, instead, banks invested in longer-term A-rated tax-exempt bonds paying 8.81 percent (and accepted the asset-liability maturity mismatch) they could have earned a positive spread of 121 basis points, even without interest cost deductibility. But they could have earned an even larger after-tax spread of 178 basis points (at a 46 percent marginal tax rate) by investing in 20-year Treasury securities (paying approximately 10.9 percent). At the proposed maximum corporate rate of 33 percent, the spread earned on taxable investments would have been even higher, approximately 221 basis points after taxes. Therefore, if banks were not able to deduct interest costs, they would not purchase tax-exempt instruments at current rates.

What would be the impact on relative tax-exempt yields if commercial banks no longer demanded new tax-exempt bonds? Suppose commercial banks cut back on demand for tax-exempts by the average annual amount they had purchased from 1981 through 1984, $6.5 billion, or 1.1 percent of the total outstanding stock. Then, using an interest elasticity of −1.27 from a study by Hendershott and Koch,[5] we would expect tax-exempt interest rates to rise by 0.9 percent, or 8 basis points based on a current interest rate of about 8.35 percent. In addition, commercial banks would probably not replace holdings as they mature. Given that banks currently hold $168 billion of tax-exempt securities, or 30.2 percent of the total, the resulting longer-run decline in demand could raise tax-exempt rates by 23.8 percent, or 200 basis points.

Offsetting these effects is the proposed repeal of the tax exemption for nongovernmental bonds. This would severely curtail the supply of tax-exempt securities after the enactment date (although there might be a rush of issues to beat the deadline). The Treasury estimates that in each of the years from 1979 to 1984, over 55 percent of the long-term tax-exempt market was comprised of nongovernmental issues (Table 2). A reduction of the supply of this amount, or some significant portion thereof, would have a major impact on relative tax-exempt rates.

In fact, quite probably the supply would not fall by the full volume of recent nongovernmental issues, since it is likely that various exceptions would be allowed in a final tax bill and that some of the functions financed by nongovernmental units would be taken over, and

[3]However, since the ratio of short-term tax-exempt to taxable yields is much lower than the long-term ratio, the marginal rate for marginal investors in short-term tax-exempts might actually be higher than 33 percent.

[4]In the short-run, however, bank demand for tax-exempts might increase as they attempt to stock up before the December 31, 1985 deadline.

[5]Patric H. Hendershott and Timothy W. Koch, "An Empirical Analysis of the Market for Tax-Exempt Securities: Estimates and Forecasts", Monograph Series in Finance and Economics, Monograph 1977-4.

financed directly, by municipalities. But even if supply were reduced by, say, only 25 percent, the interest elasticity of −1.27 implies that tax-exempt rates would have to fall by about 20 percent, or 167 basis points on an 8.35 percent level, to clear the market.

It is difficult to provide specific estimates of the effects of other parts of the tax plan, such as the proposed elimination of the itemized deduction for state and local taxes, the prohibition against advance refunding issues, the tightening of arbitrage provisions, and the broadening of the taxable income base for businesses such as property and casualty insurance companies (Table 1). As a result, it is difficult to quantify the total net impact of the tax plan or even to determine with certainty the direction of the overall impact. However, since the full impact of the elimination of the carrying cost deduction for commercial banks would probably not be felt for quite some time, it is much less likely that tax-exempt rates would rise relative to taxable rates in the short run than in the long run.

Andrew Silver

Capital Investment Incentives

One of the more controversial issues arising from the President's recent plan for tax reform is whether it will stimulate business investment spending.[1] The reforms are aimed at fostering greater capital formation, especially over the long term, by moderating the distorting effects of the present corporate tax system on the composition of investment. However, a number of economists—including Martin Feldstein and Murray Weidenbaum—have criticized the approach taken in the proposal, arguing that it will stifle spending for new investment in the near term by scaling back existing tax incentives.[2]

In this capsule we look at how the President's proposal would alter the effective marginal tax rates currently applied to income from investment in fixed capital.[3] Our analysis indicates that the reform package would substantially raise effective tax rates on investments in producers' durable equipment (PDE) while reducing them on investments in structures. On this basis, we conclude that the near-term effect will be to slow investment spending on PDE, but to encourage investment in business structures. These effects will persist in the long run as well. At the same time, the proposal would also lead to tax rates that are roughly equivalent across different assets and industries. Therefore, some offset to the overall smaller stock of capital might result from investment expenditures being allocated more on the basis of economic returns than on tax considerations.

Investments in fixed capital are now taxed at widely differing effective marginal rates across asset categories and industries. In fact, effective tax rates not only vary considerably; they are positive for structures but *negative* for most categories of PDE—indicating a tax subsidy.[4] As shown in Table 1, tax rates on investments in PDE range from a high of 7 percent to a low of −57 percent, while for business structures the rates are strictly positive, ranging from 28 percent to 48 percent. The problem with tax rates that are so unequal is that they bias investment decisions. First, within a particular industry they encourage firms to invest in certain assets over others, and second, within a given asset category they favor investments in some industries over others.

Several features of the corporate tax structure contribute to the wide variation in effective tax rates. One is that the statutory depreciation allowances under the Accelerated Cost Recovery System (ACRS)[5] are more generous than a deduction for actual economic depreciation would be. Thus, the cost of capital—and hence effective marginal tax rates—across different assets depends on the excess of ACRS depreciation over

[1]The complete plan is presented in *The President's Tax Proposals to the Congress for Fairness, Growth, and Simplicity* (May 1985), United States Government Printing Office.

[2]See Martin Feldstein, "Improving the President's Tax Reform Proposal", Testimony before the House Ways and Means Committee (June 11, 1985); and Murray L. Weidenbaum, "The Case Against Tax Reform in 1985", Occasional Paper No. 40, Center for the Study of American Business, Washington University-St. Louis (March 1985).

[3]The effective marginal tax rate (t) is defined as $t=(c-r)/c$, where c is the before-tax rate of return on fixed capital net of economic depreciation and r is the after-tax return. For a more detailed discussion of the theory behind this measure, see Alan J. Auerbach and Dale W. Jorgenson, "Inflation-Proof Depreciation of Assets", *Harvard Business Review*, Volume 58 (1980), pages 113-118; and Jane G. Gravelle "Effects of the 1981 Depreciation Revisions on the Taxation of Income from Business Capital", *National Tax Journal*, Volume 35 (1982), pages 1-20.

[4]A negative effective marginal tax rate means that an investment's after-tax rate of return is greater than its before-tax rate of return. In other words, the investment is receiving a tax subsidy. For example, with an effective rate of −50 percent, an asset earning a 7 percent rate of return before taxes really earns a 10.5 percent return after taxes. This type of subsidy comes from built-in features of the tax code, such as accelerated depreciation and the investment tax credit.

[5]The Accelerated Cost Recovery System went into effect with the enactment of the Economic Recovery Tax Act in 1981. All calculations of effective tax rates also include modifications to ACRS from the Tax Equity and Fiscal Responsibility Act of 1982.

economic depreciation. ACRS also effectively leads to varying tax rates across industries because the composition of capital assets held by firms differs among sectors of the economy.

A second feature leading to dissimilar tax rates is the investment tax credit (ITC). This provision of the tax code was designed to stimulate investment spending by giving firms a credit from 6 percent to 10 percent of the cost of new investments against their tax bill. Since the ITC applies only to investments in tangible capital, its implicit effect, particularly in conjunction with ACRS, has been to favor the capital-intensive sectors of the economy. The ITC also favors investment in industries that are profitable, and therefore better able to make use of credits to shelter income from taxation. Moreover, since the ITC only applies to investment in equipment, it favors PDE relative to structures.

Finally, the "first-in-first-out" (FIFO) method of inventory accounting also contributes to the wide variation in effective tax rates on capital. With inflation, the FIFO method creates accounting profits which raise a firm's overall tax liability.[6] The extent to which this occurs, however, differs by industry according to the

[6]Under the FIFO method of inventory valuation, inflation will push the sale price of an inventory item above its original book value. As inventories are depleted, firms realize the difference between the sale price and the book value as profit subject to tax. This results in a higher effective tax rate on corporate income and, hence, on investments in fixed capital as well.

Table 1

Effective Marginal Tax Rates on Investments in Fixed Capital Under Current Law*

In percent, by sector

Asset category	Agriculture	Mining	Construction	Durables manufacturing	Nondurables manufacturing	Transportation, communications, and utilities	Trade and services
Producers' durable equipment							
Computing, electric, and communications	−6	−57	−53	−42	−48	−34	−57
Transportation	7	−40	−42	−33	−37	−37	−36
Agricultural and mining	−3	−45	−45	−21	−22	−24	−21
Light industrial	−1	−35	−36	−24	−21	−36	−32
Heavy industrial	−4	−44	−46	−27	−24	−25	−27
Structures							
Commercial, industrial, and mining	48	35	28	32	31	29	32

*For a definition of the effective marginal tax rate see Jane G. Gravelle, *op. cit.* All calculations are made on the basis of a 4 percent real after-tax return on equity, and a 5 percent rate of inflation. While the absolute levels of the effective marginal tax rate estimates are sensitive to the real rate of interest and the rate of inflation, the relative differences across asset categories and sectors are fairly robust with respect to these assumptions.

Table 2

Effective Marginal Tax Rates on Investments in Fixed Capital Under the Administration's Tax Reform Proposal*

In percent, by sector

Asset category	Agriculture	Mining	Construction	Durables manufacturing	Nondurables manufacturing	Transportation, communications, and utilities	Trade and services
Producers' durable equipment							
Computing, electric, and communications	23	21	21	21	21	19	19
Transportation	20	18	18	19	18	17	18
Agricultural and mining	17	17	17	16	15	15	16
Light industrial	20	18	17	18	17	17	17
Heavy industrial	19	17	17	19	16	16	17
Structures							
Commercial, industrial, and mining	29	33	26	27	27	26	27

*The tax reform proposal is described in *The President's Tax Proposals to the Congress for Fairness, Growth, and Simplicity, op. cit.* For a definition of the effective marginal tax rate see Jane G. Gravelle, *op. cit.* All calculations are made on the basis of a 4 percent real after-tax return on equity, a 5 percent rate of inflation, and a 75 percent switchover to indexed FIFO inventory accounting. While the absolute levels of the effective marginal tax rate estimates are sensitive to the real rate of interest and the rate of inflation, the relative differences across asset categories and sectors are fairly robust with respect to these assumptions.

inventory-to-output ratio and the percent of inventories accounted under the FIFO method. For example, the agriculture sector holds a high proportion of its annual output as inventories—54 percent as compared with an economy-wide average of about 22 percent—and approximately 97 percent of those inventories are valued under FIFO. Together, these factors lead to comparatively higher, or less negative, effective tax rates in this sector of the economy than in other sectors.[7]

The President's reform plan recommends four major changes to the corporate tax system. First, the depreciation lives of assets would be lengthened relative to those allowed under ACRS, and the depreciable basis would be indexed for inflation. Indexing the depreciable basis is relevant mainly for long-lived assets such as structures, where failure to do so substantially raises effective tax rates at even low levels of inflation. Second, the tax plan would eliminate the investment tax credit. A third change would give firms the option of indexing the book value of FIFO inventories to eliminate accounting profits due to inflation. Finally, the proposal would lower the maximum marginal tax rate on corporate income from 46 percent to 33 percent.

The President's tax proposal should greatly reduce the present variation in effective marginal tax rates across asset categories and industries (Table 2). Although the discrepancy between effective tax rates on PDE and structures would be narrowed considerably, tax rates on equipment would still be comparatively lower. We estimate that tax rates on investments in PDE would be higher than they are now and range from 15 percent to 23 percent, while tax rates on structures would be lower than at present and range from 26 to 33 percent.

When evaluated in terms of its impact on effective marginal tax rates, the President's tax plan is, on the whole, likely to depress investment spending. Since the incentives to invest in PDE would not be nearly as great as they are now, spending on durable equipment is likely to fall significantly. This would be partially offset by a boost to investment spending on structures. However, with tax considerations less of a factor in determining the allocation of investment spending, the capital stock, though smaller, is likely to be more productive.

[7]We estimate that the FIFO inventory accounting method has raised the effective tax on corporate income in the agriculture sector from the statutory rate of 46 percent to 67 percent. In contrast, the trade and services sector holds only about 12 percent of its annual output as inventory. With such a low inventory to output ratio, the increased tax liabilities from FIFO accounting are insignificant, therefore the effective corporate income tax rate is essentially the statutory rate. Consequently, the corresponding effective tax on investment in fixed capital is greater in the agriculture sector.

Nestor D. Dominguez and Peter D. Skaperdas

Owner-Occupied Housing Costs

One important aspect of the Administration's tax reform proposal is how it may substantially boost the costs of owning a home, thus damping housing demand. The proposal would lower marginal tax rates for individuals, thereby raising the after-tax level of interest costs. And, it would eliminate deductions for state and local taxes, consequently pushing up the after-tax level of property taxes. In this capsule, we quantify these boosts to the carrying costs of the primary residence of a typical homebuyer.

To begin, we calculate the marginal tax rate faced by the average homeowner under existing and proposed law. We estimate that the proposed law would lower the average homeowner's present marginal rate from about 25 percent to just over 18 percent. These estimates are roughly in line with the tax expenditure data reported in the *Special Analyses* of the Federal budget.

From these numbers we can estimate the changes in costs to a new homeowner. Based on the median new home price and the mortgage rate early in 1985, we calculate that after-tax interest costs would climb by about $670 per year, about 7 percent of the total current carrying costs (table). Moreover, the annual after-tax property tax, now about $950, would average around $230 more per year, a 2.3 percent addition to carrying costs. Together, these tax changes would raise the average annual cost of homeownership by over 9 percent.* To put this increase into perspective, mortgage rates would have to rise by about one and one-half percentage points, without these tax changes, for there to be a comparable increase in carrying costs.

These estimates are for typical homebuyers, *i.e.*, those whose marginal tax rate and property taxes are about average. Individuals who would face larger declines in their marginal rates under the Administration's proposal would be affected more sharply, as would homeowners in communities with relatively high property taxes. On average, though, a sharp rise in the cost of homeownership would be one direct effect of the tax reform proposal, possibly reducing the demand for houses.

*The "rental rate", another widely used measure of the cost of homeownership, by definition is lower than the carrying costs of a home by the expected capital gain. On the basis of the actual annual percent change in the median house price over the past two years, we estimate that the expected annual capital gain on a typical house is now 4 percent. Using this estimate, we calculate that the higher after-tax interest and property tax costs would raise the rental rate by 12.3 percent.

Estimated Impact of the Administration's Tax Proposal on the Carrying Costs of Owner-Occupied Housing

	Level	Percent change from current level
Average carrying cost*	$9850	
Increase From:		
Elimination of property tax deduction	230	2.3
Lower marginal tax rates	670	6.8
Projected average carrying cost	$10,750	9.1†

*Carrying cost = After-tax Interest + After-tax Property Taxes + Economic Depreciation
$= (1-t_F-t_S)iP + (1-t_F)T + dP$

where t_F, t_S, i, P, T, and d are defined as follows:

Variable		Source	Period	Current value	Proposed value
t_F	Average marginal Federal tax rate for homeowners	the authors†	†	24.7 percent	18.4 percent for interest 0 percent for property taxes
t_S	Average marginal state and local tax rate for individuals	MPS model	1984	8.0 percent	
i	Mortgage interest rate	FHLMC	1985-II	12.8 percent	
P	Median price of new homes sold	Bureau of the Census	Jan.-May 1985	$83,200	
T	Average state and local property tax paid per homeowner	the authors†	†	$950	
d	Average yearly economic depreciation of a house	MPS model	‡	2.4 percent	

†Equivalent to a 1.6 percentage point increase in the mortgage rate.

‡Estimated using 1981 and 1983 IRS Statistics of Income data and the tax expenditure data reported in *Special Analyses, Budget of the United States Government* (Fiscal year 1986).

§Not applicable.

Sources: Internal Revenue Service, *Statistics of Income* (1981) and *SOI Bulletin* for 1983; Federal Home Loan Mortgage Corporation; National Association of Realtors; *Special Analyses, op. cit.*; Flint Brayton and Eileen Mauskopf, *The MPS Model of the United States Economy* (1985).

Carl J. Palash and Robert B. Stoddard

In Brief
Economic Capsules

Are Large U.S. Banks Moving International Activity Off Their Balance Sheets?

Recently market observers have drawn attention to the increased off-balance-sheet activity of banks.[1] This article finds evidence that the top nine banks are doing more international business off their balance sheets. This shift by big U.S. banks is centered in the G-10 countries.[2] Also, there is some evidence for the association of the shift with a new financial instrument.

This financial innovation, the note issuance facility (NIF), is transforming international lending. Instead of arranging a medium-term credit facility with a syndicate of banks, many borrowers now arrange a NIF. Under this facility, the borrower can repeatedly issue short-term paper through an agent or by an auction. In the event that the paper does not sell below a contracted interest rate, expressed as a spread over an interbank reference rate, the underwriting or managing banks undertake to buy the paper or to make advances. Some NIFs permit borrowing from the committed banks with no prior attempt to sell notes. The contract, which typically has a life of three to seven years, limits the underwriters' obligation to extend credit under specified circumstances that may include a deterioration in the borrower's creditworthiness. Thus, the borrower may enjoy cheaper short-term funding with some assurance of its availability over the medium term.

[1]For example, see Bank for International Settlements, *Recent Innovations in International Banking* (1986).

[2]G-10, as used here, includes Belgium, Canada, France, Italy, Japan, the Netherlands, Sweden, Switzerland, West Germany, and the United Kingdom.

The innovation of the NIF has an ambiguous effect on U.S. banks' commitments to lend. On the one hand, borrowers who have switched from medium-term syndicated credits to NIFs may rely on U.S. banks only for the commitment to lend while depending on other sources—including nonbanks—for actual funding. On the other hand, borrowers who previously relied exclusively or mainly on large U.S. banks for lines of dollar credit may be broadening the nationality and increasing the number of their committed banks and so lowering the cost by arranging NIFs. Thus, the market for contractually committed lines of credit is growing, but large U.S. banks may be losing market share.

U.S. banks do not report international commitments to lend *per se*, but these can be approximated using data from the Country Exposure Lending Survey (CELS). Loan commitments are taken to be all contingent (off-balance-sheet) claims adjusted for guarantees, less letters of credit.[3] An increase in the ratio of loan commitments to adjusted assets (on-balance-sheet claims) is taken to indicate a shift to increased off-balance-sheet banking by U.S. banks.

The change in this ratio over three years suggests that large U.S. banks are moving their international activity off their balance sheets. The top nine U.S. banks[4] have raised the ratio of loan commitments to adjusted claims from 35 percent to 43 percent between end-1982 and end-1985 for 22 OECD countries and five selected Asian borrowers—India, Indonesia, Malaysia, South Korea, and Thailand (table).[5]

The rise in commitments to lend in relation to assets is not uniform, however. The shift from on- to off-

[3]It would be better if letters of credit adjusted for guarantees were available.

[4]The top nine banks' aggregate reported in the CELS continues to include Continental Illinois.

[5]The most recent CELS data, from end-March 1986, show the same ratio, 43 percent.

International Activity of the Top Nine U.S. Banks: Ratio of Loan Commitments to Adjusted Assets

(1) Ranking/Countries	End-1982 ratio	(2) Ranking/Countries	End-1985 ratio	(3) Percent change, 1982-85*	(4) Total NIFs arranged, 1983-85† (billions of dollars)
1 New Zealand	1.11	1 Sweden	1.69	129	9.6
2 Sweden	0.74	2 France	0.66	72	5.0
3 Australia	0.71	3 Norway	0.63	30	1.4
4 Finland	0.58	4 United Kingdom	0.60	33	4.5
5 Denmark	0.51	5 Canada	0.55	75	1.1
6 Thailand	0.50	6 Australia	0.54	−24	11.6
7 Norway	0.49	7 Switzerland	0.53	10	1.2
8 Switzerland	0.49	8 Austria	0.45	90	0.6
9 Greece	0.48	9 Netherlands	0.45	9	1.3
10 United Kingdom	0.45	10 Belgium-Lux	0.43	56	0.5
11 India	0.45	11 Spain	0.43	137	0.6
12 Netherlands	0.41	12 Ireland	0.38	81	0.3
13 Iceland	0.39	13 Finland	0.36	−39	1.3
14 France	0.38	14 Denmark	0.34	−34	1.4
15 Malaysia	0.37	15 New Zealand	0.26	−76	2.9
16 Italy	0.33	16 Iceland	0.26	−32	0.2
17 Indonesia	0.32	17 Italy	0.26	−20	1.7
18 Canada	0.32	18 West Germany	0.26	0	0.3
19 Belgium-Lux	0.28	19 Indonesia	0.24	−26	0.5
20 West Germany	0.26	20 India	0.21	−54	0.4
21 Austria	0.24	21 Greece	0.20	−58	0.0
22 Ireland	0.21	22 Thailand	0.18	−65	0.2
23 Spain	0.18	23 Korea	0.16	51	0.9
24 Japan	0.13	24 Japan	0.13	4	1.4
25 Portugal	0.12	25 Turkey	0.12	249	0.0
26 Korea	0.11	26 Portugal	0.11	−14	0.6
27 Turkey	0.04	27 Malaysia	0.08	−78	0.3
Weighted averages:		*Weighted averages:*			*Totals:*
Overall	0.35	Overall	0.43	25	49.8
G-10 + Switzerland	0.33	G-10 + Switzerland	0.47	40	26.6
Other OECD	0.45	Other OECD	0.40	−10	20.9
East Asia‡	0.25	East Asia‡	0.18	−28	2.3

*For countries in column (2).
†Arrangements with all banks, U.S. and non-U.S.
‡Includes India, Indonesia, Korea, Malaysia, and Thailand.

Sources: Federal Financial Institutions Examination Council, Country Exposure Lending Survey; Bank of England; and *International Financing Review*. Data on NIFs include some arrangements with partial or without contractually associated bank commitments to lend; renegotiated facilities (for example, New Zealand's) are double-counted.

balance-sheet exposure is concentrated in the G-10 countries, where the ratio of total commitments to total assets rose from 0.33 to 0.47. In the G-10, the overall growth of the market for loan commitments appears to be more than offsetting any loss of share in that market by U.S. banks.

By contrast, the balance is shifting toward on-balance-sheet financing in Asia. Whereas commitments to the five Asian borrowers stood at 25 percent of assets in 1982, they fell to 18 percent of assets in 1985. Since Japanese banks are well represented as underwriters of NIFs in Asia, U.S. banks may be losing market share there. The same loss of market share may lie behind the decline in off-balance-sheet exposure in the OECD outside of the G-10, especially in Australia and New Zealand.

In general, the countries whose borrowers have been most active in the NIF market tend to rank higher in the ratio of commitments to assets (table). Swedish, French, Norwegian, and British borrowers have been active in the NIF market and hold the top four positions;[6] Japanese, German, and Italian borrowers have been relatively less active. The relative rise of commitments to Canadian borrowers, even though Canadian withholding tax makes NIFs unattractive, shows that NIFs are not

[6]Australian borrowers have arranged a large sum of NIFs but have drawn more heavily on them than most NIF customers. As a result, the Australian ratio declined over the three years.

a *necessary* vehicle for the shift to off-balance-sheet banking.

In summary, CELS data provide evidence that large U.S. banks are increasing their off-balance-sheet commitments to lend cross-border in relation to their actual international assets. Further, these data locate the shift in the G-10 countries. Finally, the rise in off-balance-sheet exposure appears to be associated with activity in the NIF market.

Robert N. McCauley

Prospects for the U.S. International Travel Deficit

Travel is an important part of U.S. international trade that has posted record deficits in recent years. From a position of near balance in 1981, the travel and tourism account approached a $10 billion deficit in 1985 (Table 1). Analysis of past experience confirms that travel flows are heavily influenced by the same factors that determine merchandise trade—in particular, the deterioration in the U.S. travel balance during the 1980s is largely attributable to the strong dollar and rapid real growth relative to abroad. Though the dollar's recent decline against the Japanese yen and major European currencies should significantly lower the merchandise trade deficit over the next several years, it is likely to lead to only a modest improvement in the travel balance—probably no more than $3 billion from economic factors alone. This is because the dollar has not fallen against the currencies of our primary travel partners, Canada and Mexico.

The travel account measures spending by foreign visitors to America and by U.S. travelers abroad on items such as food, lodging, transportation, and entertainment. In 1985, foreign visitors spent a total of $14 billion here while U.S. travelers spent $24 billion abroad, amounts that represent about 7 percent of U.S. merchandise exports and imports respectively. The travel deficit was about 8 percent of the 1985 U.S. current account deficit and accounted for almost half of the $20 billion deterioration in the U.S. services balance from 1981 to 1985.

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One important difference between U.S. travel and merchandise trade is their regional compositions. The Western Hemisphere's share of U.S. travel is 53 percent, considerably more than its 37 percent share of our merchandise trade (Table 2). Mexico alone accounts for 20 percent of overall travel trade, but only 6 percent of merchandise trade. In contrast, Japan accounts for a hefty 16 percent of U.S. merchandise trade, but only 7 percent of total travel expenditures. As explained later, these regional differences suggest that the recent decline in the dollar is effectively much less for U.S. travel than for merchandise trade.

Historical perspective

As with U.S. trade generally, changes in the travel balance are largely explained by relative income growth and exchange rate movements. Rising incomes increase demand for most goods and services, including travel.[1] Travel expenditures are also sensitive to relative cost considerations and hence changes in exchange rates. A decline in the dollar tends to raise the cost of overseas travel for U.S. citizens and makes the United States more attractive to visitors from the rest of the world. Prior studies suggest that a 1 percent decline in the dollar can be expected to increase travel receipts

[1]See, for instance, prior work by Jacques Artus, "An Econometric Analysis of International Travel," *IMF Staff Papers* (1972), pages 579-614; Jane S. Little, "International Travel in the U.S. Balance of Payments," *New England Economic Review* (May/June 1980), pages 42-55; and Jeffrey Rosensweig, "The Dollar and the U.S. Travel Deficit," *Economic Review*, Federal Reserve Bank of Atlanta (October 1985), pages 4-13. Their findings suggest that a 1 percent rise in a country's real GNP can be expected to raise its travel expenditures by somewhat more than 1 percent.

Table 1

International Travel and Passenger Fare Transactions

In billions of dollars

	1977	1981	1985
Total travel payments (−)	**10.2**	**16.0**	**23.8**
Passenger fares	2.7	4.5	7.3
Payments by U.S. travelers in foreign countries	7.5	11.5	16.5
Total travel receipts	**7.2**	**15.5**	**14.1**
Passenger fares	1.0	2.6	2.5
Receipts from foreign travelers in the United States	6.2	12.9	11.6
Net travel and passenger payment deficit	**3.0**	**0.5**	**9.7**
Memo:			
U.S. current account balance	**−14.5***	**6.3**	**−117.8***

*Indicates deficit.

from abroad by somewhat more than 1 percent and to reduce travel expenditures by U.S. citizens by less than 1 percent.[2]

Examination of the experience of the past decade illustrates the response of the travel balance to exchange rate movements and real growth here and abroad (Chart 1). From 1977 to 1981 the travel deficit declined from $3 billion to $0.5 billion. Although the United States grew, on average, at a rate close to that of other industrial nations, the travel account improved, largely due to a 15 percent fall in the value of the dollar against the currencies of our major travel partners during this period.[3] The deterioration in the travel deficit since 1981 can be attributed, in large measure, to the dollar's appreciation (over 30 percent on both a travel- and trade-weighted basis through mid-1985) and to faster real growth in the United States than abroad. From 1981 to 1985, total receipts from foreign travelers declined by almost 10 percent while expenditures by U.S. travelers abroad rose 44 percent.

Developments in our bilateral travel flows since the late 1970s provide further evidence of how sensitive the travel balance is to exchange rate movements and real growth. Between 1977 and 1981, the U.S. travel deficit showed significant improvement with all major partners whose currencies appreciated against the dollar (Germany, the United Kingdom, Japan, and Mexico). At the same time, our balance with Canada, whose currency depreciated against the U.S. dollar, deteriorated.

The worldwide appreciation of the dollar over 1981-85 accompanied a deterioration in our major bilateral travel balances, as U.S. citizens stepped up their travel throughout the world. In contrast to the general pattern, however, our bilateral balance with Japan improved, partly because Japan grew somewhat more rapidly (on average) than the U.S. over this period, and because the yen depreciated less against the dollar than the major European currencies did.

Our travel balance with Mexico is particularly sensitive to exchange rate movements because residents along the border can readily cross the boundary to shop. (Indeed, such spending amounts to over 50 percent of the two countries' bilateral travel trade.) As a result, a *real* appreciation of the peso combined with rapid Mexican growth produced a $1.6 billion improvement in our bilateral balance from 1977 to 1981. The subsequent sharp rise in the dollar's real value during 1982-83 led to a $2.6 billion decline in this balance. In the next two years our bilateral deficit changed little as an appreciation of the peso through mid-1985 apparently offset the effects of a weakening Mexican economy.

Prospects

Looking ahead, prospects for improvement in the U.S. travel deficit seem limited because the dollar's depreciation has been much less uniform than its prior appreciation. The dollar declined approximately 30 percent in real terms against the currencies of West Germany and Japan between the second quarters of 1985 and 1986. However, it has maintained its average value in relation to Western Hemisphere currencies; in

[2]Dollar depreciation will normally lower the dollar value of travel payments less than proportionately. The resulting decline in real expenditures by U.S. travelers is partially offset by the rise in the dollar prices paid for food, lodging, and other items while abroad. On the other hand, the effect of increased real expenditures by foreign travelers to the United States as a result of the falling dollar is reinforced by any rise in the dollar prices paid.

[3]The weights for the travel-weighted dollar index computed for this article are bilateral shares in U.S. travel trade of eight major travel partners: Canada, Mexico, the United Kingdom, France, Germany, Italy, Japan, and the Bahamas. The index is in real terms, that is with exchange rates adjusted by indexes of relative national price levels.

Table 2

Regional Distribution of the U.S. Travel Balance: 1985 (excludes passenger fares)

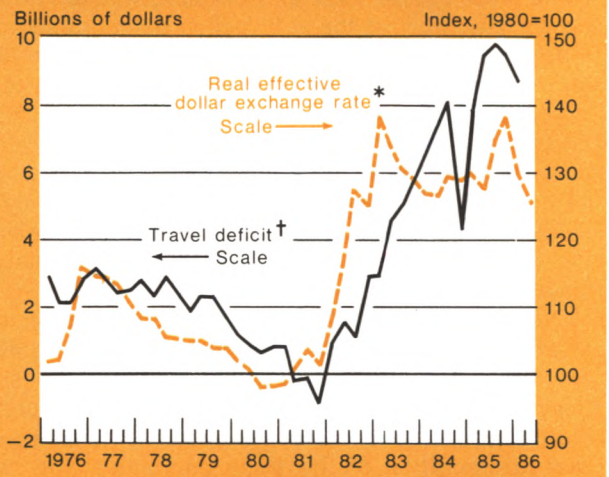
In billions of dollars

	Travel payments	Travel receipts	Net balance	Percent share of U.S. travel trade*	Percent share of U.S. merchandise trade†
Western Hemisphere	8.4	6.5	−1.9	53	37
Canada	2.7	3.0	0.3	20	23
Mexico	3.6	2.0	−1.6	20	6
Caribbean and Central America	1.8	0.6	−1.2	9	2
Western Europe	5.9	2.3	−3.6	29	24
Japan	0.5	1.4	0.9	7	16

*Bilateral shares of U.S. travel flows (receipts plus payments, excluding passenger fares).
†Bilateral shares of U.S. merchandise trade (exports plus imports).

Chart 1

The U.S. Travel Deficit and the Dollar



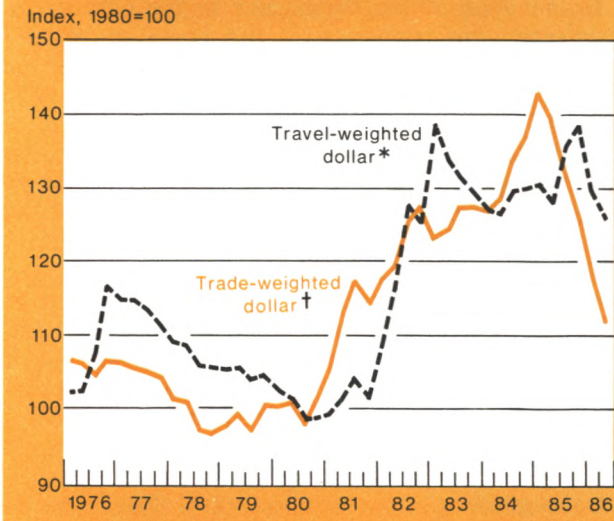
*Travel-weighted index of the dollar's real value (exchange rate adjusted by relative national price levels) against currencies of eight major U.S. travel partners. Weights are bilateral shares of U.S. travel.

†Seasonally adjusted annual rates; minus indicates surplus.

Sources: U.S. Department of Commerce and International Monetary Fund, International Financial Statistics.

Chart 2

Trade-weighted and Travel-weighted Real Values of the Dollar



*Real effective travel-weighted index of the dollar's value using bilateral shares of eight major U.S. travel partners.

†Morgan Guaranty real effective (bilateral) index of the dollar's value against currencies of eleven major U.S. merchandise trade partners.

Sources: Morgan Guaranty Trust Company and International Monetary Fund, International Financial Statistics.

fact, the dollar has appreciated sharply against the Mexican peso. As a result, the real value of the dollar has fallen only 6 percent from last year's average on a travel-weighted basis. This is significantly less than its decline during 1977-81 and reverses only about one-fifth of its rise since 1981. In contrast, the trade-weighted dollar has declined substantially, offsetting more than one-half of its prior rise as measured by most published indexes (Chart 2).

The extent to which the travel balance responds to the dollar's decline depends on the pace of real growth here and abroad. Assuming that the United States and other industrial nations grow at close to their potential rates (which implies increases in domestic demand growth rates abroad compared with the average of recent years), we could expect a modest decline of $1.5 to $3.0 billion in the travel deficit over the coming two years.[4] Most of this decline should result from increased visits to the United States, particularly from Western Europe and Japan. Travel receipts might increase by as much as 20 percent annually over this period; spending by U.S. citizens abroad is likely to continue to increase, but at a slower rate than in recent years.

Of course, the actual improvement in the travel balance may differ significantly from this estimate, depending on a variety of factors that are difficult to predict. For example, a pickup in foreign relative to U.S. growth would probably result in further improvement of the travel balance. Political factors also can be important influences on travel flows. In particular, recent events suggest that concerns over terrorism could significantly reduce U.S. travel abroad this year and next. If so, the decline in the travel deficit may be substantially greater than economic factors alone would suggest—although modest, in any case, in relation to the overall current account deficit (presently over $120 billion annually).

[4]Underlying this analysis is the assumption that real travel expenditures have an elasticity of roughly 1.5 relative to income growth and real exchange rate movements.

Bruce Kasman

In Brief
Economic Capsules

U.S. Trade with Taiwan and South Korea

The United States has been running large trade deficits with the two Asian economies of Taiwan and South Korea. By 1987 the combined U.S. trade deficit with these economies alone reached $27 billion, equal to 17 percent of the total U.S. trade deficit worldwide (Table 1). Although the U.S. deficit with these economies improved during the first half of 1988, it still remains very high. This note looks at U.S. trade with Taiwan and South Korea. It discusses both the composition of this trade and its recent growth path, giving particular attention to the factors behind the 1988 improvement in the U.S. trade position. The note ends by briefly considering the outlook for U.S. trade with the two economies in light of the current trade performance.

To summarize the main points, the United States exports primarily capital goods and industrial supplies to Taiwan and South Korea. Recent export growth has been across all commodity categories. The United States imports primarily consumer goods and capital goods components from Taiwan and South Korea. The slowdown in imports has been mainly in the consumer goods area. Appreciation of the Asian currencies, import liberalization measures undertaken particularly by Taiwan, and special circumstances in some key trade industries appear to explain most of the recent improvement in U.S. trade with these two economies. Even with this recent improvement, however, the U.S. trade deficits with both Taiwan and South Korea remain large. Further trade improvement with these economies will most likely require significant additional changes in some of the underlying trade determinants.

The Taiwanese and South Korean economies

There are some broad similarities in the Taiwanese and South Korean economies. Neither is endowed with a large natural resource base, but both have a well-educated, skilled labor force. As a consequence, the dominant industries in the two economies focus on manufacturing, both of capital and consumer goods. Both economies have, furthermore, relied on export growth to maintain a rapid pace of development, with exchange rates kept at levels necessary to insure the competitiveness of local products in world markets.

Productivity growth in the manufacturing sectors of both Taiwan and South Korea has been extremely rapid (Table 2). Supported by a very strong investment performance, this growth has kept unit labor costs competitive while wage rates have risen sharply.

Taiwan and South Korea differ somewhat in the composition of their output. Taiwan has tended to concentrate more on the production of consumer goods, while South Korea has devoted a greater percentage of its energy to producing capital goods and automobiles. In part because consumer goods production requires less investment expenditure, Taiwan has not relied as heavily as South Korea on foreign funds to finance development. In fact, while South Korea's foreign debt totaled about $35 billion at the end of 1987, Taiwan was actually a net creditor to the world.

An even sharper distinction between the two economies lies in the area of foreign trade. Taiwan has run current account surpluses since the middle 1970s. South Korea, in contrast, only began to run a current account surplus in 1986. Consequently, although recent surpluses have led both economies to appreciate their currencies, the New Taiwan dollar has appreciated more strongly against the U.S. dollar than has the South Korean won. The New Taiwan dollar rose 27 percent against the U.S. dollar between the first quarter of 1985 and the third quarter of 1988; the South Korean won rose 12 percent during this period. Adjusted for relative inflation rates, the New Taiwan dollar rose

17 percent in real terms against the U.S. dollar, the South Korean won 12 percent (Chart 1).[1]

[1]These changes are calculated in terms of movement in the Asian currency/U.S. dollar exchange rate. Real rates are calculated by deflating with wholesale price indexes. The Asian currency movements compare with nominal rises against the U.S. dollar of 43 percent for the German mark and 48 percent for the Japanese yen over the same period. In real terms the mark rose 38 percent and the yen 36 percent.

Table 1

U.S. Trade Balances with Taiwan and South Korea

(Billions of Dollars, BOP Basis)

	1985	1986	1987	1988†
Taiwan	−11.21	−14.64	−17.50	−10.83
(Percent of total U.S. trade deficit)	(9.2)	(10.1)	(10.9)	(8.3)
Korea	−4.25	−6.98	−9.39	−8.89
(Percent of total U.S. trade deficit)	(3.5)	(4.8)	(5.9)	(6.8)

†First half 1988 values, seasonally adjusted and annualized.

Taiwan has taken greater steps to remove import restrictions than has South Korea. Although Taiwanese tariffs still remain high on a number of goods, notably automobiles and agricultural products, recent measures have significantly reduced tariff rates for most items. South Korea continues to maintain relatively high tariff rates on a broad range of goods while concentrating recent import liberalization efforts on reducing the number of import items that require restrictive import licenses. Taiwan has no significant import licensing requirements.

Table 2

Growth in Productivity, Real Investment, Unit Labor Costs, and Wages in Manufacturing

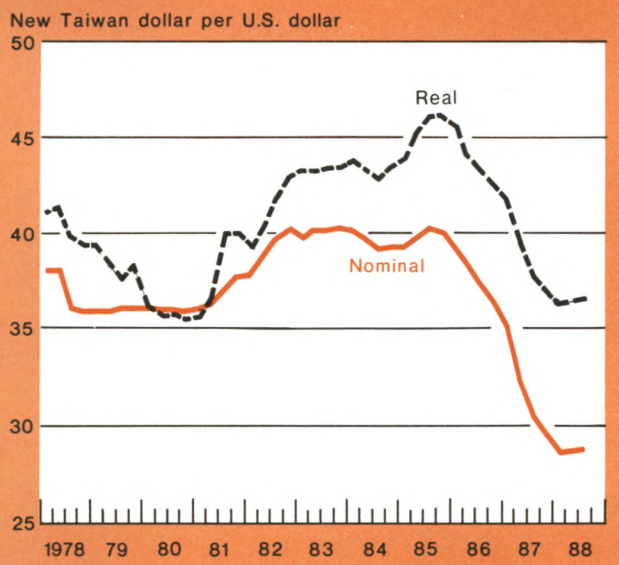
(Averaged Annualized Percent Change 1985-87)

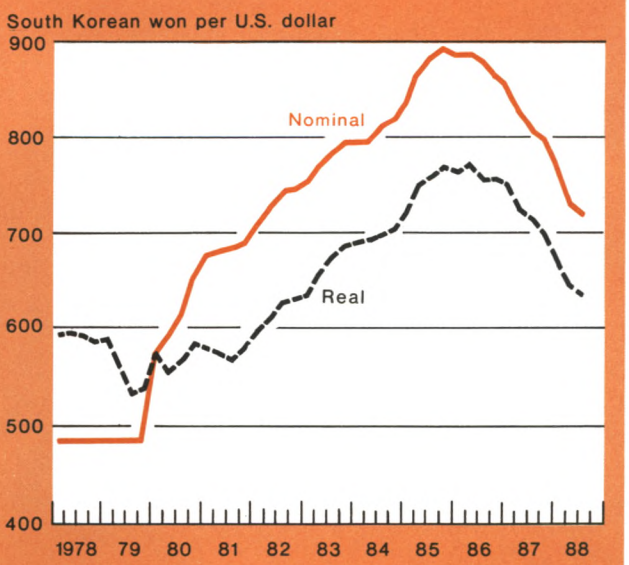
	Productivity Growth	Increase in Investment	Growth in Unit Labor Costs	Change in Average Hourly Wage
Taiwan	10.4	14.2	−1.9	9.5
South Korea	12.7	14.5	1.5	11.5

Chart 1

Asian Exchange Rates versus U.S. Dollar

Quarterly Averages





Note: Real exchange rates are calculated as nominal exchange rates multiplied by the ratio of U.S. to Asian wholesale price indexes with 1980:I=100 for all three price indexes.

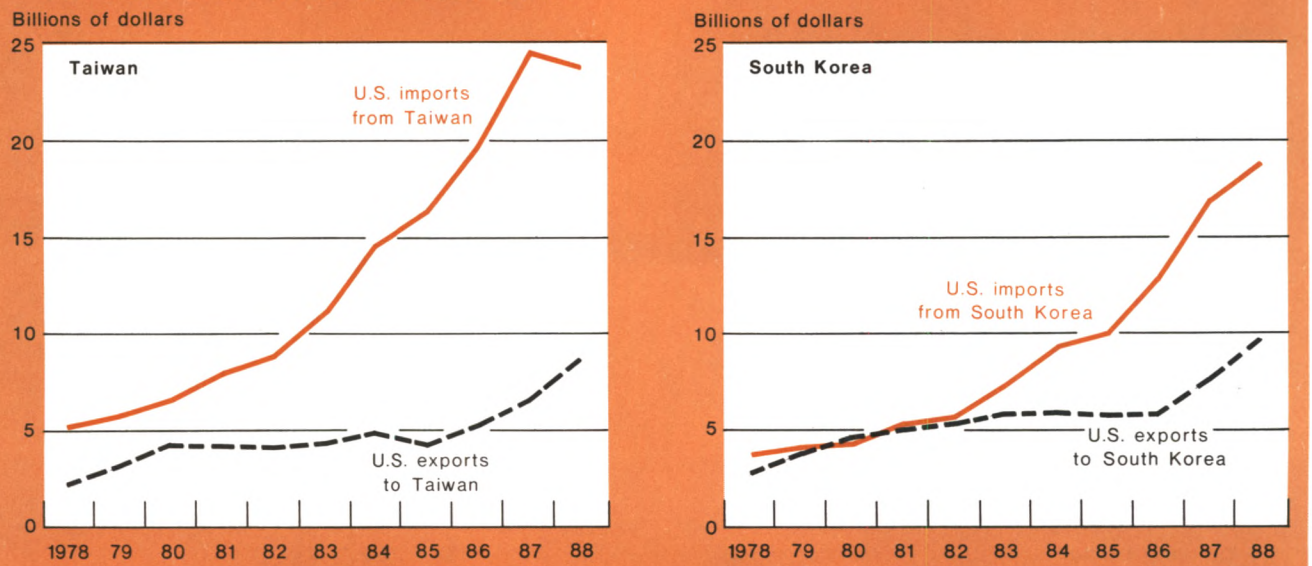
Composition and growth of U.S. trade with Taiwan and South Korea

U.S. trade with Taiwan and South Korea has grown rapidly during the 1980s, on both the export and the import side. However, U.S. imports have until recently outpaced U.S. exports, leading to growing U.S. bilateral trade deficits with both economies (Chart 2).

The United States exports primarily capital goods and industrial supplies to Taiwan and South Korea (Table 3). Agricultural sales are the next largest U.S. export category despite strong agricultural import protection by both Asian economies. U.S. automobile exports are effectively limited by high tariff rates in both Taiwan and South Korea.

Chart 2

U.S. Trade with Taiwan* and South Korea



Note: The 1988 point represents the first two quarters' value annualized and seasonally adjusted. Exports are on a f.o.b. basis and imports are on a customs basis.

*Excluding gold.

Table 3

Composition of U.S. Exports to Taiwan and South Korea in 1987

	Total	Capital Goods	Industrial Supplies	Autos	Other Consumer Goods	Agricultural Products
Taiwan (In billions of dollars)	6.5†	2.2	2.6†	0.2	0.4	0.9
South Korea (In billions of dollars)	7.5	2.5	3.6	0.2	0.2	0.9
Exports to Taiwan and South Korea as a percent of total U.S. exports	6	6	9	2	3	8

†Excluding gold.

U.S. export growth to Taiwan and South Korea has been remarkably fast over the last few quarters. In part this reflects an artificial boost to exports in 1988 from transshipment of foreign gold through the United States to Taiwan, a development that caused a sharp increase in reported U.S. sales to Taiwan. Even abstracting from gold sales, however, U.S. exports to Taiwan grew at an average annual rate of 47 percent and to South Korea at an average annual rate of 33 percent over the last half of 1987 and the first half of 1988. These rates contrast with average annual U.S. export growth rates of 9 and 13 percent to Taiwan and South Korea respectively from the beginning of 1985 through mid-1987. Recent growth was spread across most export categories (Table 4).

U.S. imports from Taiwan and South Korea are primarily consumer goods, although capital goods and, in the case of South Korea, automobiles are becoming increasingly important (Table 5). Clothing and footwear are still the largest consumer goods imports, followed by consumer electronics. Capital goods imports are mainly parts and components such as semiconductors.

U.S. imports from Taiwan and South Korea grew rapidly through mid-1987 before slowing significantly in pace by year end and through the beginning of 1988 (Table 6). After growing at an average annual rate of 28 percent over the previous two and a half years, imports from Taiwan actually fell 3 percent during the four quarters ending 1988-II. Imports from South Korea grew only 10 percent over these last four quarters, after growing at an average annual rate of 34 percent during the previous period. Although imports of industrial supplies and agricultural products declined recently, these commodity imports are relatively small; the marked slowdown in total imports from mid-1987 until mid-1988 was primarily the result of weakness in consumer goods and automobile sales.

Overall, the U.S. trade deficits with Taiwan and South

Table 4

U.S. Export Growth to Taiwan and South Korea 1988-II/1987-II

(In Percent)

	Total Growth	Capital Goods	Industrial Supplies	Autos	Other Consumer Goods	Agricultural Products
Taiwan	47.2†	29.8	37.9†	292.5	93.8	54.6
(Export share‡)	(100)	(31.2)	(37.9)	(6.8)	(6.8)	(14.7)
South Korea	33.5	18.2	42.6	−25.0	70.4	46.4
(Export share‡)	(100)	(30.7)	(51.4)	(1.3)	(3.0)	(10.6)

†Excluding gold.
‡Percentage share of each commodity category in total U.S.exports to each Asian economy in 1988-II.

Table 5

Composition of U.S. Imports from Taiwan and South Korea in 1987

	Total	Capital Goods	Industrial Supplies	Autos	Other Consumer Goods	Agricultural Products
Taiwan (In billions of dollars)	24.6	5.8	1.9	0.4	15.6	0.5
South Korea (In billions of dollars)	16.9	3.0	1.6	2.5	9.3	0.3
Imports from Taiwan and South Korea as a percent of total U.S. imports	10	10	3	3	28	3

Korea, at $11 billion and $9 billion respectively in the first half of 1988,[2] still remain exceptionally large relative to the size of the actual export and import flows between the United States and these two economies. U.S. imports from Taiwan are still three times the level of U.S. exports to Taiwan while U.S. imports from South Korea are more than double the level of U.S. exports to that economy.

Factors behind the recent strength in U.S. exports and moderation in U.S. imports

Several factors lay behind the recent strength in U.S. exports to Taiwan (abstracting from gold sales) and to South Korea and the moderation in U.S. imports from these economies. Policy decisions, general economic developments, and special circumstances in some key trade industries all played a role. Econometric analysis, described in the Box, suggests the relative importance of these various factors in improving U.S. trade with Taiwan and South Korea over the four quarters ending 1988-II (Table 7).

The Taiwanese and South Korean policy decisions to let their currencies appreciate relative to the U.S. dollar and to undertake import liberalization measures appear to have been the most important factors boosting U.S. export sales to Taiwan and South Korea during this period. The fall in U.S. prices relative to Taiwanese and South Korean prices that resulted from New Taiwan dollar and won appreciation significantly increased demand in both Asian economies for U.S. products. Import liberalization measures, along with some special policies to promote purchases of U.S. products, apparently had an even larger impact on Taiwanese demand for U.S. goods. Much weaker liberalization efforts in South Korea had a correspondingly smaller impact.

[2]These figures are seasonally adjusted and annualized.

The two other major factors raising the dollar value of U.S. exports to Taiwan and South Korea were Asian economic growth and a rise in U.S. export prices. Domestic economic growth in Taiwan and South Korea, entailing heavy investment expenditure, was particularly beneficial to U.S. exporters concentrated in capital goods and industrial supplies. U.S. export prices were up because of a significant rise in commodity prices as well as U.S. inflation in general. The commodity price factor was important because industrial supplies are a major U.S. export item to Taiwan and South Korea. U.S. export prices also appeared to be up because the dollar prices of competing Japanese products rose with yen appreciation, providing U.S. producers a little leeway to raise their own prices.

On the import side, currency appreciation and problems in specific consumer goods industries were apparently the main factors behind the slowdown in Asian sales to the United States. Foreign currency appreciation has two effects: it raises the price of imports while reducing the volume of demand. The price effect occurs first. In the case of Taiwan, the volume effect of appreciation over the four quarters ending 1988-II appears to have been greater than the price effect. Thus, Taiwanese currency appreciation significantly depressed the value of U.S. purchases from Taiwan.[3] For South Korea, whose appreciation timing pattern was different, the price effect apparently offset the volume effect during this period (although further volume effects are presumably yet to come). South Korean appreciation, therefore, seemingly did not change the value of U.S. import purchases over these

[3]During this period Taiwanese and South Korean prices rose relative to Japanese prices because of the timing of new Taiwan dollar, won, and yen appreciation. This relative price movement depressed the volume of U.S. demand for Taiwanese and South Korean goods as some purchasers switched over to Japanese items. This switch is included in the volume effect described above.

Table 6

U.S. Import Growth from Taiwan and South Korea 1988-II/1987-II

(In Percent)

	Total Growth	Capital Goods	Industrial Supplies	Autos	Other Consumer Goods	Agricultural Products
Taiwan	−2.9	14.7	−6.6	4.3	−9.0	−8.0
(Import share†)	(100)	(26.9)	(8.0)	(2.0)	(60.2)	(1.7)
South Korea	10.5	36.4	20.1	−4.2	6.6	−3.6
(Import share†)	(100)	(20.2)	(9.8)	(15.0)	(52.8)	(1.7)

†Percentage share of each commodity category in total U.S. imports from each Asian economy in 1988-II.

four quarters.

Special industry factors clearly depressed U.S. purchases from both Taiwan and South Korea. The 1987-88 slump in U.S. clothing demand significantly cut apparel imports from the two Asian economies. Financial difficulties of two U.S.-owned toy companies manufacturing in Taiwan lowered Taiwanese toy sales to the United States. An automotive industry strike in South Korea dramatically cut U.S. imports of South Korean cars. The saturation of demand in the United States for microwave ovens and VCRs also hurt sales from both Asian economies.

Appreciation and special industry factors depressing U.S. imports were balanced against two factors promoting U.S. purchases from Taiwan and South Korea—robust U.S. economic growth and growing Asian supply capacity.[4] For Taiwan, currency appreciation and special industry problems more than offset these latter factors supporting U.S. import growth, producing the outright decline in imports noted earlier. For South Korea, special industry factors cut the growth in U.S. import purchases to about half the rate suggested by these import-supporting factors alone.

[4]Growing Asian supply capacity is used here to refer to the rapid economic development of the two Asian economies that has enabled them to increase their share in world markets substantially over the

Box: Estimating the Impact of the Various Factors Affecting U.S. Export and Import Growth Rates with Taiwan and South Korea

The text assessments of the importance of the various factors underlying bilateral trade growth rates between the United States and Taiwan and South Korea were primarily based on regression analysis. Regressions for export and import price and volume were run for U.S. trade with Taiwan and South Korea over the period 1979 to 1987. On the whole, the regression results are fairly robust, but in some cases they are sensitive to significant changes in the sample period.

The regression coefficients for the major factors mentioned in the text are shown in the table. The t-statistics are given in parentheses.

Regression Coefficients

U.S. Export Growth

	Growth in Asian Industrial Production	Change in U.S./Asian Relative Prices	Change in U.S. Wholesale Price Index	Change in Japanese/ Asian Relative Prices
To Taiwan	1.16 (3.5)	−1.15 (2.8)	0.83 (3.7)	−.20 (1.0)
To South Korea	0.37 (1.1)	−1.45 (3.0)	0.81 (3..9)	−.44 (2.4)

U.S. Import Growth

	Growth in U.S. Industrial Production	Change in Asian Supply Capacity and Other Trend Effects	Change in Asian/U.S. Relative Prices	Change in Japanese/ Asian Relative Prices
From Taiwan	1.09 (3.3)	12.22 (5.5)	−1.07 (3.7)	0.53 (2.4)
From South Korea	1.21 (4.9)	13.78 (2.9)	−0.72 (2.3)	0.51 (2.9)

The factor labeled "Change in Asian Supply Capacity and Other Trend Effects" was run in the regressions as a simple trend growth term. The reason is that manufacturing capacity in Taiwan and South Korea has been growing fairly steadily over the regression period and is, consequently, difficult to separate from other trend effects. The other factors are fairly standard. Some factors were entered with a lag in the regressions, with t-statistics used to choose the appropriate lag length.

The estimated impact of other important factors affecting U.S. trade flows with Taiwan and South Korea was derived separately. The effect of Asian import liberalization was determined by applying the regression-derived price coefficients to the average change in tariff rates and to other policy-induced price changes in each Asian economy. Because tariff and other price changes did not apply to all product categories equally, these estimates should be viewed more as order of magnitude figures than as precise numerical results. In combination with the regression analysis, this estimation procedure works well in explaining U.S. export growth over different quarters in the recent past.

Estimates of the impact of special industry factors were based on deviations in U.S. import growth in the affected industries from rates expected given overall U.S. import growth from Taiwan and South Korea. Specifically it was assumed that, in the absence of special industry problems, the import growth rates for clothing, toys, and automobiles would have slowed relative to their 1986-87 growth rates by the same percent as total import growth rates slowed. The derived growth rates based on this assumption were then compared to actual growth rates for these industries to gauge the magnitude of special problems.

* * * *

The outlook for U.S. trade with Taiwan and South Korea

The U.S. trade balance with Taiwan and South Korea has improved significantly in recent quarters. However, given the still large discrepancy between the size of U.S. exports and U.S. imports with these two economies, trade improvement can only be sustained if U.S. exports continue to grow rapidly while U.S. import growth remains more subdued.

In the absence of further policy adjustment this required growth pattern may be difficult to achieve. Some of the key factors behind the recent strength in U.S. exports and moderation in U.S. imports are apt to diminish over time. The effect of past currency appreciation on trade growth rates fades with time. The same holds true for the effect of import liberalization measures. The effects of special industry factors that were favorable to trade adjustment appear to have begun to dissipate already—for example, the South Korean automobile industry strike is over.

On the positive side, at least two possible developments favorable to trade adjustment are on the horizon. Current U.S. discussions with Taiwan and South Korea may lead to further Asian trade liberalization, while U.S. demand growth may moderate as the U.S. economy slows from its very strong recent rate of expansion. The foreseeable impact of these two developments by themselves, however, is unlikely to prove sufficient to eliminate, or perhaps even reduce substantially, the U.S. trade deficits with Taiwan and South Korea.

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Thomas Klitgaard

Footnote 4 continued
last decade. In the regression analysis, the contribution that Asian economic development has made to U.S. import growth is estimated by a trend growth rate (see Box).

Table 7

Accounting for U.S. Trade Growth with Taiwan and South Korea

(Percentage Point Contributions over the Period 1987-II to 1988-II)

		Due to:				
U.S. Export Growth	Total	Relative Price Changes	Asian Trade Policy Changes	Asian Economic Growth	U.S. Price Increases Including Special Price Factors	Other†
To Taiwan (Excluding gold sales)	47	10	15	8	7	7
To South Korea	33	10	5	7	7	4

		Due to:				
U.S. Import Growth	Total	Relative Price Changes	Special Clothing, Toy, and Automobile Factors	U.S. Economic Growth	Increased Asian Supply Capacity and Other Trend Factors	Other‡
From Taiwan	−3	−10	−5	7	13	−7
From South Korea	10	−2	−7	7	17	−6

†Trend and unexplained residual.
‡Market saturation in specific consumer goods products and unexplained residual.

In Brief
Economic Capsules

Monetary Policy and U.S. External Balances

The trend toward greater economic interdependence among nations has been accompanied by increased interest in the international repercussions of U.S. macroeconomic policies. Policymakers, economists, and businessmen now regularly assess the effect that U.S. policies are likely to have on exchange rates, foreign activity, and external trade positions; concern for these external variables has at times been an important motivation in the formulation of policy.

This *In Brief* examines the impact of monetary policy actions on the U.S. current account balance. Specifically, it analyzes how a move to tighten money and credit growth in the United States will alter the flow of trade between this country and other nations. Both historical evidence and macroeconomic model simulations are used to explore these relationships and to measure the effect of particular policy initiatives on the U.S. external position.

The findings indicate that a tightening in monetary policy unambiguously leads to a decline in the current account balance. The effects of the contraction are seen principally in the services balance, which falls sharply because of the increased net investment income paid to foreigners as interest rates rise. In contrast, the influence of monetary policy on the U.S. merchandise trade balance appears to be small and of uncertain sign over the medium term.

These results suggest that in recent years a significant change has taken place in the way that monetary policy influences the external balance. With the rapid deterioration in the U.S. net external debt position and the related increase in net foreign holdings of U.S. financial assets, the sensitivity of investment income payments to changes in interest rates has increased. Our estimates indicate that the linkage between monetary policy actions and the investment income balance has strengthened substantially since the early 1980s and is now a powerful channel for monetary influence on the external balance. As a result of this development, monetary policy's effect on the U.S. current account is likely to be stronger and more consistent than it was in the past.

Identifying the main channels of influence

Economists generally agree on the identity of the main channels linking monetary policy to U.S. trade flows. However, these channels have offsetting effects and there is no a priori reason to believe that any particular channel dominates. Consequently, economic theory cannot predict definitively how changes in monetary policy will influence U.S. external balances.

To understand the nature of this ambiguity, consider what is thought to happen to trade flows when monetary policy is tightened. In most conventional models, which posit a well-defined relationship between U.S. interest rates, foreign interest rates, and exchange rates, a monetary contraction raises U.S. interest rates and induces an incipient capital inflow that pushes up the value of the dollar. Rising interest rates slow demand and thereby reduce income growth, causing a fall in import volumes that improves the trade balance. Most analyses suggest that this interest rate effect on income and trade will grow for one to two years and then slowly dissipate.

The appreciation of the dollar will, however, trigger other developments that over the medium term have an

offsetting effect on the trade balance. The dollar's higher value will increase the price of U.S. goods relative to those abroad. Since import and export demands respond slowly to these price movements, trade volume changes are likely to be small at the outset. Over the short run, therefore, the dollar's rise will be felt primarily in nominal trade balance improvement as the value of imports falls along with their price. Nevertheless, over a longer period that may extend well beyond two years, lower import prices will increase demand for import volumes and the higher relative price of our goods abroad will reduce export volumes. The net effect of the higher dollar over this longer horizon will be a worsening in U.S. trade in both real and nominal terms.

While these channels describe policy's impact on trade in most goods and services, monetary policy may also influence trade through the direct effect of interest rate movements on the net investment income component of the services balance.[1] U.S. financial assets and liabilities, consisting of securities holdings and bank claims, are largely denominated in dollars and are responsive to short-term interest rate movements. Consequently, our investment income payments to foreigners as well as receipts on our investments abroad will increase soon after a policy contraction causes interest rates to rise. When the U.S. net financial asset position (representing our net international investment position less direct investments) is close to balance, these changes in investment income flows are likely to lead to small changes in the services and overall trade position. But because our net financial asset position has moved increasingly into deficit since the early 1980s, reaching a level in excess of $500 billion, changes in investment incomes are now likely to have a more substantial effect on the trade balance. As we will see, this channel has acquired new importance in transmitting the influence of policy actions to the current account balance.

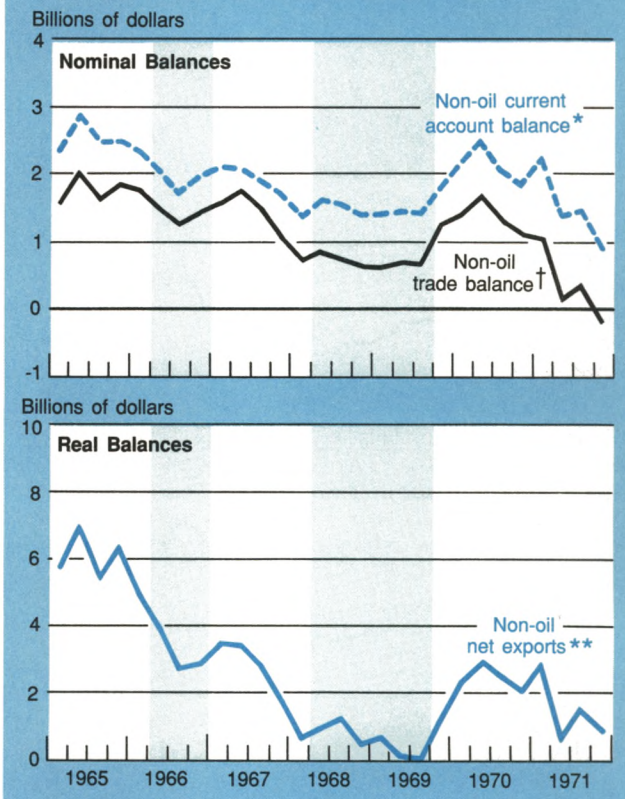
Historical evidence

Because theory cannot offer an unambiguous view of how monetary policy affects the trade balance, we now evaluate the empirical evidence on the issue. A brief review of historical relationships points to the conclusion that monetary policy actions have not in the past had a consistent effect on U.S. external balances over the medium term.

Charts 1A and 1B reveal how different measures of the U.S. trade position responded to monetary contractions during the period 1965-83. The chart plots the U.S. current account balance, the merchandise trade balance, and real net exports — all excluding oil imports — and indicates the major episodes of monetary tighten-

Chart 1A

The Response of U.S. External Balances to Monetary Tightening, 1965 to 1971



Source: Department of Commerce, "Survey of Current Business."

Note: Episodes of monetary tightening are represented by the shaded areas.

* Current account balance excluding oil imports and net transfer payments.

† Merchandise trade balance excluding oil imports.

** Real net exports (constant 1982 dollars) excluding oil imports.

[1]The investment income component of the U.S. current account balance measures payments and receipts derived from international direct investment and portfolio holdings. Although our analysis focuses on the influence of interest rate movements on investment income, other forces can alter investment income when monetary policy changes. For a discussion of the determinants of international investment income, see William Helkie and Lois Stekler, "Modeling Investment Income and Other Services in the U.S. International Transactions Accounts," Board of Governors of the Federal Reserve System, *International Finance Discussion Papers, no. 319, December* 1987.

ing with shading.[2]

Approximately three years after an episode of tightening begins, a point in time when the first-round effects of interest rate and exchange rate changes have been largely realized, no consistent pattern of change in real or nominal trade balances is observed. Some episodes of monetary tightening (1973-74) are followed by improvement in U.S. external positions; others (1966 and 1979-81), by a deterioration in these positions.

Over a shorter horizon, external balances do seem to exhibit a consistent response to tightening. Indeed, in nearly every instance, all three external balances rose in the quarters immediately following a period of contraction. The generally close correlation between movements in merchandise trade and the current account further suggests that this improvement in trade, along with the subsequent tendency of this improvement to dissipate, is attributable to monetary policy's effect on the merchandise trade balance. Policy actions apparently have had only a minor effect on the U.S. services balance during this period.

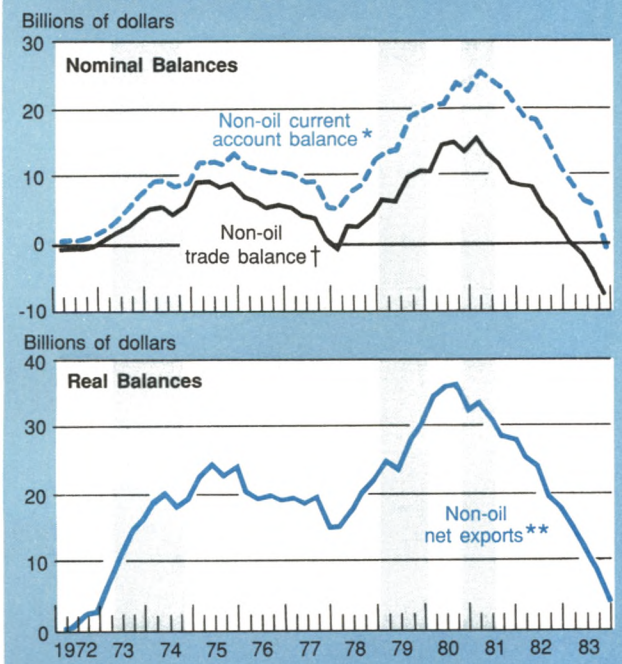
It is difficult to draw firm conclusions from these historical relationships alone. Numerous factors unrelated to U.S. monetary policy actions undoubtedly have influenced external balances during these periods.[3] Nonetheless, the existing body of empirical evidence corroborates these findings.[4]

Table 1 summarizes results from a study of the policy transmission mechanism in twelve large econometric models. The effects on the current account and real net exports of a simulation exercise in which monetary authorities expand the money supply by 4 percent in

[2]A period of monetary tightening is defined here as one in which there are persistent increases in the federal funds rate both in absolute terms and relative to long-term government bond yields.

Chart 1B

The Response of U.S. External Balances to Monetary Tightening, 1972 to 1983



Source: Department of Commerce, "Survey of Current Business."

Note: Episodes of monetary tightening are represented by the shaded areas.

* Current account balance excluding oil imports and net transfer payments.

† Merchandise trade balance excluding oil imports.

** Real net exports (constant 1982 dollars) excluding oil imports.

[3]For example, the tightening of U.S. monetary policy from 1979 to 1981 was accompanied by major shifts in the stance of macroeconomic policy in a number of large industrial economies. These shifts are often cited as factors explaining the sharp subsequent decline in U.S. external balances.

[4] See, for example, Ralph C. Bryant, Dale W. Henderson, Gerald Holtham, Peter Hooper, and Steven A. Symansky, eds., *Empirical Macroeconomics for Interdependent Economies* (Washington, D.C.: Brookings Institution, 1988); Ralph C. Bryant, John Helliwell, and Peter Hooper, "Domestic and Cross-Border Consequences of U.S. Macroeconomic Policies," Board of Governors of the Federal Reserve System, International Finance Discussion Papers, no. 344, March 1989; and Ralph C. Bryant, Gerald Holtham, and Peter Hooper, *External Deficits and the Dollar: The Pit and the Pendulum* (Washington, D.C.: Brookings Institution, 1988).

Table 1

Medium-Term Effects of a Monetary Expansion on U.S. External Balances

(Billion Dollar Deviation from Baseline, Three Years after Initial Shock)

Model	Current Account	Real Net Exports
Median of twelve models	1.8	0.6
DRI	3.2	11.8
EEC	−2.8	−3.3
EPA	2.4	8.2
MCM	−1.9	0.0
OECD	1.8	2.3
LINK	−12.6	−2.4

Source: Data for this table are derived from Richard N. Cooper, "U.S. Macroeconomic Policy, 1986-88: Are the Models Useful?" Tables 12-4 and 12-7, in Ralph C. Bryant and others, eds., *Empirical Macroeconomics for Interdependent Economies* (Washington, D.C.: Brookings Institution, 1988).

1985 are provided for the median of the entire group and for a sampling of individual models.[5] Two points emerge from this analysis. First, there is no consensus among these models regarding the direction in which monetary policy alters trade. Of the six individual models presented in the table, three predict that the current account and real net exports will improve in response to an expansion, while three predict that these balances will fall or remain unchanged.[6]

Second, these models suggest that, on average, monetary policy actions do not have large net effects on U.S. trade. The median estimates predict changes in the current account and real net exports of less than $2 billion over three years, and most of the individual models predict effects of less than $3.5 billion. Considerable diversity is displayed, however, with outcomes for the current account ranging from +$3.2 billion to -$12.6 billion.

Monetary policy's influence on trade and the growing U.S. net debt position

To assess the influence of monetary policy on the current account in more detail, let us now turn to an analysis of simulation exercises from two large macroeconomic models — the Federal Reserve Board's Multicountry Model (MCM) and the Data Resources Incorporated Model (DRI).[7]

These two models are broadly similar in their view of the structure of the U.S. economy and its international linkages.[8] However, they employ different estimates for the key parameters determining the relative sizes of the channels of transmission. As a result, in the past they have implied different patterns of transmission: MCM simulations predicted that a monetary policy contraction would yield current account improvement, while DRI simulations predicted deterioration.

In the simulation exercise considered here, authorities generate a sustained increase of 100 basis points in U.S. short-term interest rates beginning at the end of 1989.[9] In contrast to the somewhat mixed evidence

[5]For further details on this exercise and the properties of the models, see Bryant and others, *Empirical Macroeconomics for Interdependent Economies*.

[6]The disagreement among these six models is also present in the larger sample: seven models predict current account improvement while five predict a deterioration following a monetary expansion.

[7]For a more detailed description of the DRI model, see Roger Brinner, "The 1985 DRI Model: An Overview," in *Data Resources Review of the U.S. Economy* (Lexington, Mass.: Data Resources-McGraw Hill, September 1985). A detailed description of the MCM model is found in Hali Edison, Jaime Marquez, and Ralph Tryon, "The Structure and Properties of the Federal Reserve Board Multicountry Model," *Economic Modelling*, vol. 4 (April 1987). The 1983 MCM simulation results presented in this section were taken from this article. The 1990 MCM simulation results were graciously provided by William Helkie of the Federal Reserve Board.

[8]In particular, both models have basic Keynesian structures, treat expectations adaptively, and closely link exchange rates to U.S.-foreign interest differentials.

[9]More specifically, the experiment in the MCM model involves a sustained increase of 100 basis points in the U.S. three-month Treasury bill rate in the first quarter of 1990. In the DRI model the

Table 2

Transmission of a Monetary Policy Contraction

(Billion Dollar Deviation from Baseline Level Unless Otherwise Indicated)

	DRI Model† Number of Quarters after Shock			MCM Model‡ Number of Quarters after Shock		
	4	8	12	4	8	12
Current account balance	−3.3	−8.7	−15.5	−3.3	−6.1	−8.6
Merchandise trade balance	1.0	−1.5	−4.5	1.0	1.3	1.4
Exports	−2.6	−10.1	−18.8	−3.9	−11.8	−19.3
Export volume	−1.5	−6.5	−11.2	−2.3	−6.6	−9.6
Imports	−3.7	−8.7	−14.3	−4.9	−13.1	−20.7
Import volume	−0.1	−0.4	−1.2	−1.3	−6.0	−9.4
Net services and transfers	−4.3	−7.2	−11.1	−4.3	−7.4	−10.0
Net investment income	−4.5	−6.6	−9.2	−4.7	−8.4	−11.3
GNP (percent deviation from baseline)	−0.3	−0.7	−1.1	−0.4	−1.0	−1.4
Domestic demand (percent deviation from baseline)	−0.2	−0.7	−1.0	−0.3	−0.9	−1.2
U.S. long-term interest rate (percentage point deviation from baseline)	0.5	0.6	0.6	0.4	0.7	0.8
Effective exchange rate (percent deviation from baseline)	1.4	2.1	2.7	1.6	2.5	3.4

†Simulation consists of a sustained increase of 100 basis points in the U.S. federal funds rate from 1989-III onward.

‡Simulation consists of a sustained increase of 100 basis points in the U.S. three-month Treasury bill rate from 1990-I onward.

presented earlier, these simulations predict that a monetary contraction leads to a persistent worsening in the U.S. current account balance (Table 2). One year after the policy shock, the current account has fallen by $3.3 billion in each model, and after three years, the current account balance has fallen by $8.6 billion in the MCM simulation and more than $15 billion in the DRI model.

The discrepancy between model simulations and historical experience is not evident in the transmission of a monetary contraction to merchandise trade. In the DRI and MCM models, the merchandise trade balance shows a modest improvement in the year after policy tightens, a pattern similar to that which actually emerged in the 1965-83 period. Moreover, at a horizon extending beyond two years, these models support the historical evidence indicating no consistent relationship between monetary policy and merchandise trade. Three years after the contraction begins, the merchandise trade balance is $1.4 billion dollars above its baseline level in the MCM simulation; in the DRI model, the initial improvement is reversed and a decline of $4.5 billion is predicted.

This divergence in merchandise trade balance outcomes in the DRI and MCM models is largely explained by their different predictions regarding the response of import demand. Import volumes are largely unchanged following a contraction in the DRI simulation because income and relative price effects are of roughly equal magnitude. In contrast, the response of import volumes to falling income dominates relative price effects in the MCM model, causing a decline in import volumes that amounts to more than $9 billion dollars over three years.[10]

Although monetary policy's effect on merchandise trade differs in the DRI and MCM simulations, the effect of a monetary contraction on the services balance is similar in the two models. A steady decline in services trade, amounting to roughly $10 billion dollars over three years, can be observed in both models. This effect, which was not seen in the evidence presented earlier, is the key factor in the predicted deterioration in the U.S. current account in these simulations.

Underlying this substantial decline in the service balance is our large net financial debt position. As a result of the buildup in U.S. financial debt, which has risen from $26 billion at the end of 1980 to more than $530 billion at the end of 1988, the investment income component of services trade has become much more sensitive to interest rate movements. Higher interest rates are now accompanied by a large increase in net debt interest payments, reflected in the roughly $9 billion and $11 billion declines in net investment income in the DRI and MCM simulations, respectively.

A clear indication of how the transmission of monetary policy to the current account has been changed by the deterioration in our net foreign asset position is provided in Table 3. The table compares our 1990 simulation of monetary tightening with an identical exercise conducted for 1983, a year when the net financial position of the United States was close to balance. The simulation predicts that a monetary contraction in 1983 would reduce net investment incomes by roughly $3 billion over three years.[11] Although the two models predict similar effects of monetary policy on net investment income, they disagree on how a monetary contraction alters the current account balance. This disagreement largely reflects their divergent views on the importance of income and relative price changes for other components of trade.

Since 1983, however, the predicted response of investment income to a monetary tightening has increased significantly in both these models. The effect of monetary policy on debt service payments

Footnote 9 continued
federal funds rate is increased by 100 basis points in the third quarter of 1989. Note that these simulations are not comparable to those presented in Table 1.

Table 3

The Change in Monetary Policy's Effect on Trade

(Billion Dollar Deviation from Baseline, Three Years after a Monetary Contraction)

	Simulation Beginning in 1983†		Simulation Beginning in 1990‡	
	DRI Model	MCM Model§	DRI Model	MCM Model
Current account balance	−4.3	1.0	−15.5	−8.6
Net investment income	−3.5	−2.7	−9.2	−11.3

†The effects of a sustained increase of 100 basis points in federal funds rates (for DRI simulation) or three-month Treasury bill rates (for MCM simulation) beginning in 1983-I.

‡Simulation is identical to that conducted in Table 2.

§Results for net investment income from 1983 MCM model simulation are derived from staff estimates based on the Federal Reserve Bank of New York services trade model.

[10]Estimates made by Bryant and others in *External Deficits and the Dollar* suggest that the income sensitivity of non-oil import demand in the MCM model is nearly twice as great as that in the DRI model.

[11]A breakdown of the components of the current account was not available for the 1983 MCM model simulation. Thus, for this simulation, the movements in investment incomes are derived from staff estimates based on the Federal Reserve Bank of New York services trade model. Our analysis suggests that these estimates provide a good indication of how investment incomes evolve in the MCM model. Nonetheless, it must be emphasized that these results may differ somewhat from the actual simulation.

has consequently become a considerably more important channel of policy transmission, and a contraction in monetary policy now clearly worsens the U.S. current account balance in the DRI and MCM models.

The importance of the linkage between interest rates and investment incomes is further emphasized in Chart 2. The chart evaluates the effects of a monetary policy contraction in the DRI model in an environment in which foreign activity and the dollar's value remain unchanged. As might be expected, a tightening in policy can result in a sustained improvement in the merchandise trade balance when the dollar does not appreciate. Over three years, the merchandise trade balance improves by about $2½ billion dollars. Although the increase is not large in absolute size, it does place the United States in a trade position that is more than $6 billion better than that achieved when a tightening in policy is accompanied by dollar appreciation.

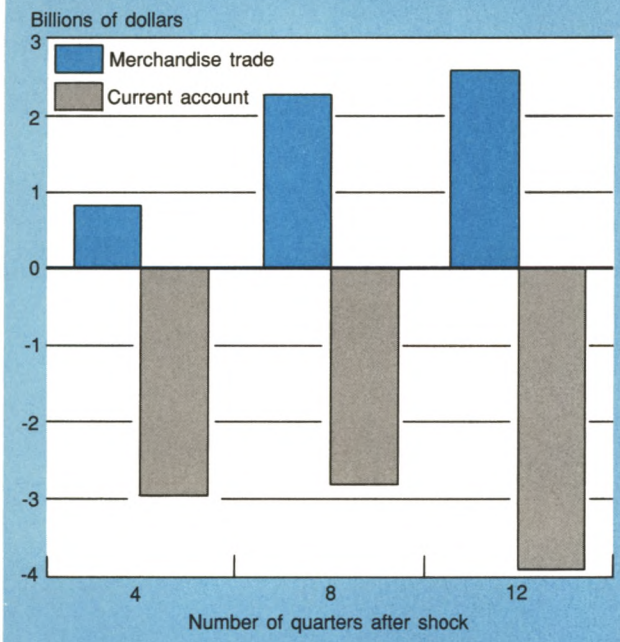
Even when a monetary policy contraction leaves the dollar's value unchanged, we observe a deterioration in the current account amounting to about $4 billion dollars over three years. The worsening of the current account is entirely attributable to the effects of higher interest rates on the services balance. This evidence suggests that as a result of the United States' current position as a large net debtor, the size of the direct effect of interest rates on trade through investment income may exceed the size of the traditional linkage of interest rates to trade flows through income.

Although our results indicate that monetary policy actions can now be expected to lead to a significant change in the U.S. current account balance, the model-based estimates presented here may somewhat overstate the actual effects of monetary policy on trade. These model estimates are predicated on the assumption that policymakers can alter the path of interest rates over an extended period. Authorities' control over interest rates in these models is enhanced because market expectations are modeled as adaptive — that is, they respond slowly and with a lag to changes in economic conditions. In practice, market expectations are likely to respond more strongly and immediately to a persistent change in policy, thereby placing greater offsetting pressures on interest rates than these models predict. For example, attempts by authorities to improve the current account by sustaining interest rates at low levels over an extended period will likely encourage expectations of higher inflation and activity growth as market participants become aware of the implications of the policy stance. These expectations will increase upward pressures on both nominal and real interest rates, and consequently limit policymakers' ability to affect the current account balance through monetary policy actions. Further pressures on interest rates may arise if the credibility of monetary authorities' commitment to price stability is eroded by a persistent expansionary policy stance. The perception of the increased risk of inflation and dollar depreciation that will likely accompany such a policy stance will lead market participants to demand higher real rates of return to hold U.S. assets.

Chart 2

Effects of a Monetary Contraction with Unchanged Exchange Rates

Deviation from Baseline, DRI Model Simulation



Note: Chart shows the result of a simulation of a permanent 100 basis point increase in federal funds rates beginning in the third quarter of 1989. Exchange rates and foreign activity are held unchanged from baseline levels.

Conclusion

This analysis indicates that monetary policy is likely to have a consistent and strong effect on the U.S. current account balance over the medium term. In particular, a monetary contraction can be expected to lead to a deterioration in the current account balance. The deterioration will arise from the higher investment income payments that accompany rising U.S. interest rates. In contrast, there is no clear evidence that monetary policy actions will have a consistent effect on the U.S. merchandise trade balance over the medium term.

The analysis also suggests that the linkage between interest rates and the U.S. current account has strengthened in recent years. The accumulation of U.S. net foreign debt and the greatly increased net foreign holdings of U.S. financial assets have made overall service account flows considerably more sensitive to movements in U.S. interest rates. Although the ability of authorities to pursue specific current account targets independent of other objectives remains limited, monetary policy actions are likely to have a stronger and more consistent effect on the current account than in the past.

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