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on Personal Saving*

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New England's Banks Been Losing Money?*

*A Primer on the Arms Trade*

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## **The Influence of Housing and Durables on Personal Saving**

*Richard W. Kopcke, Alicia H. Munnell, and Leah M. Cook*

## **Explaining the Postwar Pattern of Personal Saving**

*Alicia H. Munnell and Leah M. Cook*

The rate of national saving declined sharply in the 1980s. Some of the explanations for this puzzling performance have considered the influence of capital gains, a reduction in the need for precautionary saving, a decline in the need for retirement saving, the effect of slower income growth, and a host of other factors.

This article explores the relationship between personal saving and the treatment of owner-occupied housing and consumer durable goods in the national income and product accounts. It examines the potential consequences of understating the returns on owner-occupied houses and overstating the consumption of services of durable goods. The article concludes that the greater value of homeowners' investment in their residences after the 1970s and, to a lesser extent, rising outlays for consumer durable goods in the 1980s, depressed reported personal saving during the last decade, as the national accounts underestimated income and overestimated consumption. 3

Economists spent most of the 1980s trying to explain the decline in personal and national saving. They have supplied a host of possibilities, including the impact of capital gains, a decline in the need for retirement saving, and the impact of slower income growth, among others. None of these candidates, however, provides a convincing explanation for the apparent changing pattern of personal thrift.

Two potential culprits have received considerably less attention and most probably have played major roles in the decline in the reported personal saving rate: the appreciation of owner-occupied housing in the late 1960s and 1970s, and the funding limitations faced by private pension plans in the 1980s. This article presents an empirical analysis of the extent to which the housing boom and pension funding provisions determined the pattern of saving in the postwar period. 17

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## **Cyclical Swing or Secular Slide? Why Have New England's Banks Been Losing Money?**

*Robert Tannenwald*

Are the losses recently incurred by New England's banking industry symptomatic of chronic excess capacity that will depress the industry's profitability even after the region's economy recovers from its current recession? Or can the industry restore its profitability by ridding itself of the extraordinary costs resulting from its large overhang of bad loans? This article maintains that the industry is not "overbanked" and that its underlying profitability will eventually reemerge. In support of this contention, the article provides estimates of the "normal" profitability of New England's banking industry—what its average rate of return would have been in 1989 and 1990 given a "normal" incidence of bad loans. The article finds the normal rate of return of New England's banks to be similar to that of banks in the rest of the nation.

The article disputes the widespread belief that New England's high number of bank offices per capita is symptomatic of overbanking. This regional characteristic may instead reflect a conscious competitive strategy, encouraged by regulatory biases, to cater to New Englanders' preference for access and convenience in banking. 29

## **A Primer on the Arms Trade**

*Norman S. Fieleke*

Among the many consequences of the recent Persian Gulf War was a heightened interest in the international trade in armaments, with some analysts forecasting a substantial increase. This article surveys the arms trade, focusing chiefly on the economic features. The survey finds that national prosperity is not connected to a high ratio of arms exports to total output. Nor does poverty stop a nation from spending a relatively large share of its total income on arms from abroad.

In recent years two-thirds of all arms exports have come from the United States and the Soviet Union. However, the competition for influence between NATO and the Warsaw Pact seldom resulted in significant arms transfers from both alliances to the same country. A number of multilateral efforts have been undertaken to control the arms trade. U.S. controls have operated to forfeit arms sales by U.S. firms to foreign competitors, but a drastic reduction in authorized U.S. arms exports would not have a dramatic impact on the U.S. economy. 47

## *The Influence of Housing and Durables on Personal Saving*

*Richard W. Kopcke,  
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**T**he rate of national saving declined sharply in the 1980s. Relative to national income, saving dropped from its postwar average of 8 percent to 2 percent by the end of the decade. The growth of federal deficits accounted for much of the drop, but more than one-half reflected a sharp decline in the private saving rate. Personal saving as a share of disposable income, the only official rate published by the U.S. Bureau of Economic Analysis, declined from 7 to 3 percent. This decline was puzzling, because it came after decades of stability and in the wake of the Economic Recovery Tax Act and other policies designed to increase saving and investment.

Explaining the drop in saving has become a major industry for economists. Great efforts have been made to determine whether the decline is a real phenomenon or a measurement problem. Some of the explanations for this puzzling performance have considered the influence of capital gains, a reduction in the need for precautionary saving, a decline in the need for retirement saving, the effect of slower income growth, and a host of other factors.

This article explores the relationship between personal saving and the treatment of owner-occupied housing and consumer durable goods in the national accounts. The 1970s was an extraordinary period for housing: housing transactions increased greatly, many homeowners made large capital gains and expected further gains, and in the 1980s the ratio of mortgage debt to the housing stock rose markedly. Moreover, consumers' purchases of durable goods rose noticeably during the economic recovery of the 1980s. Even if personal thrift had not changed in the last decade, these developments would have

Table 1  
*Saving as a Percent of Net National Product, 1951 to 1989*

Item	1951-60	1961-70	1971-75	1976-80	1981-85	1986-89
Private Saving	8.6	8.3	9.2	8.8	6.3	4.0
Personal Saving	5.1	5.3	6.8	5.5	4.8	3.2
Private Pensions	.9	1.2	1.7	2.2	1.8	1.2
Other	4.2	4.1	5.1	3.3	2.9	2.0
Business Saving	3.5	3.0	2.3	3.4	1.5	.8
Government Saving	-.4	-.5	-1.4	-.8	-3.3	-2.6
Total National Saving	8.2	7.8	7.8	8.0	3.0	1.4
Addendum: Personal Saving as a Percent of Disposable Income	6.7	7.0	8.8	7.0	6.0	4.0

Note: Items may not sum to totals because of rounding.

Source: U.S. Bureau of Economic Analysis, 1986, *The National Income and Product Accounts of the United States, 1929-82*, Tables 1.8, 2.1, 5.1, and 6.13; U.S. Bureau of Economic Analysis, 1986 to 1990, "National Income and Product Accounts: Revised Estimates," in *Survey of Current Business* (July), Tables 1.9, 2.1, 5.1, and 6.13.

affected the measures of personal saving reported in our national accounts, because of the techniques used to account for homeowners' investment in their residences and the consumption of services provided by durable goods.

After an introductory section on national saving trends, sections II and III explore the treatment of housing and consumer durable goods in the national income and product accounts (NIPA). Section IV examines the potential consequences of understating the returns on owner-occupied houses and overstating the consumption of services of durable goods. This article concludes that the greater value of homeowners' investment in their residences after the 1970s and, to a lesser extent, rising outlays for consumer durable goods in the 1980s depressed reported personal saving during the last decade, as the NIPA underestimated income and overestimated consumption.

Although the national accounts attempt to measure only the value of currently produced goods and services, both the measurement of this output and the allocation of national income among its various factors of production depend on the expected rate of growth of output and the value of assets in the future. This dependency cannot be avoided as long as the valuation and allocation of national income are derived from the prices of long-lived physical assets, such as houses, and the yields on financial instruments, such as mortgage loans.

## I. Trends in National Saving

The appropriate measure of national saving has been the subject of considerable controversy. A major dispute is whether or not to include capital gains (Bradford 1990). In some ways the controversy has been exaggerated; different measures are useful for different purposes. The figures presented in the national income and product accounts, which do not include capital gains, are designed to measure current production and the payments to the factors used to produce current output.

The NIPA saving data for the postwar decades are shown in Table 1. They are drawn directly from the published accounts, even though other authors have included a wide range of defensible modifications (Summers and Carroll 1987; Auerbach and Kotlikoff 1989; Hendershott and Peek 1989; Bradford 1990; Eisner 1991). National saving remained virtually unchanged as a share of income from the 1950s through the 1970s; the total averaged 8 percent, reflecting personal saving of 6 percent, business saving of 3 percent, and government saving of minus 1 percent. In the 1980s, national saving fell to 3 percent of income in the first half of the decade and to 1.4 percent in the second half. Each component contributed to the collapse of the national rate. The federal government's deficit rose from 1 percent to 3 percent of national income in the wake of tax cuts and continued spending on defense. Business saving fell

from 3 percent to 1 percent of income, as financial corporations suffered substantial losses and nonfinancial corporations paid out increasing shares of their income.

The personal saving rate also fell during the 1980s. The decline in saving through private pension plans reflected a reduction in employer pension contributions in the wake of the runup in stock prices during the 1980s (Munnell 1987). Many plan sponsors found themselves facing the Internal Revenue Code's full-funding limitation, which restricts tax-deductible contributions once plans have reached designated funding levels. State and local government plans, which were less well funded initially and not subject to the Revenue Code limitations, have maintained their funding contributions.

Despite a long list of reasons suggesting that personal nonpension saving should have increased in the 1980s, it also dropped sharply. The 1980s witnessed the introduction of numerous saving incentives, such as the introduction of individual retirement accounts (IRAs) and the expansion of 401(k) and 403(b) plans, that allowed individuals to make

pre-tax contributions and defer interest on earnings until withdrawal. The 1980s was also a decade during which the reduction of rapid inflation restored attractive real rates of return, which most observers would expect to stimulate saving. Moreover, to the degree that investors "pierced the corporate veil," they would have been expected to compensate for the low level of business saving by increasing their own direct saving. Finally, demographic trends also should have fostered greater personal saving during the 1980s: the young and the elderly, typically regarded as small savers, represented a declining share of the population, implying that the average rate of saving should have been rising.

The major explanation for the apparent drop in personal saving can be found in the treatment of housing and, to a lesser degree, of durable goods in the national accounts. The accounts understate homeowners' investment in their residences and overstate the consumption of durable goods. As will be shown below, adjusting the national accounts for these two phenomena eliminates the collapse of saving in the 1980s.

Table 2  
*Housing in the National Income and Product Accounts, 1989*  
Billions of Dollars

Product Approach				Earnings Approach			
Item	Tenant-Occupied	Owner-Occupied <sup>a</sup>	Total	Item	Tenant-Occupied	Owner-Occupied <sup>a</sup>	Total
Housing Consumption	142	371	513	Capital Consumption Allowance	37	89	126
Less: Intermediate Goods & Services Consumed	27	47	74	Taxes <sup>b</sup>	9	61	70
Gross Housing Product	116	324	440	Compensation of Employees	4		4
				Interest	41	197	238
				Net Rental Income <sup>c</sup>	25	-23	2
				Gross Housing Product	116	324	440

Addenda:

Personal Consumption Expenditures: 3,450  
Gross National Product: 5,201

Note: Items may not sum to totals because of rounding.

<sup>a</sup>Includes farm (2.5 percent of the total) as well as nonfarm housing.

<sup>b</sup>Taxes are indirect business tax and nontax liability plus business transfer payments plus subsidies less current surplus of government enterprises.

<sup>c</sup>Includes both proprietors' income and corporate profits.

Source: U.S. Bureau of Economic Analysis, 1990, "National Income and Product Accounts: Revised Estimates," in *Survey of Current Business*, vol. 70, no. 7 (July), Tables 1.1, 1.9, 1.23, and 8.9.

## II. Housing in the National Income Accounts

In the national income accounts, saving is the difference between income and outlays; it is not measured directly. Income is calculated in two different ways, which turn out to be equivalent. The first sums the value of final products—consumption of goods and services and investment—produced each year. Adding only final products avoids the problem of double-counting that would result from summing the values of both the flour and the bread. The second approach sums the earnings of the land, labor, and capital that produce the nation's output. The two approaches yield identical results because profits (and a statistical discrepancy) eliminate any

difference between the value of final product and the payments to the factors of production.

The accounting for residences that are rented to tenants is easily accommodated by this framework (Table 2). Using the product approach, annual rents paid by the tenants are reduced by the cost of intermediate goods and services consumed, such as maintenance expenditures, in order to measure gross housing product. With the earnings approach, gross housing product consists of depreciation (capital consumption allowances), taxes (primarily property taxes), compensation of employees, such as wages for building superintendents, mortgage interest paid by the owners of buildings, and net rental income earned by building owners. All of these figures can be derived from the financial statements of building operators.

Table 3  
*Imputed Rental Income on Owner-Occupied Housing<sup>a</sup> in the National Income and Product Accounts*

Billions of Dollars

Year	Imputed Space Rent	Less Expenses				Net Rental Income
		Maintenance <sup>b</sup>	Capital Consumption Allowances	Taxes <sup>c</sup>	Interest	
Average:						
1951-60	24.0	3.6	6.0	3.5	4.3	6.7
1961-70	47.6	5.1	10.4	9.3	11.8	11.0
1971-75	86.0	11.9	20.6	18.3	25.5	9.5
1976-80	148.2	25.5	38.4	27.3	55.7	1.3
1981-85	246.7	38.3	60.0	40.3	116.1	-8.2
1986-89	337.2	46.5	78.2	55.2	172.7	-15.2
1976	114.2	18.5	28.4	24.0	37.5	5.8
1977	127.8	22.6	32.7	26.6	44.5	1.5
1978	145.4	25.0	37.9	27.3	53.4	1.7
1979	165.2	29.0	43.9	28.1	65.1	-0.9
1980	188.3	32.5	49.2	30.4	77.8	-1.6
1981	212.2	34.8	53.8	33.8	90.3	-0.7
1982	229.9	36.9	56.8	37.3	101.6	-2.8
1983	245.0	38.2	59.6	40.2	114.3	-7.3
1984	263.5	40.2	62.6	43.6	130.5	-13.4
1985	282.7	41.5	67.0	46.8	144.0	-16.7
1986	302.6	43.7	69.3	50.2	152.5	-12.9
1987	326.4	46.8	74.7	53.1	163.6	-11.9
1988	348.8	48.3	79.6	56.0	177.5	-12.7
1989	371.1	47.2	89.2	61.3	197.1	-23.4

Note: Items may not sum to totals because of rounding.

<sup>a</sup>Includes farm as well as nonfarm owner-occupied housing.

<sup>b</sup>Officially classified as intermediate goods and services consumed.

<sup>c</sup>Taxes are net of small subsidy payments.

Source: U.S. Bureau of Economic Analysis, 1986, *National Income and Product Accounts of the United States, 1929-82*, Table 8.9; U.S. Bureau of Economic Analysis, 1986 to 1990, "The U.S. National Income and Product Accounts: Revised Estimates," in *Survey of Current Business* (July), Table 8.9.

The case of owner-occupied housing is more complicated, because homeowners in the NIPA are treated as if they rent their homes to themselves. While this treatment recognizes appropriately that housing provides a long-term flow of services to the owner-occupant, it requires some assumptions.

Using the product approach, housing consumption is an imputed space rent, which is derived from data on the owner-occupied housing stock and rents for comparable units as reported in the decennial census. For years between the censuses, rents are revised according to the rent component of the consumer price index, and the number of housing units is adjusted to reflect the number of households in the Census Bureau's current population survey.

The earnings approach requires additional assumptions. Depreciation is estimated using the perpetual inventory method from the capital stock calculations of the Bureau of Economic Analysis. Taxes, which are primarily state and local, come from Census Bureau quarterly surveys of state and local tax collections. In decennial census years, interest payments are taken directly from the Census. In intermediate years, this interest figure is increased by the change in an indicator series. This indicator series is estimated by applying an appropriate market interest rate to the stock of mortgage debt on one- to four-family housing as reported by the Federal Reserve Board. Net imputed rental income is then calculated as space rent less intermediate goods and services purchased, expenses for depreciation, taxes, and interest.

Housing consumption for owner-occupants is the single largest imputation in the NIPA, amounting to \$371 billion, or about 11 percent of personal consumption expenditures in 1989. The estimation and classification of these numbers can alter measures of personal saving. The current method of imputing owner-occupied rents raises two issues. First, market rents for comparable units most likely understate the implicit rents of homeowners. Second, homeowners may regard a portion of their implicit rent as an investment.

#### *Net Rental Income on Owner-Occupied Houses*

The decennial census describes (1) the number and value of owner-occupied and tenant-occupied units and (2) mean contract rent—that is, rent including furnishings, utilities, and services for tenant-occupied units—arrayed by the market value of the

Table 4  
*Percent Change in Real Value of Housing Stock due to Net Investment and to Capital Gains, Selected Periods, 1951 to 1990*

Period	Percent Change in Value of Housing Stock	Source of Change	
		Net Housing Investment (Percentage Points)	Capital Gains
1951-55	41.3	33.5	7.7
1956-60	22.5	23.5	-.9
1961-65	13.6	16.6	-3.0
1966-70	22.7	13.0	9.8
1971-75	28.4	15.1	13.3
1976-80	40.0	19.3	20.6
1981-85	6.6	10.9	-4.2
1986-90	8.9	17.1	-8.3

Note: Items may not sum to totals because of rounding.

Source: Authors' calculations based on Board of Governors of the Federal Reserve System, 1991, "Balance Sheets for the U.S. Economy, 1945-1990," C.9 Release (April), pp. 19-24, pp. 61-66.

properties. Mean contract rent for owner-occupied units is then imputed on the basis of the rent charged for tenant-occupied units of the same value to derive space rent. Mortgage interest expense is calculated simply by multiplying the stock of outstanding mortgages on owner-occupied housing by the relevant interest rate.

Although this technique for estimating net rental income for owner-occupied housing might appear reasonable, since 1979 expenses have outstripped the income imputed to owner-occupants, producing negative net rental income (Table 3). These negative returns have not been offset by any real appreciation; real capital gains have also been negative over the same period (Table 4). The housing boom occurred during the 1970s; afterward, housing values for the nation as a whole failed to keep pace with inflation. This pattern is evident not only in the wealth data but also in data on median sales price of existing homes (Table 5).

These dismal financial rewards raise the question of why rational consumers would continue to invest in housing that yielded increasingly negative returns. One possible explanation is that the returns are not measured correctly, because the imputed space rent understates the receipts of homeowners.

Homeownership conveys potentially valuable benefits to households in addition to the standard

Table 5  
*Percent Change in the Real Median Sales Price of Existing One-Family Homes, Selected Periods, 1970 to 1990*

Period	U.S.	Northeast	Midwest	South	West
1970-75	11.2	13.0	8.5	13.6	18.1
1975-80	20.5	5.8	17.9	14.5	54.2
1980-85	-5.8	13.5	-11.9	.1	-17.1
1985-90	3.5	30.0	2.8	-6.5	19.7

Source: U.S. Bureau of the Census, 1990, *Statistical Abstract of the United States 1990*, Table 1266; National Association of Realtors, 1991, *Home Sales*, vol. 5, no. 3 (March), p. 10.

rights of tenants. Some of these benefits should be attributed to consumption: homeowners are free to paint rooms any color they want, hang pictures, build bookcases and make other improvements that they can retain. They can also enjoy the sense of pride and stability that comes with owning one's home. Other benefits may be classified as investment: homeowners possess a hedge against future increases in rents; they also acquire the landlord's option to cancel their lease; and they assume the landlord's right to manage or dispose of the property.

For motives related to both consumption and investment, homeowners are almost certainly willing to pay more to own than to rent a given home. The features that accompany ownership, whether tangible or financial, are more valuable than those offered to renters. Because families are willing to pay a premium over market rents to own their home, the NIPA understate the imputed space rents received by homeowners. Not only would increasing implicit space rents increase the return to housing, thereby making this return more comparable to those on other investments, but the disposition of this additional rent also might alter the reported personal saving rate considerably.

### *Consumption and Investment Components of Space Rent*

If the additional space rent that homeowners receive is attributed to consumption, then raising imputed space rents does not alter NIPA personal saving, because consumption and income increase by the same amount (see the Box). This premium would, however, lower the ratio of personal saving to disposable personal income, since higher space rents

would raise income. Therefore, increasing imputed space rents would not alter the puzzling decline in the personal saving rate, even though this premium would increase the estimated return on owner-occupied housing.

On the other hand, if the premium is attributed to saving, the return on owner-occupied housing rises, consumption remains unchanged, and reported personal saving and the personal saving rate rise with the imputed space rent premium. The case for regarding much of the premium as saving, as opposed to consumption, is compelling. In the wake of the housing boom, the cost of capital for homeowners increased compared to the implicit rental return on owner-occupied dwellings. In other words, homeowners became willing to pay higher prices for their residences given their opportunity cost for undertaking this investment. This increase in the value of homes occurred as many households regarded homeownership as a more attractive investment than they had previously.

Consider, for example, two situations: in the first, a family expects no change in real rents; in the second, the family expects real rents (and real house prices) to increase by 2 percent annually. In the first situation, where homeownership conveys no financial benefits, the family that could rent a house for \$5,000 annually would be willing to purchase that home for \$100,000 if its real discount rate were 5 percent. In the second situation, where the family expects rents to rise, the family would be willing to pay \$170,000 (\$5,000 capitalized at 2.94 percent ( $1.0294 = 1.05/1.02$ )).

The second family pays an additional \$70,000 for its home in order to avoid paying higher rents in the future. This higher price increases the family's annual outlays by \$3,500, reflecting 5 percent interest on the additional \$70,000.<sup>1</sup> The NIPA record the second family's additional outlay of \$3,500, but they do not credit the family's income with any additional space rent. Consequently, the reported income and saving

<sup>1</sup> This "outlay" will take the form of interest payments on any additional mortgage loans as well as the opportunity cost of funds on any additional equity investment (down payment). This example assumes that the real interest rate on mortgages and the real rate of return on families' financial investments equal 5 percent. Whenever the rate of interest on mortgage loans exceeds the yields on financial instruments held by families, the family's disposable personal income will fall with increased mortgage borrowing. Accordingly, the NIPA's measures of households' incomes and saving are particularly likely to fall after real house prices increase when the cost of mortgage financing is relatively high.

### *The National Income and Product Accounts*

In the national income and product accounts (NIPA), personal income comprises wages, salaries, transfer payments, dividends, interest receipts, proprietors' incomes, and the implicit rental income of homeowners. In turn, implicit rental income equals the return on owner-occupied residences less mortgage interest expenses and other housing expenses, such as capital consumption, maintenance, and property taxes. Disposable personal income equals personal income less taxes and some other nontax payments.

$$(1) \quad Y^D = Y + Y^{INT} + (SR - INTM - OHE) - TAX,$$

where  $Y^D$  is disposable income,  
 $Y$  is all income other than the implicit income of homeowners and interest income,  
 $Y^{INT}$  is interest income,  
 $SR$  is the implicit return received by homeowners,  
 $INTM$  is homeowners' mortgage expenses,  
 $OHE$  is other expenses attributed to owner-occupied residences, and  
 $TAX$  is personal tax and nontax payments.

The NIPA allocate disposable personal income among consumption, interest payments to business on loans other than mortgage loans, and saving.<sup>2</sup> Consumption includes the implicit space rents that homeowners pay themselves to occupy their residences.

$$(2) \quad Y^D = (C^O + SR^C) + INTB + S,$$

where  $C^O$  is personal consumption other than the implicit space rents paid by homeowners,  
 $SR^C$  is the market value of the implicit space rent on owner-occupied residences,  
 $INTB$  is personal interest payments to businesses on loans other than home mortgage loans, and  
 $S$  is personal saving.

Together, this accounting for the sources and uses of disposable income implies

$$(3) \quad S = (Y - TAX - C^O - OHE) + (Y^{INT} - INTM - INTB) + (SR - SR^C).$$

Because  $SR$  equals  $SR^C$  in the NIPA, saving does not depend on the estimates of implicit returns or rents attributed to homeowners. Nevertheless, the personal saving rate tends to fall as

imputed rents increase, because disposable income rises with these returns. If  $SR$  were not required to equal  $SR^C$ , then disposable income, saving, and the saving rate would increase when the difference between  $SR$  and  $SR^C$  increases.

The NIPA account for personal interest payments on home mortgages differently than they account for other personal interest payments.  $INTM$  is deducted from personal receipts in calculating disposable income, whereas  $INTB$  is treated as an outlay similar to consumption. When personal interest payments (on either mortgage loans or consumer loans) increase, personal interest income also tends to increase. Should the increase in  $Y^{INT}$  match that of  $(INTM + INTB)$ , saving would not change. However, if the increase comes from  $INTB$ , disposable income would increase by the same amount, and the saving rate would fall. If  $INTM$  increased, and  $Y^{INT}$  rose by the same amount, disposable income would remain unchanged and the saving rate would be unaffected.

If the accounting for consumers' durable goods matched that of owner-occupied residences, purchases of durables in consumption would be replaced by the implicit rents that consumers pay for using their durable goods. Therefore, the foregoing equations would be altered as follows:

$$(1a) \quad Y^D = Y + Y^{INT} + (SR - INTM - OHE) + (RD - INTB - ODE) - TAX,$$

$$(2a) \quad Y^D = (C^O - CD + RD^C + SR^C) + S, \text{ and}$$

$$(3a) \quad S = (Y - TAX - C^O - OHE) + (Y^{INT} - INTM - INTB) + (SR - SR^C) + (CD - ODE) + (RD - RD^C),$$

where  $RD$  is the implicit return to owners of durable goods,  
 $ODE$  is other expenses attributed to durable goods (principally capital consumption),  
 $CD$  is consumers' purchases of durable goods, and  
 $RD^C$  is the implicit rent paid by owners of durable goods.

Because  $CD$  has exceeded  $ODE$  and  $RD$  is no less than  $RD^C$ , these changes increase saving. Disposable income also increases when the rewards for owning durable goods exceed their expenses.

of the family in the second situation are \$3,500 less than those of the family in the first situation.

From the second family's perspective, its implicit return from homeownership is understated by \$3,500; consequently, its income and saving also are understated by \$3,500. The family is willing to pay an additional \$70,000 for its home, because the investment features of homeownership are worth \$3,500 annually. In purchasing its home, thereby fixing its rents, the family can increase its consumption and living standard in the future as much as it would if it accumulated financial assets at the rate of \$3,500 annually. Only in exchange for an annual payment exceeding \$3,500 would the family relinquish one of its benefits as a homeowner and assume the obligation to pay the greater rents expected in the future.

Although the foregoing example highlights the importance of expected changes in real rents, the relative value of homes can change for other reasons. For example, should the tax burden on owner-occupied homes fall relative to that on other investments, the real value of homeownership would rise. Should interest rates not adjust fully when the rate of inflation increases, as was the case in the late 1970s, the real value of homes would rise. Should interest rates adjust fully, a higher rate of inflation would not alter house prices, but it would increase the cost of financing residences compared to their rental returns.<sup>3</sup> Consequently, the increase in the rate of inflation from the 1960s to the 1980s tended to depress the return on owner-occupied housing reported in the NIPA without necessarily reducing the total rate of return to homeowners.

Imputed net rental income became negative in the 1980s, because people were willing to pay a premium to own their own homes in the wake of the housing boom of the 1970s. The NIPA recorded a tripling of homeowners' mortgage debt, but they did not record the higher implicit rents accruing to homeowners. Consequently, the NIPA understated both income and saving in the 1980s, and the resulting decline in the reported personal saving rate did not in fact reflect a shift in the national attitude toward thrift.

### *III. Consumers' Durable Goods in the National Income Accounts*

The NIPA classify purchases of durable goods by individuals as consumption rather than investment. Accordingly, the reported personal saving rate tends

to fall when savers shift from financial to tangible assets or when consumers increase their stock of durable goods, as is common during economic recoveries. Because the NIPA attribute no implicit rents to the stock of consumers' durable goods, the NIPA also understate national income and disposable personal income.

Disposable personal income is allocated to three general categories: consumption, saving, and interest payments to businesses on loans other than mortgage loans (see the Box). According to this accounting, reported saving may fall relative to income because either consumption or nonmortgage interest payments represent a greater share of income.

Measures of personal thrift that dwell only on the saving rate implicitly combine personal nonmortgage interest payments with consumption, which entails a degree of double-counting of consumers' outlays for services provided by their durable goods (other than their homes). When people buy new automobiles, the initial outlay is counted entirely as consumption. This outlay represents the present value of the transportation services that the buyers expect to receive over the life of their automobiles. The value of these services also is reflected in the buyers' annual interest payments on their auto loans. Subtracting both the purchase of the durable good and the annual interest payment from disposable income understates the saving rate.

Interest expense principally represents a transfer payment, not an outlay that absorbs current output. National product is the sum of goods and services that are consumed, purchased by governments, invested by businesses, and sold abroad (net of imported goods and services). The output that people do not consume becomes available for other uses, including investment. Unlike expenditures for food, interest payments do not represent a significant claim on national product.

<sup>2</sup> In the NIPA, disposable personal income is also allocated to a fourth category, net personal transfer payments to foreigners. This category is omitted from the following discussion because the volume of these transfers is negligible: in 1990, for example, these transfers were approximately \$1 billion which was less than 0.03 percent of disposable personal income.

<sup>3</sup> Homeowners anticipate implicit rents rising at the rate of inflation, whereas the opportunity cost of financing a residence is constant (as long as the rate of inflation does not change). Although the cost of financing a residence initially exceeds its rental return if the rate of inflation is sufficiently high, rents eventually will rise to exceed the cost of financing (Poole 1972; Lessard and Modigliani 1975; Peek and Wilcox 1991).

If families seeking credit obtain their loans directly from other families, the resulting interest payments are neither net income for families as a whole nor a net outlay. But, if families obtain credit through a financial intermediary, which in turn obtains its funds from other families, the NIPA credit the lenders with interest income and the borrowers with interest expense. Except for the interest margin that financial intermediaries charge for handling this exchange, this transaction, too, is essentially a transfer of funds among households.

The classification of some personal interest payments as both income and outlays may alter the personal saving rate, even though it may not alter measures of consumption or saving. For example, suppose a country produces \$1 trillion of goods and services annually and that disposable personal income also is \$1 trillion, personal consumption spending is \$900 billion, and personal saving is \$100 billion. The personal saving rate is 10 percent. Suppose that a second country resembles the first in every respect, except that families have made loans to each other on which the annual interest is \$100 billion. In this case, national income, consumption, saving, and investment are the same as in the first. But, in this second case disposable personal income is \$1.1 trillion, and personal outlays include \$100 billion of interest expense. Consequently, in this second country the personal saving rate is only 9.1 percent ( $\$100/\$1,100$ ). In both countries investment accounts for 10 percent of national product.

These examples suggest that subtracting personal interest outlays both from personal income and from total personal outlays is a simple remedy for this potential bias in measuring the personal saving rate. Accordingly, income would comprise only consumption and saving, and it would not be inflated by transfers of funds among people.

This simple remedy is only the first step toward an accounting for consumers' purchases of durable goods that would resemble more closely that used for owner-occupied houses, an accounting that would treat consumers' durables as investments (see the Box). By deducting the income on owner-occupied residences (net of mortgage interest expenses) from personal income, the NIPA already subtract homeowners' mortgage interest payments from personal income and from personal outlays. But, in the case of housing, the NIPA take two more steps. First, they do not include the purchase of residences in consumption, adding instead the value of services that homeowners derive from their dwellings each year.

Second, the NIPA attempt to add to personal income the returns that homeowners derive from their residences. A similar treatment for consumer durables would subtract the purchase of durable goods from consumption, adding instead an annual rent for using these goods (essentially the opportunity cost of funds plus capital consumption). Then, the net income from owning durable goods (the rent defined previously less interest payments on loans) would be added to personal income.

Classifying consumers' durable goods as investments and recognizing the implicit rents on these assets would have at least three consequences for the NIPA. First, national income would be increased by the amount of these implicit rents. Second, disposable personal income would be increased by the amount of these rents less personal interest payments. Third, personal saving would be increased by consumers' net purchases of durable goods less that portion of the implicit rent on existing durables that represents consumption.

#### *IV. The Return to Housing, the Consumption of Durable Goods, and the Personal Saving Rate*

Understating homeowners' investment in their residences and, to a lesser degree, overstating the consumption of durable goods have accounted for much of the recent decline in the personal saving rate. Table 6 compares the personal saving rate as reported in the NIPA to alternative measures that, first, attribute a competitive rate of return to owner-occupied housing and account for a portion of this return as saving; and second, treat consumers' durable goods as investments.

Column (2) of the table shows an alternative measure of the personal saving rate for which homeowners' implicit receipts equal the product of the value of their housing stock and their opportunity cost of funds, calculated as the sum of the mortgage rate and the rate of capital consumption for residences (Appendix Table 1). This approach produces a substantially larger space rent figure than that reported in the NIPA. The calculations in column (2) assume that all this difference in space rents could be viewed as consumption before the first signs of the housing boom appeared in 1966; the premium averaged roughly 7 percent between 1951 and 1966. After 1966, any premium in excess of 7 percent was attributed to investment.

Table 6  
*Personal Saving as a Percent of Disposable Income with Adjustments for Space Rent and Consumption of Consumer Durables, Selected Periods, 1951 to 1989*

Period	Personal Saving Rate NIPA as Reported (1)	Alternative Personal Saving Rates		
		NIPA plus Space Rent Adjustment (2)	NIPA plus Durables Adjustment (3)	NIPA plus Space Rent and Durables Adjustments (4)
		1951-55	6.7	6.7
1956-60	6.8	6.7	9.2	9.1
1961-65	6.6	6.6	9.0	9.0
1966-70	7.3	8.5	11.9	13.0
1971-75	8.8	11.6	13.6	16.2
1976-80	7.0	13.8	12.3	18.5
1981-85	6.0	15.0	9.0	17.7
1986-89	4.0	9.5	8.1	13.5

Source: Authors' estimates.

By construction, these alternative estimates of the return on owner-occupied residences alter the personal saving rate negligibly before 1966, but afterward they increase the saving rate significantly. During the late 1960s, the alternative saving rate exceeds the reported saving rate by less than 2 percentage points. During the late 1970s and early 1980s, after

<sup>4</sup> Although this alternative estimate of receipts generally exceeds that which appears in the NIPA, this alternative also may understate homeowners' income. The homeowners' discount rate for valuing their investment in their residences, for example, probably exceeds the mortgage rate, which reflects the discount rate for a more secure investment in housing. Accordingly, homeowners would not exchange their residence for an annuity or a bond, unless this alternative asset's yield exceeded the mortgage rate. Indeed, homeowners are willing to pay the mortgage rate to obtain financing because the net yield on houses exceeds the mortgage rate.

The mortgage rate also may understate the homeowners' gross discount rate because mortgages are less expensive to manage than houses. Although mortgage interest may be deducted from homeowners' taxable income while homeowners' implicit receipts are not taxed as income, the local property taxes that are levied against the value of residences amount to a substantial implicit tax on homeowners' implicit rents.

<sup>5</sup> If one-half of the rental premium assigned here to homeowners' saving were, instead, classified as consumption, the personal saving rate for the last half of the 1980s would be approximately the same as that for the 1960s.

the value of houses had risen greatly in real terms and relative to personal income, the saving rate exceeds the reported saving rate by approximately 7 percentage points.<sup>4</sup> Although this alternative saving rate fell in the last half of the 1980s, it remains greater than saving rates of the 1950s and 1960s, and it still exceeds the reported saving rate by 5.5 percentage points.<sup>5</sup>

Using this "bond equivalent" technique for estimating space rents removes an asymmetry in the current NIPA technique. Because of the importance of mortgage financing, the cost of homeownership assumes the form of an annuity, whereas the implicit space rents of homeowners resemble dividends on the stock of a growing business. Whenever a homeowner buys a dwelling, the initial interest payments are relatively great compared to the dwelling's rents. In time, however, rents are expected to surpass interest expenses. Consequently, whenever many new homes are sold or homeowners exchange dwellings, the implicit income of homeowners tends to fall in the NIPA, because the burden of mortgage financing is borne relatively early compared to timing of the expected rewards of homeownership.<sup>6</sup>

Column (3) of Table 6 shows an alternative measure of the personal saving rate for which the implicit rents for consuming personal durable goods equal the product of the value of the stock of consumers' durables and the opportunity cost of funds, which is measured as the sum of the consumers' discount rate and the rate of capital consumption on the stock of these durables (Appendix Table 2). The discount rate equals the three-year Treasury bill yield plus 3 percentage points.<sup>7</sup>

<sup>6</sup> Even if homeowners were to purchase their dwellings without mortgage financing, resorting instead to selling securities held as assets, the opportunity cost of financing a house (the forgone interest income) would be relatively great compared to rents during the early years of the owners' tenure.

This "front-end loading" of financial costs compared to the accrual of rents is exaggerated by the standard, amortized mortgage loan. The payments are constant over the life of the loan (provided interest rates do not change in the case of an adjustable rate mortgage). But virtually all of the annual payment at the inception of the loan represents interest, whereas very little of the annual payment in the loan's last years represents interest. This mismatching of cash flows becomes especially great when the inflation premium in mortgage yields increases.

<sup>7</sup> The 3-percentage-point margin is slightly greater than that common in pricing adjustable rate mortgage loans. If this margin is too great, then the alternative measure of disposable personal income, described in the next paragraph, also is too great and this, in turn, reduces the alternative personal saving rates shown in column 3.

This alternative accounting for the value of durable goods in consumption spending alters the measurement of both personal income and personal saving. The net income that consumers derive from owning their stock of durable goods, their implicit rents on their durables less the sum of capital consumption expenses and interest paid to business, is added to disposable personal income. Because of this adjustment and because the implicit rents for durable goods replace outlays on durables in consumption, the difference between these outlays and the amount of capital consumption on the stock of consumers' durable goods is added to personal saving.

The alternative estimates shown in column (3) exceed the reported saving rate by a significant margin in every period, because the acquisition of new durable goods by consumers consistently exceeded their consumption of these goods. The difference between the estimates of the saving rate in column (3) and those reported in the NIPA (column (1)) averages approximately 3.5 percentage points in the 1950s, 1960s, and 1980s. During the 1970s, this difference increased to 5 percentage points, as purchases of tangible assets represented a greater share of disposable personal income.

Although this alternative accounting for durable goods generally increases the personal saving rate, it alone does not eliminate the drop in saving that occurred in the late 1980s. During the 1950s and 1960s, the alternative saving rate shown in column (3) averaged almost 2.5 percentage points more than it did in the late 1980s. For the NIPA saving rate shown in column (1), this difference is almost 2.9 percentage points.

The course of the saving rate shown in column (4), which combines the adjustments described in columns (2) and (3), differs considerably from that of the reported personal saving rate. According to the figures in column (4), during the last half of the 1980s the personal saving rate declined from the extraordinarily high rates of the 1970s and early 1980s toward rates of saving that prevailed in the 1950s and 1960s.

Although the techniques used here for estimating these alternative saving rates are not above criticism, they suggest that the level and the course of the personal saving rate depend greatly on the NIPA's specific techniques for estimating the return to owner-occupied housing and the NIPA's classification of personal purchases of durable goods as consumption. Of the two adjustments considered here, the NIPA's underestimates of the implicit income and implicit saving attributed to owner-occupied resi-

dences appear to be primarily responsible for the low rates of personal saving reported during the late 1980s. Therefore, from this perspective, the challenge is to explain the high rate of personal saving in the 1970s and early 1980s, not the collapse in saving during the late 1980s.

## V. *Conclusions and Implications*

Much of the decline in the personal saving rate during the 1980s may be attributed principally to the NIPA's accounting for homeowners' implicit investment in their residences and, to a lesser degree, to the NIPA's measurement of the consumption of durable goods. The NIPA attempt to measure only the value of currently produced goods and services. Yet, the measurement of income depends on the value of durable assets and the yields on financial instruments, both of which depend on expectations of the value of output in the future. This inconsistency is highlighted whenever a productive asset is financed with a security whose prospective stream of payments has a profile that does not closely resemble the asset's stream of receipts and does not change with economic conditions in the same way that the asset's stream of receipts changes. Much of the cost of financing owner-occupied housing, for example, is borne relatively early compared to the accrual of their rents. When investors expect rents to increase in the future, the financial burden of holding these dwellings rises along with their price, while their current "income" can fall significantly.

Using an alternative measure of implicit returns on housing that reflects the opportunity cost of financing housing, this article concludes that the NIPA generally understate personal income, personal saving, and the personal saving rate. Furthermore, the degree to which the NIPA understate this saving rate increased during the 1980s after the value of the stock of owner-occupied houses increased relative to rents and personal income. The NIPA understatement of the returns to owner-occupied residences also leads to an understatement of national product, which means that the resulting increase in personal saving also increases national saving, since it does not entail any offsetting reduction in business, government, or foreign saving.

Saving also would account for a greater share of personal income if consumption spending included the implicit rent on the stock of consumers' durable goods, rather than purchases of durables, because

consumers' purchases of new durables have exceeded the implicit rents on these assets. This alternative technique of measuring personal income and consumption tends to increase the saving rate by similar amounts in both the 1980s and the 1960s. Consequently, it alone does not explain why the personal saving rate reported in the NIPA is lower in the late 1980s than it was in the 1960s.

The foregoing restatement of returns and saving attributed to tangible assets need not be limited to owner-occupied housing or to consumers' durable goods. For example, the income attributed to business investments that are financed with debt will

tend to fall according to the NIPA whenever investors revise their forecasts, expecting the revenues accruing on these assets to increase more rapidly in the future.

The NIPA are not designed to measure all the returns on assets as perceived by investors; therefore, the NIPA do not account fully for investors' disposition of their returns between consumption and saving. Accordingly, a decline in national saving reported in the NIPA neither necessarily represents a fundamental change in the motives of consumers and investors, nor necessarily warrants new public policies designed to foster thrift.

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Appendix Table 1

*Implicit Space Rents on Owner-Occupied Housing: NIPA and Adjusted, 1950 to 1989*

Year	NIPA Implicit Space Rent	Value of Housing Stock	NIPA Rent As Percent of Housing Stock	Homeowners' Opportunity Cost of Funds	Adjusted Implicit Space Rent
1950	12.9	165.2	7.8	8.3	13.8
1951	14.6	188.1	7.8	8.5	15.9
1952	16.5	207.1	8.0	8.6	17.8
1953	18.6	222.1	8.4	8.8	19.4
1954	20.4	238.2	8.6	8.8	20.9
1955	22.1	260.0	8.5	8.8	22.8
1956	24.0	285.3	8.4	8.9	25.4
1957	25.8	305.8	8.4	9.5	29.1
1958	27.7	322.0	8.6	9.5	30.6
1959	29.8	340.1	8.8	9.7	33.1
1960	32.0	361.3	8.8	10.1	36.4
1961	34.0	380.4	8.9	9.8	37.3
1962	36.4	395.9	9.2	9.7	38.4
1963	38.4	409.2	9.4	9.9	40.5
1964	40.5	427.9	9.5	9.8	42.1
1965	43.1	451.7	9.5	9.8	44.3
1966	45.6	486.3	9.4	10.3	49.8
1967	48.5	523.7	9.3	10.5	54.8
1968	51.9	568.7	9.1	11.0	62.4
1969	56.3	628.0	9.0	11.8	74.2
1970	60.8	672.7	9.0	12.5	83.8
1971	66.6	728.9	9.1	11.7	85.6
1972	72.6	813.6	8.9	11.6	94.4
1973	79.2	928.4	8.5	12.0	111.0
1974	87.4	1067.6	8.2	12.9	137.9
1975	96.5	1185.4	8.1	13.0	154.1
1976	106.5	1324.5	8.0	13.0	172.2
1977	118.7	1550.4	7.7	13.0	201.9
1978	134.9	1850.4	7.3	13.6	250.9
1979	153.3	2169.7	7.1	14.8	320.7
1980	174.7	2446.2	7.1	16.7	407.5
1981	196.7	2707.2	7.3	18.7	506.3
1982	214.3	2825.0	7.6	19.1	540.7
1983	230.0	2933.4	7.8	16.6	486.1
1984	248.2	3152.7	7.9	16.4	516.4
1985	268.0	3326.9	8.1	15.6	517.3
1986	288.6	3553.7	8.1	14.2	503.6
1987	311.7	3891.5	8.0	13.3	518.0
1988	333.9	4202.9	7.9	13.2	554.4
1989	356.4	4490.2	7.9	14.1	634.5

Source: U.S. Bureau of Economic Analysis, 1991, unpublished data behind space rent calculation; Board of Governors of the Federal Reserve System, 1991, "Balance Sheets for the U.S. Economy, 1945-1990," C.9 Release (April), pp. 19-24; Council of Economic Advisers, 1991, *Economic Report of the President*, Table B-71; Guttentag, Jack M. and Morris Beck, 1970, *New Series on Home Mortgage Yields Since 1951*, Appendix Table 3-2.

Appendix Table 2

*Treatment of Consumer Durable Goods: NIPA and Adjusted, 1950 to 1989*

Year	NIPA Purchases of Consumer Durable Goods	Value of Durables Stock	NIPA Purchases As Percent of Durables Stock	Opportunity Cost of Funds	Implicit Rents on Durables
1950	30.8	97.4	31.6	14.5	14.1
1951	29.9	116.3	25.7	14.9	17.4
1952	29.3	129.2	22.7	15.1	19.5
1953	32.7	138.5	23.6	15.5	21.4
1954	32.1	145.0	22.1	14.6	21.2
1955	38.9	152.2	25.6	15.5	23.5
1956	38.2	164.6	23.2	16.2	26.6
1957	39.7	174.0	22.8	17.0	29.5
1958	37.2	179.1	20.8	15.8	28.4
1959	42.8	185.5	23.1	17.5	32.4
1960	43.5	191.3	22.7	17.0	32.5
1961	41.9	195.2	21.5	16.5	32.3
1962	47.0	199.6	23.6	16.5	32.9
1963	51.8	207.6	24.9	16.7	34.6
1964	56.8	218.3	26.0	17.0	37.2
1965	63.5	229.9	27.6	17.2	39.6
1966	68.5	247.3	27.7	18.2	45.1
1967	70.6	270.8	26.1	18.0	48.8
1968	81.0	298.7	27.1	18.7	55.8
1969	86.2	329.0	26.2	20.0	65.9
1970	85.7	358.1	23.9	20.3	72.7
1971	97.6	383.1	25.5	18.7	71.4
1972	111.2	409.2	27.2	18.7	76.6
1973	124.7	447.6	27.9	20.0	89.3
1974	123.8	507.3	24.4	20.8	105.6
1975	135.4	569.9	23.8	20.5	116.8
1976	161.5	624.2	25.9	19.8	123.4
1977	184.5	689.1	26.8	19.7	135.7
1978	205.6	773.0	26.6	21.3	164.6
1979	219.0	872.9	25.1	22.7	198.2
1980	219.3	972.6	22.5	24.6	238.8
1981	239.9	1058.2	22.7	27.4	290.4
1982	252.7	1119.1	22.6	25.9	290.1
1983	289.1	1174.3	24.6	23.5	275.4
1984	335.5	1249.6	26.9	24.9	311.0
1985	372.2	1345.1	27.7	22.6	304.5
1986	406.0	1465.9	27.7	20.1	294.1
1987	423.4	1598.9	26.5	20.7	330.7
1988	457.5	1734.7	26.4	21.3	368.8
1989	474.6	1869.7	25.4	21.6	402.9

Source: U.S. Bureau of Economic Analysis, 1986, *The National Income and Product Accounts of the United States, 1929-1982*, Table 2.2; U.S. Bureau of Economic Analysis, 1986 to 1990, "The National Income and Product Accounts: Revised Estimates," in *Survey of Current Business* (July), Table 2.2; Board of Governors of the Federal Reserve System, 1991, "Balance Sheets for the U.S. Economy, 1945-1990," C.9 Release (April), pp. 19-24; Council of Economic Advisers, 1991, *Economic Report of the President*, Table B-71; Board of Governors of the Federal Reserve System, 1976, *Banking and Monetary Statistics, 1941-1970*, Table 12.7.

# *Explaining the Postwar Pattern of Personal Saving*

**P**ersonal saving as a percentage of disposable income, the only official saving rate published by the U.S. Bureau of Economic Analysis, declined sharply during the 1980s. This decline has been viewed as particularly troubling, because it occurred during a time when business and government saving also plummeted and in the wake of numerous supply-side efforts to increase personal saving.

Economists spent most of the decade trying to explain the decline in personal and national saving. They have supplied a host of possibilities, including the impact of capital gains, a decline in the need for retirement saving, and the impact of slower income growth, among others. None of these candidates, however, provides a convincing explanation for the apparent changing pattern of personal thrift. Two potential culprits have received considerably less attention and most probably have played major roles in the decline in the reported personal saving rate: the appreciation of owner-occupied housing in the late 1960s and 1970s, and the funding limitations faced by private pension plans in the 1980s.

The late 1960s and the 1970s witnessed a spectacular housing boom as the members of the baby-boom generation started to establish their own households. This housing boom affected the reported saving rate during the 1980s in two ways. The first was a behavioral response to the run-up in housing prices, as individuals reduced their saving out of current income in the wake of unexpected capital gains on their homes. The second was an accounting effect, as the national accounts seriously understated the return to housing following the boom. The understatement reduced measured income and saving during the late 1970s and the 1980s. The housing story highlights the fact that a significant increase in asset prices, even if not recorded directly in the reported saving statistic, has an enormous impact on saving.

The second culprit is the funding behavior of private pension plans. The pension component of personal saving, as measured by employer contributions to their company plans, dropped dramatically during the

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1980s. This drop stemmed from the rapid run-up in stock prices that brought many plan sponsors squarely up against the Internal Revenue Code's full-funding limitation, which restricts tax-deductible contributions once plan sponsors have reached designated funding levels.

This article presents an empirical analysis of the extent to which the housing boom and pension funding provisions determined the pattern of saving in the postwar period. Part I lays out the trends in saving over the postwar period. Parts II and III explore the relationship between the housing boom and personal saving, looking first at the behavioral response and then at the accounting issue. Part IV discusses the role that pension funding has played in determining the pattern of personal saving. Part V summarizes the regression results. The implications and conclusions are discussed in Part VI.

### I. Trends in Personal Saving

Personal saving as a percentage of disposable income dropped in the late 1980s (Table 1). The highly publicized saving rate fell from nearly 10 percent in the early 1970s to a low of 2.7 percent in 1987; in 1990 saving equalled 4.6 percent of disposable income. Roughly 1 percentage point of the decline can be attributed to the drop in employer contributions to private pension plans, but the remainder comes from nonpension saving.

The drop in personal saving is puzzling, given the long list of factors that should have encouraged

higher saving by individuals. The 1980s witnessed the introduction of numerous saving incentives, such as individual retirement accounts (IRAs) and the expansion of 401(k) and 403(b) plans, that allowed individuals to make pre-tax contributions and defer interest on earnings until withdrawal. The 1980s was also a decade during which the sudden collapse of rapid inflation produced very high real rates of return; most observers would expect such high returns to stimulate saving. Finally, demographics would also have led a forecaster to predict higher private saving during the 1980s; the reduction in the number of young exceeded the increase in the elderly, both of whom are viewed as small savers. These small savers represented a declining share of the overall population, leading one to expect increased saving in the aggregate.

Moreover, the decline in personal saving occurred within the context of an even more dramatic drop in business and government saving. From the 1950s through the 1970s, business saving averaged 3.5 percent of national income, and government saving hovered around minus 0.5 percent. In the 1980s, changes in business and government contributed importantly to the collapse of the national saving rate. The federal government's deficit rose from 1 percent to 3 percent of national income in the wake of massive tax cuts and continued spending on defense. Business saving fell from 3 percent to 1 percent of income, as financial corporations suffered substantial losses leading to negative undistributed corporate profits after 1985, and nonfinancial corporations paid out increasing shares of their after-tax income.

Table 1

#### *Personal Saving as a Percentage of Disposable Income, 1950 to 1990*

Item	1950-59	1960-69	1970-74	1975-79	1980-84	1985-90
Personal Saving	6.8	6.8	8.6	7.4	6.5	4.2
Private Pensions	1.2	1.6	2.1	2.7	2.5	1.5
Non-Pension	5.6	5.2	6.5	4.6	4.1	2.7
Addendum: Saving as a Percentage of Net National Product						
Total	8.5	8.0	8.1	8.1	4.1	1.4
Personal	5.2	5.1	6.6	5.7	5.2	3.3
Business	3.6	3.2	2.0	3.6	1.8	.8
Government	-.2	-.3	-.5	-1.2	-2.9	-2.8

Note: Items may not sum to totals because of rounding.

Source: U.S. Bureau of Economic Analysis, 1986, *The National Income and Product Accounts of the United States, 1929-82*, Tables 1.8, 2.1, 5.1, and 6.13; U.S. Bureau of Economic Analysis, 1986-1990, "National Income and Product Accounts: Revised Estimates," *Survey of Current Business* (July), Tables 1.9, 2.1, 5.1, and 6.13.

Some have argued that individuals take account of the behavior of business and government when making their own saving decisions and compensate for changes in those sectors by adjusting their own saving rate. If valid, this argument provides further support for the expectation of an increase in the personal saving rate, rather than a decrease, during the 1980s. That is, individuals would have been expected to compensate for the low level of business saving by increasing their own direct saving. Similarly, to the extent that taxpayers perceived that the large federal deficits would impose greater tax burdens on their children, they might have increased their saving to produce offsetting bequests.

Despite the long list of reasons suggesting that personal saving should have increased in the 1980s, it dropped sharply. The question is: "Why?" The next three sections explore the role played by the housing boom and the mechanics of pension funding.

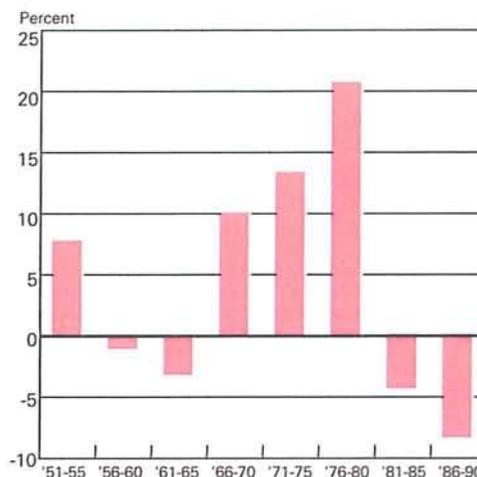
## II. The Housing Boom and Personal Saving: The Behavioral Response

A housing boom can have a powerful effect on saving, and the United States enjoyed a dramatic increase in the value of the housing stock during the late 1960s and the 1970s. Real capital gains on housing for the nation as a whole amounted to 10 percent of the housing stock in the late 1960s, increased to 13 percent of the stock in the early 1970s, and rose to 21 percent in the late 1970s (Figure 1). ("Real" means that all increases in value due simply to changes in the price level have been removed.) The late 1960s and the 1970s were an unusual period; housing values had changed little before the boom, and since the boom, housing prices have failed to keep pace with inflation. Such a dramatic swing in the value of an asset that accounts for 28 percent of the nation's net worth and that is widely held by all income groups in the population is bound to have a direct and important effect on personal saving.

On the behavioral side, the life-cycle model provides a very clear prediction that unexpected capital gains in housing will lead individuals, all else equal, to reduce their saving out of current income. The notion is that people want to maintain a steady stream of consumption over their lifetimes, and they can achieve that goal with less saving out of current income if they experience an appreciation in the value of assets they have already accumulated. The following simple model illustrates this point and explores

Figure 1

### Real Capital Gains on Housing as a Percent of Initial Stock



Source: Board of Governors of the Federal Reserve System (1991, pp. 19-24 and 61-66).

the size of the impact of capital gains on saving.

Suppose the population consists of individuals who expect to live exactly  $T$  years. People begin work at birth, earn  $E$  dollars of compensation per year while at work, and retire at age  $R$ . This leaves workers  $T - R$  years in retirement, during which time they earn no wages. Ignoring interest, an individual's lifetime income is

$$(1) \quad Y = RE,$$

or the product of years at work and earnings per year.

Workers wishing to avoid starvation during their retirement will save during their working years. According to the life-cycle model, they will save and dissave exactly enough so their annual consumption,  $C$ , is identical in each year of their life, including periods of work and retirement:

$$(2) \quad C = (RE)/T.$$

This consumption pattern implies that annual savings while at work will be

$$(3) \quad S = E - [(RE)/T] = E(T - R)/T$$

Assume that people live exactly 50 years and

typically retire when they reach age 40 (that is,  $T = 50$  and  $R = 40$ ). Next assume that the individual receives a lump sum capital gain ( $G$ ) after 20 years of work. Income for the individual's remaining life becomes:

$$(4) \quad Y = (R - 20)E + G + 20[E(T - R)/T].$$

Consumption over the remainder of the lifetime is obtained by dividing equation (4) by the number of years of life left,  $T - 20$ , yielding:

$$(5) \quad C = \{(R - 20)E + G + 20[E(T - R)/T]\}/(T - 20).$$

Given that yearly saving is simply earnings minus yearly consumption and after separating the terms of equation (5), saving can be written as:

$$(6) \quad S = E - (R - 20)E/(T - 20) - G/(T - 20) - 20[E(T - R)/T]/(T - 20).$$

The impact of the capital gain on annual savings is determined by the partial derivative of saving with respect to  $G$ , thus:

$$(7) \quad \delta S/\delta G = -[1/(T - 20)].$$

Assuming that people live exactly 50 years and given the assumption of a lump sum gain in year 20, this equation implies that \$1 of capital gains will reduce annual saving by \$.03. If the gain occurred earlier in life, the reduction would be smaller; if the gain came later, the saving offset would be somewhat larger. The important point, however, is that an unexpected run-up in housing prices would reduce saving out of current income and the personal saving rate.

### III. The Housing Boom and Personal Saving: The Accounting Issue

On the accounting side, a run-up in house prices affects the reported saving statistic, because the National Income and Product Accounts (NIPA) severely understate the return to owner-occupied housing in the wake of a housing boom. To understand this point, it is necessary to take a brief look at the treatment of owner-occupied housing in the NIPA and the impact of this treatment for personal saving.

The NIPA consider the purchase of a house an investment that yields annual services to the occupants during their tenancy. To account for these services, homeowners are treated as if they rent their homes to themselves and net rental income for owner-occupied housing is a component of personal income. In other words, personal income is composed of wages and salaries, transfer payments,

interest and dividend income, proprietors' income, and net rental income of homeowners. Taxes are subtracted to yield disposable income. Thus,

$$(8) \quad Y^d = Y^o + Y^{int} + (SR - INTM - OHE) - TAX,$$

where  $Y^d$  is disposable income,  
 $Y^o$  is all other income excluding interest income and imputed income on housing,  
 $Y^{int}$  is interest income,  
 $SR$  is the imputed return earned by owner-occupants,  
 $INTM$  is mortgage interest expense,  
 $OHE$  is other expenses of owner-occupants, and  
 $TAX$  is personal tax and nontax payments.

The NIPA also allocate disposable income among its uses: consumption, interest paid to business on loans other than mortgages, and saving. Consumption includes both outlays for goods and services and imputed consumption of owner-occupied housing.

$$(9) \quad Y^d = C^o + SR^c + INTB + S,$$

where  $C^o$  is consumption excluding owner-occupied housing,  
 $SR^c$  is the imputed consumption of owner-occupied housing,  
 $INTB$  is interest payments to business, and  
 $S$  is personal saving.

Combining the sources and uses of disposable income to estimate saving implies that

$$(10) \quad S = (Y^o - TAX - C^o - OHE) + (Y^{int} - INTM - INTB) + (SR - SR^c).$$

House prices come into play through their impact on  $SR$  and  $SR^c$ . Mechanically, imputed housing consumption is an estimated space rent, which is derived from data on the owner-occupied housing stock and rents for comparably valued tenant-occupied units as reported in the decennial census. For years between the censuses, rents are revised according to the rent component of the consumer price index and the number of households in the Census Bureau's current population survey. The NIPA also assume that imputed housing consumption,  $SR^c$ , is equal to the return received by homeowners,  $SR$ .

This treatment of housing consumption and the return to owner-occupied housing is correct only if two assumptions hold: 1) the benefits of owning and renting a particular property are identical, so that market rents are an accurate gauge for the return to

owner-occupied housing, and 2) any premium associated with owning rather than renting can be attributed to consumption rather than saving.

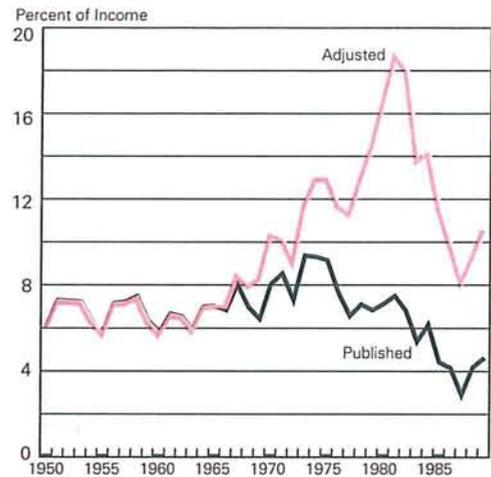
In fact, individuals are willing to pay a premium over market rents to own their home, and the reasons for that premium include both consumption and saving considerations. On the consumption side, owners can remodel the kitchen and paint the walls any color they want; they also gain a sense of pride and stability from owning their homes. On the saving or investment side, owners acquire the landlord's right to manage the property, his option to cancel the lease, and a hedge against rising rents. Because the features that accompany ownership are more valuable than those offered to renters, the market rent figure used by the NIPA understates housing consumption and the return to owner-occupied housing. (See Kopcke, Munnell, and Cook (1991) for a more complete discussion.)

A more accurate estimate of the return to owner-occupied housing would be derived from the value of the housing stock and the opportunity cost of funds, represented by the sum of the mortgage interest rate and the rate of depreciation on residences. The extent to which such a reestimation of space rents affects personal saving and the saving rate depends on how much of the premium is attributable to consumption and how much to investment. At one extreme, if the entire premium reflects the ability to paint the walls purple—and thus is attributable entirely to consumption—then the reestimation of space rents would have no impact on the dollar amount of personal saving, since both housing consumption,  $SR^c$ , and the return to housing,  $SR$ , would increase by the same amount (see equation (3) above). It would, however, lower the measured saving rate, since income, the denominator, would increase by the amount of the premium associated with ownership.

On the other hand, if the full premium is attributed to saving, the return on owner-occupied housing,  $SR$ , rises, consumption,  $SR^c$ , remains unchanged, and reported personal saving and the personal saving rate rise with the imputed space rent premium. The case for considering most of the premium as saving, as opposed to consumption, is compelling, particularly in the wake of the housing boom. Imputed net rental income became negative in the late 1970s, because individuals were willing to pay a substantial premium to own their homes in the wake of the housing boom. House prices (and rents) had increased nearly 45 percent in real terms between 1966 and 1979; the expectation was that prices (and

Figure 2

*Personal Saving Rates: Published and with Space Rent Adjustment, 1950 to 1989*



Source: U.S. Bureau of Economic Analysis (1986, Table 5.1) and (1986 to 1990, July, Table 5.1).

rents) would continue to rise. To avoid paying higher rents, people were willing to spend substantially more to own their residences. The NIPA recorded the tripling of homeowners' mortgage debt, but they did not record the higher implicit rents accruing to homeowners.

A more accurate measure of personal saving requires adjusting personal income to reflect the full return accruing to owner occupants; it also requires determining how much of that return is attributable to consumption and how much to investment. For the adjusted saving rate shown in Figure 2, it was assumed that the homeowner's full return was equal to the product of the housing stock and the opportunity cost of funds. This approach produced a substantially larger return than that reported in the NIPA. In allocating the difference between the calculated and the NIPA figures to consumption and investment, it was assumed that all the premium before the first signs of the housing boom in 1966, roughly 7 percent per year, could be viewed as consumption; after 1966, any premium in excess of 7 percent was attributable to investment.

The pattern of personal saving that emerges from

these calculations is very different from that revealed in the reported statistics. Personal saving surged during the late 1970s as a result of the higher return to housing that followed the dramatic run-up in housing prices. When the escalation in housing prices ceased and individuals no longer expected further real gains or rising rents, the return to owner-occupied housing regained more normal levels and saving dropped. But the saving rate appears to have dropped back to levels experienced in the 1950s and 1960s rather than to unprecedented lows. Therefore, it does not appear as if any fundamental shift has occurred in the nation's attitude toward thrift.

#### IV. Private Pension Plans and Personal Saving

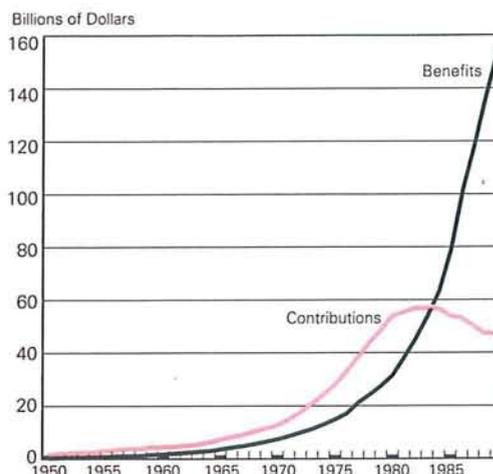
As discussed earlier, a second major factor affecting saving in the 1970s and the 1980s is the funding of the nation's defined-benefit pension plans. Employer contributions to pension plans are counted as part of personal income, so that, all else equal, an increase in pension contributions means greater personal income and higher personal saving. As shown in Figure 3, annual contributions to private pension plans grew from \$13 billion in 1970 to \$49 billion in 1979, and therefore were an important component of personal saving during the 1970s. In 1979, contributions suddenly leveled off and they have actually declined in nominal dollars over the 1980s.

The reasons for this dramatic shift in the pattern of pension contributions can be found in the laws governing defined benefit plans. The Employee Retirement Income Security Act of 1974 (ERISA) instituted provisions whereby sponsors of defined-benefit pension plans were required to put aside money to cover accruing benefit costs and to pay off existing unfunded liabilities over a 40-year period. Much of the higher level of personal saving in the late 1970s can be attributed to this push to fund private plans.

In the 1980s, enormous gains on corporate bonds and common stocks meant that many plan sponsors could satisfy ERISA's minimum funding requirements without making any further contributions. That is, sponsors of defined-benefit plans operate as target savers. They have promised specific benefits, for which they must accumulate specific assets; if they can satisfy their goals through capital gains, they can reduce their annual contributions to the pension fund.

Figure 3

#### Private Pension Contributions and Benefits, 1950 to 1989



Source: U.S. Bureau of Economic Analysis, (1986, Table 6.13) and (1986-90, July, Table 6.13).

The impact of the large capital gains on the minimum funding requirements alone cannot explain the dramatic falloff in pension contributions. ERISA has extensive averaging and amortizing provisions, so that a stock market boom would have produced a much slower change in contributions to meet minimum funding goals than actually occurred. The abruptness of the change appears to have been caused by the combination of higher returns and the Internal Revenue Code's full-funding limitation (incorporated as Title II of ERISA). This provision was designed to protect Treasury revenues by limiting the amount of tax-deductible contributions that can be made by sponsors of overfunded plans. Any plan assets in excess of the amount defined as full funding are considered surplus and must be applied as a full-funding credit against normal cost payments. The full-funding limitation makes it virtually impossible for firms to make any contributions to fully funded plans.

Prior to 1987, full funding was defined as assets in excess of accrued liability, calculated on the basis of an ongoing plan. In the 1987 Omnibus Budget Rec-

conciliation Act (OBRA), Congress tightened the limitation by (inappropriately) redefining full funding. The new law constrained pension assets to be no more than 150 percent of termination liability, which, in most cases, is a significantly smaller amount than ongoing accrued liability.

The full-funding provision, especially with the OBRA redefinition of full funding, makes pension contributions and thus personal saving very sensitive to the number of plans that are up against the funding ceiling. Moreover, the amounts of money that could be affected by the full-funding limitation are large, both absolutely and relative to total personal saving. For example, in 1989, with pension contributions of \$48 billion, personal saving amounted to \$172 billion or 4.6 percent of disposable income; if pension contributions had simply stayed at their 1979 levels in real terms, they would have amounted to \$81 billion, raising saving to \$205 billion or 5.5 percent of disposable income. If 1979 contributions had kept pace with private sector wages, they would have amounted to \$101 billion in 1989, raising personal saving to \$225 billion or 6.0 percent of disposable income.

The impact of the stock market boom on pension funding and the impact of the housing boom on personal saving are similar in that both reflect situations where changes in asset prices affect the allocation of current output. Thus, while the NIPA are designed to focus only on currently produced goods and services, both the measurement of this output and its allocation between consumption and saving depend crucially on the current and future value of assets.

### *V. Estimating the Impact of Housing and Pensions on Personal Saving*

This section attempts to determine whether the evidence is consistent with the hypothesis that the housing boom and pensions have played a major role in the pattern of saving in the postwar period. Two approaches are adopted. The first introduces independent variables and accounting adjustments to explain the reported NIPA saving and saving rate. The second adjusts the saving variables themselves to move towards a more accurate measure of saving and uses the independent variables to explain the adjusted pattern of saving. The two approaches yield very similar results.

For the NIPA saving measure, the basic equation was a simple saving function with additional varia-

bles to capture pension funding and accounting adjustments. That is,

$$(11) \quad S_t = \beta_0 + \beta_1 Y_t + \beta_2 NWH_{(t-1)} + \beta_3 NWO_{(t-1)} + \beta_4 RINT_t + \beta_5 PF_t + \beta_6 YSR_t + \beta_7 YDUR_t$$

where  $S$  is personal saving,  
 $Y$  is personal disposable income,  
 $NWH$  is owner-occupied housing net worth in the previous period,  
 $NWO$  is all other net worth in the previous period,  
 $RINT$  is real after-tax interest rate,  
 $PF$  is status of pension funding,  
 $YSR$  is an income adjustment for space rents, and  
 $YDUR$  is an income adjustment for consumer durables.

Income and wealth are the usual components of any saving equation based on the Ando-Modigliani life-cycle model. If households wish to distribute consumption evenly over their lifetimes, then previously accumulated assets will reduce the need to save out of current income to reach the intended target. The only modification here is separating net worth into housing and other components because of the contention that the housing boom had a significant impact on saving. The values for these variables and others included in the equations are summarized in Table 2.

The real after-tax interest rate earned on investments would be expected to have a positive impact on saving. Although the impact of such a return is theoretically ambiguous, creating both an income and a substitution effect, the consensus among economists is that the substitution effect dominates. Interestingly, the negative real after-tax rates during the 1970s and the positive rates in the late 1980s would have been expected, all else equal, to have produced a pattern of saving opposite to that actually observed.

Two measures of pension funding are used. The first is a statistic published by the Wyatt Company on the percentage of plans with 1,000 or more active participants that have assets greater than accrued liability. Here the relationship between pension funding status and saving should be negative; the more plans fully funded, the smaller will be employer contributions. The second measure attempts to turn the pension funding concept into a dollar figure by estimating the difference between the liabilities of defined benefit plans and pension assets held by

Table 2  
*Factors Affecting Personal Saving, 1982 Dollars per Capita, Selected Years, 1950 to 1989*

Year	Personal Saving	Personal Disposable Income	Wealth		Real Interest Rate After Tax	Pension Funding		Income Adjustments	
			Housing	Other		Percent of Plans Fully Funded	Funding Gap	Space Rent	Consumer Durables
1950	\$317	\$5,215	\$3,930	\$17,965	-6.2	15.0	\$2,349	\$23	\$66
1955	329	5,725	5,123	20,680	-.3	15.0	3,941	13	-196
1960	351	6,061	5,971	23,119	1.5	15.0	5,910	74	-225
1965	498	7,066	6,467	25,328	1.9	15.0	8,057	18	-328
1970	659	8,177	7,661	27,833	1.4	15.0	9,201	263	-11
1975	820	8,959	9,239	24,902	-1.9	17.0	9,348	452	67
1980	696	9,746	12,423	29,131	-1.0	31.0	5,615	1,183	339
1985	471	10,655	12,377	32,163	1.3	78.0	1,022	936	-169
1989	533	11,553	13,689	36,118	2.8	82.0	1,029	862	-142

Source: Personal saving and disposable income taken from U.S. Bureau of Economic Analysis, 1986, *The National Income and Product Accounts of the United States, 1929-82*, Tables 2.1 and 5.1, and U.S. Bureau of Economic Analysis, 1986-1990, "National Income and Product Accounts: Revised Estimates," *Survey of Current Business* (July), Tables 2.1 and 5.1. Wealth information from Board of Governors of the Federal Reserve System, 1991, "Balance Sheets for the U.S. Economy, 1945-1990," (April) pp. 19-24. Real after-tax interest rate calculated as  $(\text{one-year T-Bill rate} * (1 - \text{average marginal tax rate})) - \text{average inflation rate over the previous three years}$ . The pension funding variables are based on Wyatt Co. data from their *Survey of Actuarial Assumptions and Funding* on the percent of defined benefit plans with assets greater than accrued liabilities. The gap variable uses this information (FF), along with data on pension fund assets (A) taken from the Federal Reserve's "Balance Sheets" and the percentage of assets in defined benefit plans (DB) from EBRI (1990) to calculate the difference between accrued liabilities and assets using the following formula:  $\text{GAP} = ((A * \text{DB})/\text{FF}) - (A * \text{DB}) = (A * \text{DB})(1/\text{FF} - 1)$ . The income adjustments are calculated as described in Kopcke, Munnell and Cook (1991).

these plans. The relationship between this pension funding "gap" and saving should be positive.

The space rent adjustment is the premium, discussed earlier, that people are willing to pay to own rather than rent a residence. It is the difference between the return to owner-occupied housing reported in the NIPA and the return calculated by applying the opportunity cost of funds to the housing stock. As evident in Table 2, this premium became very large in the wake of the housing boom and has been declining steadily over the 1980s.

A second accounting adjustment is also included, this one pertaining to the treatment of consumer durables. Currently the NIPA treat expenditures on durables as consumption; in fact, durables are very similar to owner-occupied housing in that they provide a stream of services over several years. Thus, on the consumption side, the adjustment involves subtracting outlays for consumer durables from consumption and adding back in an estimate of the value of consumer services. On the income side, the adjustment involves estimating the return to consumer durables by subtracting from the value of consumption services the interest payments used to finance the purchase of the consumer durables and depreciation. This step eliminates the current double-

counting involved in including as outlays both the expenditure for the consumer durables and the interest payment to finance that expenditure. The variable included in the equation is the income adjustment.

Two variants of this equation were estimated. In the first, all variables were converted to 1982 dollars, using the implicit price deflator for personal consumption expenditures, and expressed on a per capita basis; the real interest rate was multiplied by real net worth to convert it into a dollar measure, and the pension funding gap was included, that is, the difference between accrued liabilities and assets in defined benefit plans. In the second variant, all variables were expressed as rates; saving and other dollar variables were divided by disposable income, while the full-funding measure and the real interest rate remained as rates.

The results of both equations explaining NIPA saving confirm the importance of the housing boom and pension funding on the saving pattern (Table 3). Housing enters in two places. The first is the stock of owner-occupied housing, which has a statistically significant negative coefficient indicating that for each dollar of unexpected increase in the value of housing, individuals reduce their saving out of current income by 9 cents. The coefficient on housing is three times

larger than that on other forms of wealth, reflecting the fact that housing is the major asset holding for most families.

Interpreting the coefficient is a little tricky. If all the gains in the per capita stock of housing simply reflected earlier saving and more investment in housing, then one would not expect a major shift in saving patterns. On the other hand, if increases in the housing stock resulted from unanticipated gains, then households would be expected to revamp their saving plans. Table 4 breaks down the change in the housing stock into investment and capital gains, revealing a sudden increase in the real value of housing beginning in 1966. Although it is beyond the scope of this paper, the housing boom appears to coincide with the coming-of-age of the baby-boom

generation. It seems reasonable to assume that the real increase of roughly 3 percent per year for the 14 years from 1966 to 1979 caught households by surprise and caused them to reassess their saving needs. If so, a 44 percent increase in the real value of housing with initial per capita holdings of \$7,000 produces an unexpected gain over the entire period of \$3,080. Applying the coefficient of 0.09 would imply that individuals saved \$277 less annually per capita because of the 1966–79 housing boom.

The second place that housing enters the equation is the income adjustment for space rents. This variable is included because the NIPA understate the return to homeownership. The coefficient confirms that if the premium that homeowners were willing to pay were included in income, saving would have

Table 3  
*Regression Results: Explaining Personal Saving, 1950 to 1989*

Variable	NIPA Saving		Adjusted Saving		NIPA Saving As a Percent of Disposable Income 1950–81
	Per Capita (1982 Dollars)	As a Percent of Disposable Income	Per Capita (1982 Dollars)	As a Percent of Adjusted Income	
Disposable Income	.17 (5.0)	22.33 (6.5)	.37 (10.3)	.42 (11.3)	23.93 (5.7)
Income Adjustments					
Housing Space Rent	.41 (4.1)	.35 (3.0)	.94 (8.8)	1.02 (7.9)	.26 (.86)
Consumer Durables	.07 (.8)	-.05 (.6)	.98 (10.2)	.88 (8.6)	-.02 (.15)
Net Worth: Housing	-.09 (3.6)	-.08 (3.0)	-.15 (5.4)	-.15 (5.1)	-.08 (2.1)
Net Worth: Other	-.03 (3.1)	-.02 (2.5)	-.03 (3.9)	-.04 (6.1)	-.03 (2.6)
Pension Funding <sup>a</sup>	.03 (8.4)	-.06 (8.6)	.01 (3.5)	-.02 (3.0)	-.06 (.7)
Real Interest Rate	.04 (2.2)	.23 (2.9)	.02 (1.1)	.19 (2.6)	.28 (2.8)
Constant	275.0 (3.2)	-5.7 (.1)	-49.4 (.5)	—	-7.2 (.1)
$\bar{R}^2$	.88	.77	.99	.96	.47
DW	1.7	1.5	1.8	1.6	1.5
SE	52.7	.7	55.3	.7	.7
Mean of Dependent Variable	531	6.7	1192	13.5	7.2

<sup>a</sup>Pension funding is measured first as the dollar gap between accrued liabilities and assets in defined benefit plans and second as the percent of large plans with assets in excess of accrued liabilities. This explains the different coefficients in equations 1 and 3, on the one hand, and 2, 4, and 5 on the other.

Source: Authors' calculations.

Table 4  
*Percent Change in Real Value of Housing Stock due to Net Investment and to Capital Gains, Selected Periods, 1951 to 1990*

Years	Percent Change in Housing Stock	Source of Change	
		Net Housing Investment (Percentage Points)	Capital Gains
1951-55	41.3	33.5	7.7
1956-60	22.5	23.5	-9
1961-65	13.6	16.6	-3.0
1966-70	22.7	13.0	9.8
1971-75	28.4	15.1	13.3
1976-80	40.0	19.3	20.6
1981-85	6.6	10.9	-4.2
1986-90	8.9	17.1	-8.3

Source: Authors' calculations based on Board of Governors of the Federal Reserve System, 1991, "Balance Sheets for the U.S. Economy 1945-1990," C.9 Release (April), pp. 19-24, 61-66.

been considerably higher. Specifically, in the early 1980s, per capita income appears to have been understated by roughly \$1,200; applying the coefficient of 0.41 to this amount suggests that personal saving was understated by \$490. In other words, the housing boom not only directly reduced saving out of disposable income through the life-cycle behavioral response, but also resulted in a very large understatement of true saving because of the accounting problems.

Pension funding also appears to have had a substantial effect on NIPA personal saving. The enormous unfunded pension liability in the early 1970s combined with the passage of ERISA produced rapid growth in employer contributions to private pension plans. Then, in the wake of the stock market boom in the early 1980s, the funding gap, which had amounted to \$5,615 per capita in 1980, declined to \$1,022 by 1985; a coefficient of 0.03 on this variable suggests that the drop could have reduced per capita saving by roughly \$138.

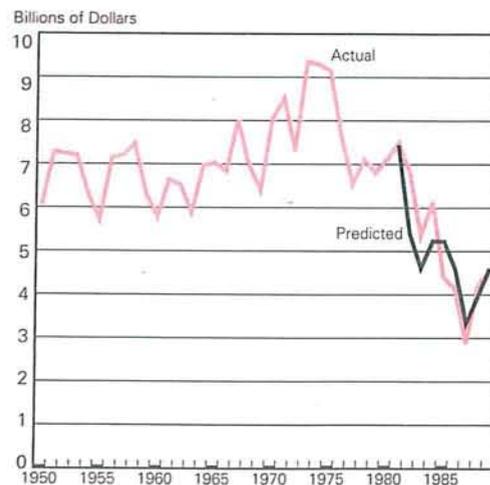
The second approach to the empirical exercise was to redefine both saving and income and reestimate the equations. That is, saving was augmented to include a substantial portion of the premium associated with homeownership and expenditures for consumer durables. Once again, the income adjustments

were included as explanatory variables, but this time the expanded income measure was used as the denominator in the equation for the saving rate. The equations for the adjusted saving measures prompt two major observations. First, the independent variables provide a better fit for the adjusted than for the NIPA saving measure; in the per capita equation, the  $\bar{R}^2$  rises from 0.88 to 0.99, and in the saving rate equation it goes from 0.77 to 0.96. Second, the results in terms of the sign, size, and significance of the coefficients are consistent across the two sets of equations. In other words, the equations for the adjusted measure confirm the important role for the housing boom and for pensions in determining the pattern of personal saving.

The final exercise was to determine the stability of the relationship between saving and the explanatory variables over time. For this purpose, the equation for the NIPA saving rate was estimated for the period 1950 to 1981 and the results were used to predict the saving rate for the years 1982 through 1989. The equation is presented in the last column of Table 3, and actual and projected saving rates are presented in Figure 4. Clearly the forces were already

Figure 4

*Actual and Predicted Personal Saving Rates, 1950 to 1989*



Source: U.S. Bureau of Economic Analysis, (1986, Table 5.1); and authors' calculations.

in place to produce dramatically lower measured NIPA saving in the 1980s than had been experienced in the 1970s. No fundamental shift in the nation's attitude toward thrift is required to explain the stunning decline in the official saving rate.

## *VI. Conclusions and Implications*

This paper has shown that the NIPA personal saving rate was affected substantially by the housing boom and by pension funding regulations. It also showed that, in the wake of the housing boom, the NIPA saving rate understated personal saving, since the national accounts failed to account for the premium associated with homeownership and thereby understated income and saving. The question is why these findings are important.

First, the saving rate per se is not a very interesting notion; rather, the crucial issue is investment—that is, the share of current output put aside today to enhance living standards tomorrow. Policymakers and economists sense that too little of current output is being invested for the future and have seized on two available statistics—the personal saving rate and the budget deficit—to support their position. The serious understatement of income and saving in the wake of the 1966–79 housing boom suggests that the personal saving rate cannot be used as a measure of society's desire or efforts to defer consumption.

Second, concern about the rate of national investment, combined with the assumed link between

investment and the personal saving rate, has created renewed enthusiasm for incentives to increase individual saving. The reported decline in the personal saving rate during the 1980s is used to document the need to enhance the return received by individuals for deferring consumption. The evidence presented above raises two questions about this line of reasoning. First, the saving rate during the 1980s was mismeasured; income and saving were understated because the return to owner-occupied housing was understated. A more appropriate measure of saving shows the personal saving rate declining from the heights of the 1970s, but declining back to historical levels, not to all-time lows. Second, the NIPA rate as reported has been driven down by the housing boom and by the run-up in the stock market in combination with the Internal Revenue Code's full-funding limitation on employer contributions to private pension plans. The forces were already in place in 1981 to produce the decline in the reported saving rate experienced during the 1980s; the decline did not result from any fundamental shift in individuals' attitudes toward thrift. Thus, the case for new saving incentives is not compelling.

In short, the personal saving rate and movements in this rate reveal little about society's willingness to defer consumption and invest for the future. Since investment is the ultimate goal, policy initiatives would be much better served by directly encouraging productive investment rather than stimulating the elusive concept of personal saving.

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# *Cyclical Swing or Secular Slide? Why Have New England's Banks Been Losing Money?*

**I**n 1989 New England's banking industry incurred its first annual deficit since the Great Depression. It has been losing money ever since. By contrast, the rate of return to banking in the rest of the nation has hovered near its 1972-88 average (Figure 1).

New England's banks have been losing money in large part because the region's economy, especially its real estate industry, has contracted sharply. As a result, an increasing proportion of borrowers have defaulted or fallen behind on their payments. The rising incidence of problem loans has decreased interest receipts; compelled banks to expand loan loss reserves; forced them to raise interest rates on deposits in order to retain funds; and increased their outlays for lawyers, accountants, and consultants to help renegotiate bad loans, dispose of foreclosed property, and comply with regulatory orders.

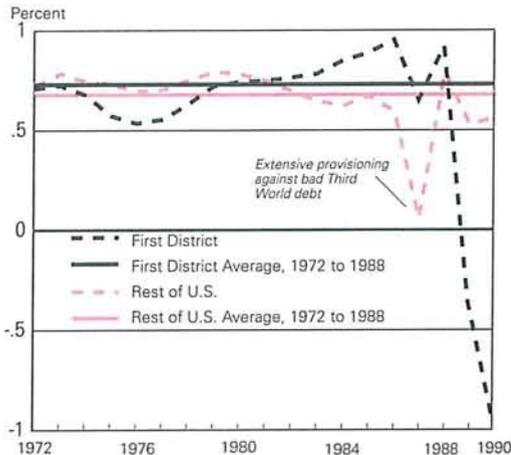
These expenses should decrease once the region's economy and real estate markets recover. Will they decrease sufficiently to restore the profitability of New England's banking industry to pre-recession levels? Some bankers, regulators, and consultants—the "cyclical swingers"—believe that they will. Others—the "secular sliders"—disagree. Although the secular sliders acknowledge that a shrinking economy and bad real estate loans are important causes of the region's banking woes, they also blame them partially on chronic imbalances in its banking markets. Deregulation, interest rate volatility, and changes in the technology of providing financial services have diminished the demand for traditional banking products and increased the competitiveness of banking. According to the secular sliders, the nation's banks as a whole have had difficulty adjusting to these changes. As a result, the supply of economic resources allocated to banking has become excessive relative to the industry's expected rate of return. Some secular sliders consider the degree of "overbanking," as this imbalance is often called, to be especially severe in New England. They advocate intraregional consolidation of large banking organizations in order to reduce the region's

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*Economist, Federal Reserve Bank of Boston. Mitchell Fournier and Lesley Eydenberg provided valuable research assistance.*

Figure 1 *Return on Average Assets (ROA), First District and the Rest of the United States, All Commercial Banks, 1972 to 1990*



Source: Federal Deposit Insurance Corporation, *FDIC Reports on Condition and Income*; author's calculations.

excess banking capacity and to enhance banks' operational efficiency.

Are the secular sliders correct in asserting that secular factors have depressed the profitability of the nation's banking industry? If so, have these factors depressed the profitability of New England banking to an unusual degree? While addressing both questions, this study focuses on the second: the extent to which secular factors have exerted an especially large effect on the profitability of the region's banks. In evaluating this issue, the study estimates the "normal" rate of return—the rate of return that a bank would have earned given a "normal" incidence of problem loans—for large banks in both the region and the rest of the nation. The study finds no convincing evidence that secular factors have exerted a significant influence on the profitability of banking either in New England or in the nation as a whole.

Nevertheless, the sooner the depressing effect of bad loans on the profitability of New England's banks is eliminated the better. The region's banks need to accumulate sufficient capital to permit them to write off their bad loans, so that they can resume their operations unencumbered by extraordinary expenses.

## I. The Secular Sliders' Case

As alluded to in the introduction, the structure, technology, and regulatory environment of the U.S. banking industry have changed over the past 20 years in ways that have increased its cost of funds and decreased demand for traditional banking services. According to the secular sliders, the industry has failed to contract sufficiently in response to these changes, resulting in growing excess capacity and declining profitability.

### *Secular Pressures on U.S. Banks*

Competition between commercial banks and other financial institutions has intensified dramatically over the past two decades. Advances in computer technology have permitted the creation of money market mutual funds (MMMFs), which compete directly with banks for deposits but are subject to fewer regulatory restraints. The rapid rise in interest rates during the mid 1970s, in combination with interest rate ceilings imposed on banks, spurred the growth of these funds. Thrifts obtained authority to offer Negotiated Orders of Withdrawal (NOW) accounts over the course of the 1970s and early 1980s. The introduction of these interest-bearing, liquid accounts, along with the growth of MMMFs, broke commercial banks' monopoly on transactions balances. As interest rate ceilings were phased out, greater competition among banks as well as thrifts, MMMFs, and other nonbank financial institutions tended to raise banks' cost of funds.

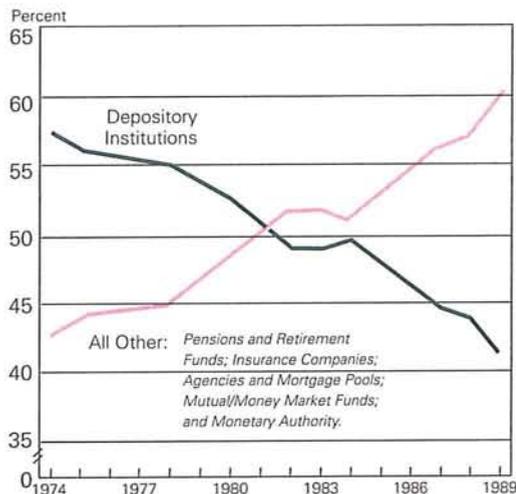
In addition, households now place a significant proportion of their savings into large, professionally managed funds, such as pension funds and thrift plans. New disclosure rules and advances in computer technology have enabled these funds to manage investments in publicly tradable securities. Large corporations are able to borrow directly from these funds. Consequently, neither households nor businesses need the intermediation of banks to the degree that they did 25 years ago (Davis 1986; Kaufman 1991; U.S. Department of the Treasury 1991).

### *Banks' Response to Changes in Their Environment*

In the eyes of the secular sliders, the nation's commercial banks have responded to these secular pressures in shortsighted ways that have aggravated their long-term problems. First, they have increased the proportion of their portfolios invested in commer-

Figure 2

*Financial Assets Held by Depository Institutions as a Percentage of Total Financial Sector, 1974 to 1989*



Source: U.S. Department of the Treasury (1991, p. 3).

cial real estate loans and construction and development loans. Because commercial real estate values in many parts of the nation have fallen in recent years, this shift in asset mix has raised the incidence of problem loans, which in turn has caused the average credit rating of banks to deteriorate. The deterioration has further dissuaded uninsured savers from channeling their investments through banks, further increased banks' propensity for risk-taking, further increased their baseline level of nonperforming loans, further eroded their long-run profitability, and so on.

Second, commercial banks have increased the number of their branches in order to meet the competition for funds posed by thrifts and MMMFs. In so doing, they have attempted to attract deposits by providing the advantages of access and convenience to potential customers. A bias in branching restrictions favoring commercial banks over thrifts has encouraged this competitive strategy (Kimball 1978b).

*Evidence of Excess Banking Capacity in the Nation as a Whole*

According to the secular sliders, the accumulation of excess capacity in the nation's banking indus-

try is evident in its declining profitability and shrinking share of the nation's financial assets (Figure 2). The average ROA of U.S. commercial banks outside New England fell gradually but steadily from the late 1970s through 1986, then sharply in 1987 (Figure 3). The secular sliders assert that the increase in bank profitability during the late 1980s (Figure 1) does not indicate that this long-term decline has been reversed. Rather, it reflects an improvement in the nation's agriculture and energy industries and the quality of banks' Third World debt. Weakness in agriculture and energy and a decline in the quality of loans to Third World countries accelerated the deterioration in bank profitability during the middle of the decade. (Bank profitability dropped precipitously in 1987 because many large banks provisioned heavily against their bad Third World debt in that year.)

New England has more commercial bank and thrift offices per capita than the nation as a whole (Figure 4). Some secular sliders conclude from this fact that the region's chronic excess banking capacity is especially severe and is depressing its banks' profitability relative to that of its peers nationwide.<sup>1</sup>

*II. Flaws in the Secular Slide Theory*

The evidence cited by the secular sliders to support their view of the banking industry in both the United States and New England is inconclusive. Other evidence suggests that the cyclical swingers' view is at least as plausible.

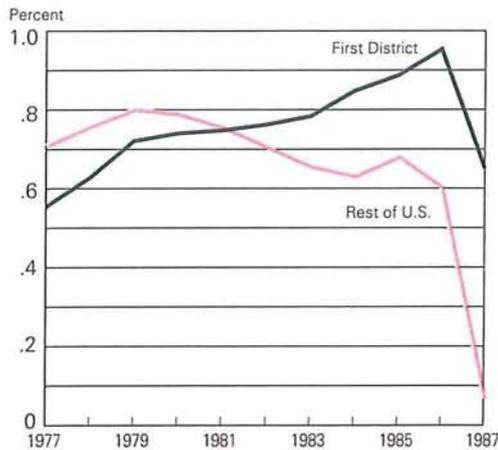
<sup>1</sup> As Ira Stepanian, Chairman and Chief Executive Officer of Bank of Boston, has put it (1991):

Quite simply, there are just too many banks . . . chasing too few customers in New England, paying too much for deposits, charging too little for loans, inevitably reducing spreads, profits, and capital.

Unless we find a way to reduce the number of banks [in New England] . . . we will continue to have too many unprofitable banks chasing relatively too few customers.

Figure 4 suggests that New England's high ratio of bank offices to population might be related to the sparseness of its population in certain states, especially Maine and Vermont. Both states, more sparsely populated than the nation as a whole, have consistently ranked among the top two in the region according to this ratio. Note, however, that Connecticut, which ranked third in the region according to this ratio in 1988, was the third most densely populated state in the nation in that year. Massachusetts, which accounts for almost one-half of New England's population, is also one of the most densely populated states in the country.

Figure 3 *Return on Average Assets (ROA), First District and the Rest of the United States, All Commercial Banks, 1977 to 1987*



Source: See Figure 1.

### *A Critique of the Secular Sliders' View of U.S. Banking*

The declining trend in U.S. bank profitability between 1979 and 1987 displayed in Figure 3 could have been caused by cyclical forces and temporary shocks rather than by secular factors. The 1981–82 recession was the largest economic contraction that the nation has experienced since the Great Depression. During the mid 1980s, the profitability of small and mid-sized banks was constrained by the high rate of default among farmers, due in turn to drought and low prices for agricultural products. Over the same period, and especially in 1987, large banks (mainly money center institutions) were forced to make large contributions to their loan loss reserves because of their exposure to deteriorating Third World debt.

Bennett (1986) attempted to estimate the independent impact of cyclical factors, secular factors, and transitory economic shocks on U.S. bank profitability between 1976 and 1984. Although he found a mild secular decline in the profitability of money center and large regional banks during this period, he concluded that "once business cycle effects are taken into account, the evidence does not point to any massive recent decline in bank earnings."

If the secular trend in bank profitability has continued to be mildly declining or even flat since 1984, Bennett's results may indirectly support the secular slide theory. If banks have responded to secular pressures by knowingly increasing the riskiness of their portfolios, their long-run profitability should have been trending upward because they have been receiving rising risk premiums.<sup>2</sup> A flat or declining secular trend in profitability would imply that other long-run factors have been exerting an offsetting, downward effect on bank profitability.

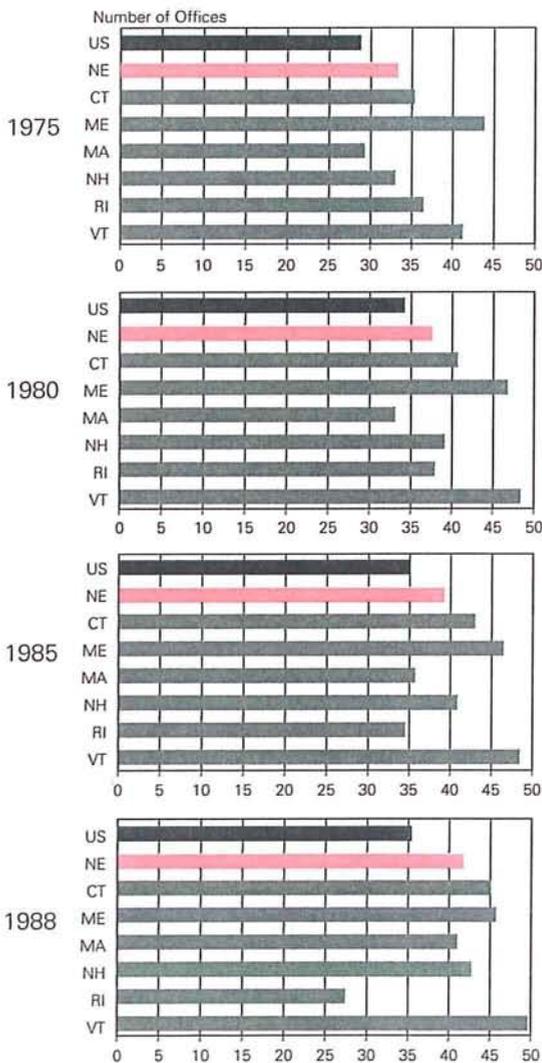
In hindsight, the recent volatility of real estate markets has taught bankers and regulators alike that construction and commercial real estate lending is, in fact, relatively risky. It is not clear, however, that bankers viewed such lending as especially risky when they greatly expanded the role of such loans in their portfolios. Before New England's recent real estate "bubble" burst, for example, the probability of a decline in real estate values was considered to be quite low. Unsecured commercial and industrial lending was perceived by many bankers to be at least as risky as construction and commercial real estate lending. Consequently, it is not clear that bankers have demanded increases in risk premiums on bank loans sufficient to compensate them for their higher risks. Therefore, one should not necessarily posit a recent upward secular trend in bank profitability. Nor should one conclude that the absence of such a trend indicates the presence of chronic excess capacity in the U.S. banking industry.

Even if bankers clearly foresaw the high risk of default associated with construction and commercial real estate lending, rapid expansion of such lending did not necessarily increase the riskiness of loan portfolios. While loans to firms in a volatile industry entail high credit risk, such loans can nonetheless reduce the riskiness of a portfolio if the industry's cycle is uncorrelated with the cycles of the other industries represented in the portfolio. By enhancing diversity, the loans to the volatile industry can reduce the long-run incidence of default for the portfolio as a whole. One could argue that banks diversified their portfolios by expanding their construction and commercial real estate lending, since construction and

<sup>2</sup> Greater riskiness implies higher average profitability only with the further widely held assumption that investors are risk-averse. In addition, as discussed later in the text, expanding the role of a loan category with a high risk of default does not necessarily increase the riskiness of one's portfolio if such expansion increases the portfolio's diversity.

Figure 4

*Total Bank Offices per 100,000 Persons, the New England States, New England, and United States*



Source: Federal Deposit Insurance Corporation; U.S. Bureau of the Census, *Statistical Abstract of the United States*; author's calculations.

real estate cycles generally differ from those of other industries.

The declining trend in the share of financial assets held by depository institutions shown in Figure 2 also does not necessarily reflect chronic excess capacity and declining long-term profitability. Boyd

and Graham (1991) point out that many financial assets held by nonbank institutions produce profits for commercial banks. For example, banks receive fees for providing backup lines of credit for issues of commercial paper and for clearing the checks written against money market mutual funds. More importantly, an increasing proportion of a commercial bank's activity is not reflected in its balance sheet and therefore is not reflected in its assets. Examples include the servicing of loans sold in secondary markets and the issuance of standby letters of credit, options, and forward contracts. Boyd and Graham further note (p. 9) that the share of the nation's gross national product accounted for by both banks and nonbank institutions has grown steadily during the postwar period. Rather than declining, U.S. banks, as well as their nonbank competitors, have been growing faster than the economy as a whole.

*Is Excess Banking Capacity Especially Large in New England?*

New England's large number of bank offices per capita is a long-standing regional characteristic not necessarily indicative of a high degree of excess capacity. Alternative measures of the volume of resources devoted to banking show little or no difference between New England and the rest of the nation. Furthermore, the assertion that the region's banking industry suffers from unusually intense competition is inconsistent with the wide net interest margins that New England's banks typically enjoyed before the onset of their current problems.

*New England's multiplicity of bank offices has historical roots.* New England has had a large number of commercial bank and thrift offices per capita since at least 1860. In that year the region had 15 bank offices per 100,000 people, three times greater than the comparable figure for the United States as a whole (Lamoreaux 1991). If this ratio is an indicator of overbanking, New England has been relatively overbanked for at least 130 years.

During the first half of the nineteenth century, industrial entrepreneurship was the most important reason for the region's multiplicity of banks. America's industrial revolution, as well as its political revolution, started in the region. Entrepreneurs needed capital to finance their mills and factories. In order to meet this need, each entrepreneurial group attempted to establish its own bank. Politically influential groups were often successful, since in those days bank charters were granted directly by state

legislatures (Lamoreaux 1986).

Throughout the nineteenth century, especially during its latter half, New England's class and ethnic divisions also stimulated the proliferation of banks. Commercial banks tended to serve the middle and upper classes and lent to large and mid-sized businesses. Savings banks were established to lend to small businesses and to encourage thrift among low-income urban workers by providing them with stable (albeit low) rates of return on passbook savings accounts.<sup>3</sup> In addition, each ethnic group tended to establish its own exclusive set of depository institutions.

Thus, the high ratio of bank offices to population in New England originated in its inhabitants' desire for exclusiveness and ready access to bank services. As will be discussed later in this section, the region's multiplicity of banks may also reflect an attempt by its commercial banks to compete with nonbank financial institutions by providing superior access and convenience rather than superior prices. Whatever the historical reasons for the region's high number of bank offices per capita, the secular sliders argue that this characteristic is an inefficient anachronism that is diminishing the profitability of the region's banks.

*What alternative measures of banking capacity show.* While New England may have a large number of bank offices per capita, its banks spend relatively little per office on "non-interest expenses" such as labor, office space, machinery and equipment, materials, and consultants. Its large number of bank offices per capita, therefore, may indicate that its banking resources are dispersed rather than excessive. A better gauge of the region's excess banking capacity is the ratio of non-interest expense to total assets ("overhead" ratio). Some bankers and consultants who maintain that the nation as a whole is overbanked cite as evidence the steadily rising overhead ratio of the U.S. banking industry since the mid 1970s (Table 1).

Until the mid 1980s, New England's banking industry had a consistently higher overhead ratio than its counterparts nationwide in all size groups. Starting in 1986, however, the region's overhead ratios began to fall both absolutely and relative to those of the rest of the nation. By 1988, the regional ratio was virtually identical to the national ratio for all size groups.<sup>4</sup> This convergence raises the possibility that, while high overhead costs may have depressed the relative rate of return to banking in New England during the 1970s and early 1980s, the regional industry may have significantly narrowed or even eliminated this disadvantage between 1985 and 1988.

The decline in New England's overhead ratio, in both absolute and relative terms, may have had nothing to do with reduction in excess capacity or enhancement of operational efficiency. Instead it could have reflected an increased emphasis among banks outside of New England on nontraditional, fee-based activities such as fiduciary management, data processing, currency trading, and financial consulting. When banks devote labor, capital, and materials to such activities, they generate income but do not create financial assets. By contrast, financial intermediation generates both income and financial assets. Consequently, other things equal, one would expect a bank increasing its reliance on nontraditional activities simultaneously to increase its ratio of overhead to total assets.<sup>5</sup>

In fact, banks outside New England did increase their reliance on nontraditional activities between 1985 and 1988. Large banks outside the region raised their ratio of gross non-interest income to gross

<sup>3</sup> Welfling (1968, pp. 3-10). Boston's Provident Institution for Savings, still in operation today, was the first savings bank in the nation to receive a charter, in 1816. To this day, New England's thrifts rank among the most commercially active in the country. In 1987 thrifts accounted for 45 percent of the assets owned by commercial bank and thrift institutions in the region, compared to 34 percent for the nation as a whole. Moreover, in that year, 71 percent of New England's thrifts were savings banks, as opposed to savings and loan associations (U.S. League of Savings Institutions 1988, p. 47). Savings banks have more latitude than savings and loans in the types of loans they can offer and the types of securities they can purchase (Teck 1968). In other regions of the country, with the exception of the mid-Atlantic states, savings banks play little role in the thrift industry.

State regulatory policy promoted the competitiveness of thrifts within the region. The region's state governments were among the first to give thrifts authority to offer NOW accounts. Massachusetts became the first state to do so, in 1972. As late as 1978, New England's depository institutions were the only ones in the nation with the authority to offer NOWs. Not until the passage of the Depository Institutions Deregulation and Monetary Control Act of 1980 were depositories in all other states similarly empowered. See Paulus (1975) and Kimball (1978a) for analyses of the impact of the authorization of NOW accounts on the profitability of commercial banks in New England.

<sup>4</sup> The drop in the overhead ratio of the region's small banks from 1987 to 1988 was precipitous and without precedent between 1976 and 1990 (Table 1). The fact that within this size group the region's overhead ratio was lower than that of the rest of the U.S. in 1988 therefore appears to have been an anomaly, not an indication of a sharp reduction in excess capacity or a dramatic improvement in operating efficiency.

New England's small banks accounted for only 1 percent of the region's total bank assets in 1988. The region's large and medium-sized banks accounted for 90 percent and 9 percent, respectively.

<sup>5</sup> See First Manhattan Consulting Group (1987) for further discussion of the impact of product mix on measures of operational efficiency.

Table 1

*Overhead Ratio or Non-Interest Expense as a Percentage of Total Assets of Commercial Banks, by Size Group, First District versus the Rest of the United States, 1976 to 1990*

Year	Large Banks		Medium Banks		Small Banks	
	First District	Rest of United States <sup>a</sup>	First District	Rest of United States	First District	Rest of United States
1976	2.94	2.38	3.96	2.86	3.74	2.73
1977	2.89	2.39	3.83	2.83	3.63	2.71
1978	3.01	2.44	3.84	2.85	3.61	2.79
1979	3.04	2.48	3.98	2.97	3.49	2.88
1980	3.19	2.58	4.03	3.05	3.65	3.01
1981	3.47	2.73	4.26	3.16	3.89	3.09
1982	3.72	2.89	4.40	3.24	4.08	3.19
1983	3.61	2.96	3.79	3.16	3.93	3.17
1984	3.73	3.10	3.64	3.17	3.77	3.24
1985	3.81	3.22	3.30	3.21	4.87	3.36
1986	3.52	3.23	3.24	3.22	4.35	3.37
1987	3.47	3.34	3.16	3.20	4.65	3.38
1988	3.29	3.28	3.19	3.22	3.21	3.35
1989	3.37	3.31	3.38	3.28	4.12	3.36
1990	3.96	3.39	3.68	3.22	5.23	3.41

Note: Large = Banks with total assets greater than \$300 million.

Medium = Banks with total assets greater than \$50 million but less than or equal to \$300 million.

Small = Banks with total assets less than or equal to \$50 million.

<sup>a</sup>Excludes money center banks for purposes of comparability.

Source: Federal Deposit Insurance Corporation, *Reports on Condition and Income*. Data for 1976 through 1983 are estimates based on source data and author's calculations. Data for other years are reported in the source.

interest income from 0.143 to 0.185. The comparable ratio for New England's large banks remained constant at 0.160. The real estate boom during this three-year period induced the region's banks to expand their lending activity much more rapidly than their counterparts in the rest of the country. As a result, growth in their interest income kept pace with growth in their non-interest income.

One way of avoiding the bias resulting from differences among regions in product mix is to compare New England's banks with their counterparts nationwide in terms of their ratio of overhead to income instead of assets. For this calculation, income should include net interest income and non-interest receipts in order to exclude one-time gains and losses and items whose value is heavily influenced by the discretion of accountants and regulators, such as provisioning.<sup>6</sup> The resulting "adjusted" overhead ratio answers the following question: how much does a bank spend on overhead in order to generate a dollar of net interest income or non-interest receipts?

The results using the adjusted overhead ratio (Table 2) are similar to those using the unadjusted

ratio. From the mid 1970s to the mid 1980s, New England's banking industry had a much higher adjusted ratio than its peers in the rest of the nation in all size groups. These differences narrowed rapidly between 1984 and 1987. In 1987 the adjusted ratio for the region's large banks was actually lower than that of its peers in the rest of the nation. The same was true for the region's medium-sized banks from 1986 through 1988.

<sup>6</sup> One important item not included in the denominator of the adjusted overhead ratio is interest payments on "performing nonperforming" loans. Although regulators classify such a loan as nonperforming, the borrower is still able to pay some interest on a current basis. These payments are recorded as reductions in principal outstanding rather than interest receipts on banks' income statements. Consequently, data on these payments are not readily available.

The incidence of "performing nonperforming" loans was higher in New England than in the rest of the nation during the latter half of the 1980s. Consequently, the omission of payments on such loans from the denominator of the adjusted overhead ratio biases upward the adjusted overhead ratio of New England's banks more than that of banks in the rest of the nation. The elimination of the gap between the regional and national adjusted ratios between 1985 and 1988, despite this bias, further weakens the secular sliders' case.

Table 2  
*Adjusted Overhead Ratio,<sup>a</sup> First District versus the Rest of the United States, Commercial Banks, by Size Group, 1976 to 1990*

	Large Banks		Medium Banks		Small Banks	
	First District	Rest of United States <sup>b</sup>	First District	Rest of United States	First District	Rest of United States
1976	0.708	0.669	0.788	0.701	0.794	0.681
1977	0.731	0.675	0.776	0.686	0.781	0.669
1978	0.717	0.658	0.739	0.657	0.736	0.642
1979	0.689	0.655	0.706	0.640	0.699	0.621
1980	0.708	0.667	0.729	0.647	0.702	0.621
1981	0.746	0.687	0.719	0.662	0.694	0.627
1982	0.737	0.692	0.729	0.668	0.719	0.652
1983	0.736	0.695	0.726	0.669	0.747	0.668
1984	0.712	0.695	0.705	0.665	0.743	0.683
1985	0.709	0.675	0.668	0.668	0.797	0.687
1986	0.696	0.679	0.680	0.690	0.747	0.725
1987	0.674	0.684	0.676	0.683	0.780	0.726
1988	0.671	0.658	0.668	0.676	0.746	0.720
1989	0.707	0.697	0.672	0.655	0.788	0.690
1990	0.808	0.651	0.766	0.667	0.867	0.720

Note: Size groups defined in note at foot of Table 1.

<sup>a</sup>Defined as non-interest expense/(non-interest receipts plus net interest income).

<sup>b</sup>Excludes money center banks for purpose of comparability.

Source: See Table 1.

The adjusted ratio reported in Table 2 fails to control for the bias resulting from the rapid growth in assets experienced by New England's banks between 1985 and 1988. Many of the region's banks relaxed their credit controls during this period, permitting them to "churn out" a large volume of assets per dollar of overhead. These economies of scale were short-term in nature, not long-term reductions in excess capacity or lasting improvements in operating efficiency.

In order to control for this possibility, the adjusted ratios presented in Table 2 were recalculated with the constraint that between 1985 and 1988 net interest income grew only as fast as non-interest expense. The details of these calculations and their results are reported in Appendix I. Even bound by this severe constraint, New England's adjusted ratios improved relative to the nation's, although not as much as in the absence of this constraint.

A large gap reemerged between the region's overhead ratio (no matter how measured) and that of the rest of the nation in 1990 (in 1989 for small banks). In theory, this development could indicate a sudden long-run increase in excess banking capacity or a

reduction in operational efficiency within the region. Cyclical swingers would argue that the overhead ratio of the region's banks has been temporarily raised by unusually high overhead expenses and low net interest income resulting from the high percentage of loans past due. The composition of recent increases in non-interest expenses suggests that they are, in fact, related to the rising incidence of nonperforming loans. Call Reports filed with the Federal Deposit Insurance Corporation provide statistics on three categories of non-interest expense: compensation to labor, expenses of premises and fixed assets, and "other" non-interest expenses. Extraordinary outlays made by banks during periods of extreme financial stress—fees for consultants, lawyers, and accountants; advertising; travel—are concentrated in the "other" non-interest expense category. Among the First District's large banks, "other" non-interest expenses as a percentage of total assets increased by 49 basis points between 1988 and 1990, compared to only 8 basis points among their peers in the rest of the nation.

*Why have New England's banks generally enjoyed such wide net interest margins? If New England's bank-*

Table 3  
*Net Interest Margin,<sup>a</sup> First District versus the Rest of the United States, Commercial Banks, by Size Group, 1976 to 1990*

Year	Large Banks		Medium Banks		Small Banks	
	First District	Rest of United States <sup>b</sup>	First District	Rest of United States	First District	Rest of United States
1976	3.18	2.89	4.14	3.51	4.08	3.55
1977	3.00	2.86	4.04	3.57	4.04	3.57
1978	3.28	3.01	4.30	3.77	4.29	3.84
1979	3.47	3.07	4.71	4.00	4.49	4.08
1980	3.43	3.07	4.54	4.06	4.61	4.23
1981	3.40	3.10	4.99	4.08	5.00	4.28
1982	3.69	3.23	5.02	4.13	4.99	4.25
1983	3.51	3.22	4.28	3.98	4.41	4.09
1984	3.46	3.25	4.21	3.96	4.08	4.01
1985	3.73	3.43	4.16	4.00	4.08	4.13
1986	3.57	3.37	4.00	3.84	3.80	3.90
1987	3.61	3.44	3.96	3.86	3.54	3.87
1988	3.32	3.51	3.85	3.90	3.40	3.87
1989	3.09	3.14	4.06	4.07	3.97	4.00
1990	2.87	3.54	3.70	3.95	4.10	3.86

Note: Size groups defined in note at foot of Table 1.

<sup>a</sup>Defined as (gross interest income – gross interest expense)/total assets.

<sup>b</sup>Excludes money center banks for purposes of comparability.

Source: See Table 1.

ing industry is suffering from excess capacity, why have the region's banks traditionally enjoyed wider net interest margins than their peers in the rest of the nation? (See Table 3.) Net interest margin is the ratio of net interest income to total assets. Competition tends to narrow this margin, as banks compete for funds by raising rates on deposits and for borrowers by lowering rates on loans.

Perhaps New England's multiplicity of bank offices reflects a competitive strategy on the part of the region's commercial banks to win customers by providing superior access and convenience. According to this view, the region's banks have purposely targeted customers willing to accept low interest rates on their deposits or high interest rates on their loans in return for the opportunity to bank at a branch close to their home or business. In other words, the region's banks have catered to customers willing to pay higher prices for ready access to convenient banking services. Several characteristics of New England tend to support this explanation. First, New England's commercial banks have been exposed to relatively intense competition from thrifts, credit unions, money market mutual funds, and life insurance companies.<sup>7</sup>

However, as already suggested above, biases in branching restrictions throughout the nation favoring commercial banks have encouraged them to meet this competition by branching. This bias has been especially severe in New England.<sup>8</sup>

Furthermore, some evidence suggests New Englanders' preference for accessible banking services is still strong. Demand deposits have traditionally played a large role in the liability mix of the region's banks, indicating a strong preference among New

<sup>7</sup> The intensity of competition from thrifts is discussed in footnote 3. The region's commercial banks have been especially sensitive to competition from MMMFs and insurance companies for two reasons. Both types of institutions are heavily represented in New England and therefore compete with its large banks for the same labor pool. In addition, the region's commercial bankers have been conditioned by the aggressiveness of its thrifts to compete vigorously with nonbank competitors.

<sup>8</sup> As early as 1979, four of the region's six states imposed no restrictions whatsoever on the branching of banks within their borders ("statewide branching"). None were "unit banking" states—those that allowed no bank branching whatsoever. By comparison, 27 percent of the other states and the District of Columbia were unit banking states, while only 40 percent permitted unlimited statewide branching (U.S. Department of the Treasury 1981, pp. 44–52).

Englanders for liquidity (Appendix II). Liquidity is complementary to accessibility in that frequent deposits and withdrawals require frequent trips to the bank. New England's preference for both liquidity and accessibility may be partially attributable to the large percentage of its population that is 65 years or older.<sup>9</sup> Compared to other age groups, the elderly are more conservative in their saving habits and tend to make frequent withdrawals because they live, in part, off their savings. Traveling to and from the bank is physically demanding for many of them.<sup>10</sup>

### III. A More Direct Test of the Secular Slide Theory: Comparing Normal Rates of Return

The secular slide theory can be tested more directly. Suppose that one could control for the effects of New England's recent boom-bust economic cycle and concomitant deterioration in credit quality on the profitability of its banks. How profitable would they have been in 1989 and in 1990 in the absence of these effects? That is, what would their "normal" rate of return have been?<sup>11</sup> Would it have been less than that of their peers in the rest of the nation? An affirmative answer would strengthen the secular sliders' case.

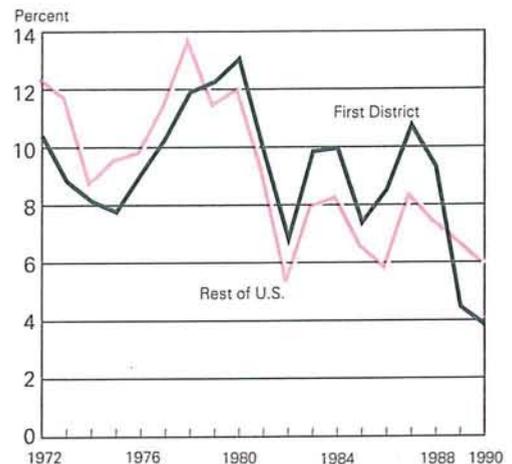
#### *New England's Economy and the Profitability of Its Banks: The Past Two Decades*

As suggested by Figures 5 and 6, the relative profitability of New England's banks has been strongly correlated with the relative rate of growth of its economy. From 1972 through 1978, the rate of growth in the region's inflation-adjusted personal income was considerably slower than that of the nation as a whole. During this period, the rate of return to the region's banking industry, as measured by ROA, averaged 20 basis points below that earned by banks nationwide. This gap closed rapidly between 1978 and 1982, when the region's rate of economic growth, buoyed by the "high tech revolution" and an increase in defense spending, significantly exceeded the nation's. By 1983, the ROA of the region's banks exceeded that of their peers nationwide in every size group.

The years 1983 through 1988 were extremely profitable, both absolutely and relative to banking nationwide, for New England's banking industry. Over the course of these six years, the region's

Figure 5

#### *Annual Rate of Change in Personal Income, First District and the Rest of the United States, 1972-1990*



Source: U.S. Bureau of Economic Analysis, author's calculations.

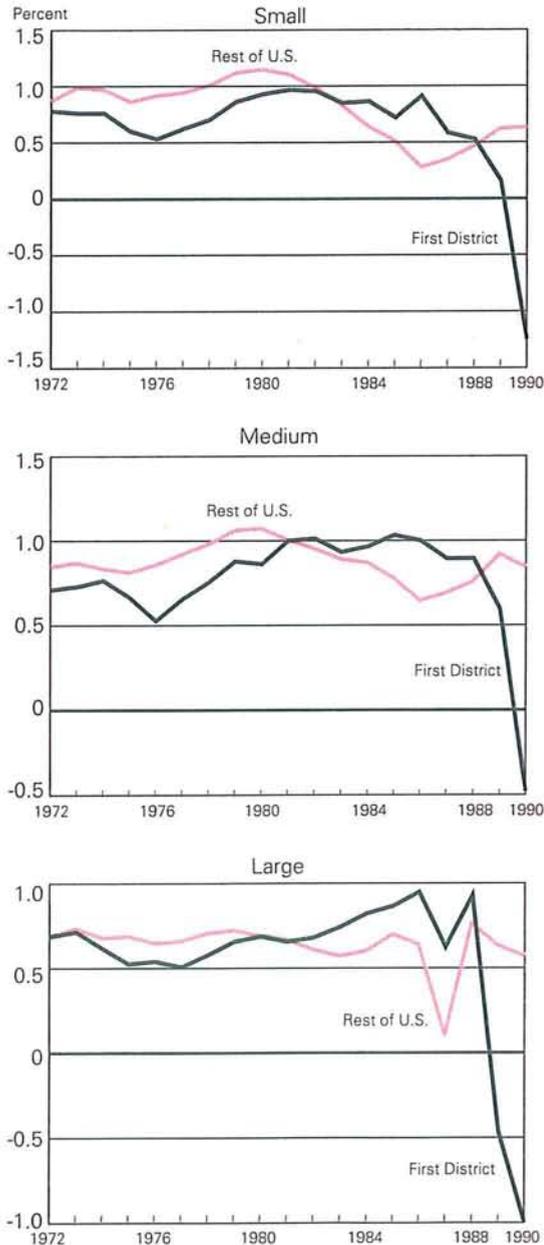
economy, bolstered by growth in construction, real estate, and other financial services, expanded at an annualized rate of 6 percent, compared to only 4 percent for the national economy. Largely as a result, the average annual ROA of New England's banks was 21 basis points above the nation's during this interval. The relative profitability of the region's small and mid-sized banks was especially high in 1985 and 1986, when many other parts of the nation were suffering from a slump in agriculture and energy

<sup>9</sup> In 1988, 13.4 percent of New England's population was 65 years of age or older, compared to a nationwide average of 12.4 percent. Only the North Central and Mid-Atlantic regions had higher percentages of elderly in their population (U.S. Bureau of the Census 1990).

<sup>10</sup> The popularity of Money Market Deposit Accounts (MMDAs) in New England may be a further indication of this preference.

<sup>11</sup> In estimating the normal average rate of return of each size group, in both New England and in the rest of the nation, this study assumes that the normal riskiness of the size group's portfolio in any given year is equivalent to that of the size group's members nationwide less those located in New England and Texas. This assumption is implicit in the method by which the normal asset mix of each peer group is estimated in a given year, explained in the text.

Figure 6  
*Return on Average Assets (ROA), First District and the Rest of the United States, by Size of Commercial Bank,<sup>a</sup> 1972 to 1990*



<sup>a</sup>See note at foot of Table 1 for definition of size group.  
 Source: See Figure 1.

extraction industries. (Neither plays a significant role in New England's economy.<sup>12</sup>) The relative profitability of the region's large banks peaked in 1987, when many of their peers in other regions were compelled to provision heavily against bad Third World loans. (In general, these loans play a smaller role in the portfolios of New England's large banks than in those of large banks nationwide.<sup>13</sup>)

As stated in the introduction, the profitability of New England's banking industry has plummeted during the last two years, both absolutely and relative to that of the national industry. This development has coincided with a dramatic slowing of the rate of growth in the region's economy in general and its real estate industry in particular. The personal income of New Englanders increased by only 8 percent between the fourth quarter of 1988 and the fourth quarter of 1990, while that of the rest of the nation increased by 14 percent. Over the same period, the value of new construction contracts awarded within the region shrank by 38 percent, compared to only 3 percent in the rest of the nation.

#### *A Model of the Links between Economic Conditions and Bank Profitability*

In order to control for the effects of recent extreme economic fluctuations on the profitability of New England's banks, one needs a model of how these effects have been transmitted. Such a model is depicted in Figure 7.

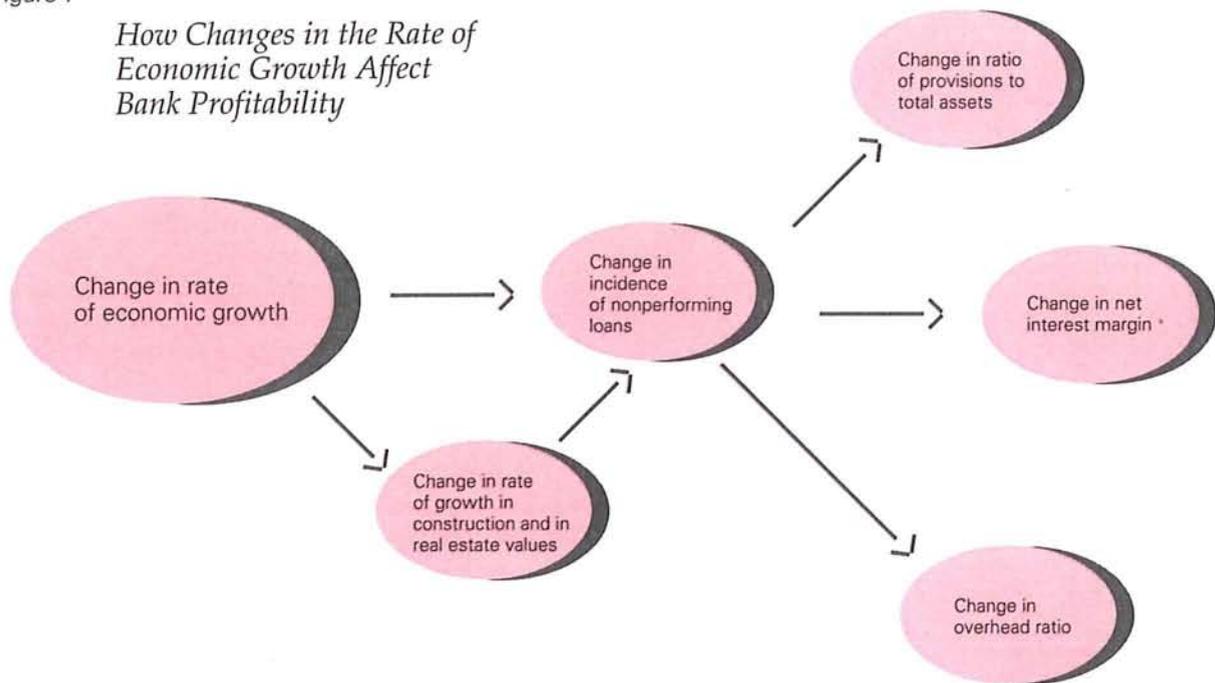
*Description of the model.* During the 1980s, banks in both New England and the rest of the nation expanded the proportion of their asset portfolios allocated to loans in general and to construction and commercial real estate loans in particular. These increases were especially large in New England because the region's rapid rate of economic growth stimulated construction and raised real estate values. Since construction and commercial real estate loans are relatively risky, their greater role in asset portfolio

<sup>12</sup> In 1986, agricultural loans accounted for 6.85 percent of the total assets of small banks outside of New England. The comparable figure for small banks within New England was 0.26 percent. In that year, agricultural loans accounted for 2.2 percent of all assets of mid-sized banks outside of New England. The comparable percentage within the region was 0.17 percent. The discrepancy between New England and the rest of the nation was even greater in earlier years, when U.S. agriculture was more profitable.

<sup>13</sup> In 1987, 1.24 percent of the assets of large banks outside of New England consisted of loans to foreign governments. The comparable percentage for New England's large banks was 0.99.

Figure 7

*How Changes in the Rate of Economic Growth Affect Bank Profitability*



lios raised the incidence of nonperforming loans at the region's banks. The incidence of nonperforming loans in all loan categories rose sharply after the region's economy began to contract in 1989 and in 1990.

As mentioned, this deterioration in credit quality has influenced several components of bank profitability. Banks have been compelled to increase their provisions to loan reserves. They have lost interest income and have incurred high interest expenses in order to discourage deposit runoff. They have incurred extraordinary non-interest expenses in order to obtain help in dealing with their extraordinary credit problems.

*Model estimation.* The data available to estimate the correlations hypothesized in the model are extremely limited. The Federal Deposit Insurance Corporation collects data on nonperforming loans only from the large banks that it insures (those with total assets in excess of \$300 million). It has been collecting such data only since 1982 and has been describing them by type of loan only since 1987. Data on nonperforming loans are further limited in that they are not finely partitioned by loan type. All real estate loans, including construction and development, com-

mercial real estate, residential real estate, and farm real estate, are lumped together into one category. These components differ considerably in their riskiness. Moreover, their relative importance in the loan mix of New England's commercial banks has changed dramatically during the last five years. Because the estimates of the normal profitability of large banks presented in Tables 4 and 5 are necessarily rough, they should be interpreted cautiously.

*Key assumptions.* The normal ratio of nonperforming loans to total assets, for large banks in both the region and the rest of the nation, was assumed to equal the comparable ratio for the rest of the nation's large banks excluding money center banks and large banks domiciled in Texas. Money center banks were excluded, as they are in all the comparisons of large banks presented in this article, because their balance sheets are unique. Texas banks were excluded because of their extraordinarily high incidence of nonperforming loans in general and energy loans in particular. The period over which the average ratio of nonperforming loans to total assets was computed is 1982 through 1988 excluding the year 1987. The incidence of nonperforming loans in 1987 was unusually high among large banks throughout the nation—

Table 4

*Estimates of Normal Rate of Return<sup>a</sup> (ROA\*) for Banks with Total Assets Greater than \$300 Million excluding Money Center Banks, First District versus the Rest of the United States less Texas, 1989*

	Actual		Normal	
	First District	Rest of United States less Texas	First District	Rest of United States less Texas
As a Percentage of Total Assets:				
Nonperforming loans	2.28	2.33	2.16 <sup>b</sup>	2.16 <sup>b</sup>
Provisions against loan losses	1.81	.87	.86 <sup>c</sup>	.86 <sup>c</sup>
Net interest income	3.09	3.22	3.09 <sup>d</sup>	3.22 <sup>d</sup>
Non-interest expense	3.37	3.26	3.37 <sup>d</sup>	3.26 <sup>d</sup>
Net income before taxes and extraordinary items (normal rate of return)	(.52)	.92	.43	.93

<sup>a</sup> Measured as net income before taxes and extraordinary items as a percentage of total assets.

<sup>b</sup> The average value for nonperforming loans as a percentage of total assets for the United States less the First District and Texas for the years 1982 to 1986 and 1988. See text and the Appendix for further methodological details.

<sup>c</sup> Assumes a ratio of provisions to nonperforming assets of 0.4.

<sup>d</sup> It was assumed that, because the actual ratio of nonperforming loans to total assets was so close to the normal ratio for both the First District and the rest of the United States less Texas, no adjustment to the actual value of net interest income or non-interest expense was necessary in the computation of normal rate of return.

Source: Federal Deposit Insurance Corporation, *Reports on Condition and Income* and author's calculations.

especially outside of New England—because of a sharp deterioration in the performance of loans to Third World nations.

The estimated normal incidence of nonperforming loans, 2.16 percent of total assets (Tables 4 and 5), is high for New England's large banks by the standards of the 1980s. From 1982 to 1988, the ratio of nonperforming loans to total assets for the region's large banks averaged only 1.35 percent. However, the extraordinarily rapid rate of economic growth in New England during this six-year period kept the incidence of nonperforming loans unusually low. The region's long-run potential growth rate is much lower.<sup>14</sup> One would expect, therefore, that even under normal conditions the incidence of nonperforming loans among the region's banks will be higher in the future.

The normal ratio of provisions to nonperforming assets for both the region and the rest of the nation was assumed to be 0.4, resulting in an assumed normal ratio of provisions to total assets of  $0.4 \times 2.16$  percent, or 0.86 percent. Between 1982 and 1988 the average ratio of provisions to nonperforming assets

for both the region and the rest of the nation was approximately 0.3. It was assumed that the normal ratio is now higher than this historical average because of stricter regulatory requirements and the secular trend toward investment in increasingly risky assets.<sup>15</sup>

In 1989, the actual ratio of nonperforming loans to total assets for large banks in both New England and the rest of the nation less Texas was not significantly different from the estimated normal ratio of 2.16 percent. In 1990 the actual ratio for the rest of the nation less Texas was, by coincidence, equal to 2.16 percent. Consequently, it was assumed that an abnormally high incidence of nonperforming loans af-

<sup>14</sup> Demographers estimate that the average annual long-run growth rate of New England's working-age population during the 1990s will be 0.5 percent. If productivity grows at an average annual rate of between 0.5 percent and 1 percent, the estimated average annual rate of economic growth is between 1 and 1.5 percent.

<sup>15</sup> The assumed normal ratio of provisions to nonperforming assets affects only the absolute values of estimated normal rates of profit, not the estimated normal rate of profit of New England's banks relative to that of banks in the rest of the nation.

Table 5

*Estimates of Normal Rate of Return<sup>a</sup> (ROA\*) for Banks with Total Assets Greater than \$300 Million excluding Money Center Banks, First District versus the Rest of the United States less Texas, 1990*

	Actual		Normal	
	First District	Rest of United States less Texas	First District	Rest of United States less Texas
As a Percentage of Total Assets:				
Nonperforming loans	4.44	2.16	2.16 <sup>b</sup>	2.16 <sup>b</sup>
Provisions against loan losses	1.95	1.04	.86 <sup>c</sup>	.86 <sup>c</sup>
Net interest income	2.87	3.59	3.59–3.73 <sup>d</sup>	3.59 <sup>e</sup>
Non-interest expense	3.96	3.39	3.56–3.43 <sup>f</sup>	3.39 <sup>e</sup>
Net income before taxes and extraordinary items (normal rate of return)	(1.00)	.80	1.28–1.42	.98

Source: Federal Deposit Insurance Corporation, *Reports on Condition and Income* and author's calculations.

<sup>a</sup> Measured as net income before taxes and extraordinary items as a percentage of total assets.

<sup>b</sup> The average value for nonperforming loans as a percentage of total assets for the United States less the First District and Texas for the years 1982 to 1986, and 1988. See text and the Appendix for further methodological details.

<sup>c</sup> Assumes a ratio of provisions to nonperforming assets of 0.4.

<sup>d</sup> The lower bound is the actual net interest margin earned by large U.S. commercial banks less the First District and Texas (money center banks excluded). The upper bound is this net interest margin plus 14 basis points, the average difference between this net interest margin and that earned by large First District Banks from 1984 through 1988.

<sup>e</sup> It was assumed that, because the actual ratio of nonperforming loans to total assets was so close to the normal ratio for both the First District and the rest of the United States less Texas, no adjustment to the actual value of net interest income or non-interest expense was necessary in the computation of normal rate of return.

<sup>f</sup> The upper boundary of this range is the average for large First District Commercial banks for 1984 through 1988. The lower boundary is the average for 1986 through 1988. By way of comparison, the 1984–1988 average for large U.S. commercial banks (money center banks excluded) less the First District and Texas is 3.17.

fect net interest income and non-interest expense only in New England in 1990. Otherwise, normal net interest margin and normal overhead ratio were assumed to equal their actual values.

The normal ratio of net interest income to total assets for New England's large banks in 1990 was estimated according to two alternative rules. Under the "low" rule, this ratio was assumed to equal that actually earned by large banks in the rest of the nation less Texas. Under the "high" rule, the regional ratio was assumed to equal that earned by large banks in the rest of the nation less Texas plus 14 basis points. This spread is the average difference in the ratio earned by large First District banks and that earned by large banks in the rest of the nation less Texas between 1984 and 1988.

The normal ratio of non-interest expense to total assets for New England's large banks in 1990 was also estimated according to two alternative rules. According to the "high" rule, this ratio was assumed to equal the region's average for 1984 through 1988.

According to the "low" rule, this ratio was assumed to equal the region's average for 1986 through 1988. The "low" rule implicitly assumes that New England's large banks successfully improved their operational efficiency relative to that of their nationwide peers during the 1986–88 period.

#### *Estimates of the "Normal" Profitability of New England's Banks*

As reported in Table 4, the normal ROA before taxes and extraordinary items (ROA\*) earned by the region's large banks in 1989 was estimated at 0.43 or 50 basis points lower than that estimated for their peers in the rest of the nation. Very different results were found for 1990 (Table 5). In that year, the estimated normal ROA\* in the region exceeded that in the rest of the nation by between 30 and 44 basis points, depending on the rules used for estimating normal net interest margin and normal overhead ratio. The average estimated normal ROA\* for the

region for both years combined is between 0.85 and 0.92, only 3 to 10 basis points below the average estimated normal ROA\* for the rest of the nation less Texas. This difference is insignificant given the imprecision of the estimation techniques.

#### *IV. Summary and Policy Implications*

The severity of New England's recession and the collapse of its real estate markets have inflicted heavy losses on the region's banking industry. Banks in all size groups have shared these losses. However, their profitability will recover as the regional economy resumes its growth and real estate values eventually rebound from their depressed levels.

The region's banks, like their counterparts in the rest of the nation, have been subject to secular forces over the past 15 to 20 years that have intensified the competitiveness of their industry and reduced the demand for their traditional products. Evidence of a resulting significant decline in the profitability of the nation's banks is inconclusive. Furthermore, this author has found no evidence that New England's banks have been less adept at adjusting to these forces or that their profitability relative to that of their peers nationwide has suffered accordingly. When the impact of the region's unusually high incidence of nonperforming loans is controlled for, as shown in the estimates above of "normal" profitability, the average underlying rate of return earned by large

banks in the region over the past two years has been approximately the same as that earned by large banks in the rest of the nation.

The relatively large number of bank offices per capita in New England is not necessarily an indication that New England is overbanked. Rather, it may reflect a conscious strategy on the part of the region's banks to win customers by providing superior access and convenience. This explanation is consistent with the wide net interest margins that New England banks have traditionally enjoyed, the intense competition that they have encountered from mutual savings banks and nonbank financial organizations, the regulatory incentives within the region to meet this competition by branching, and the apparently strong preference of New Englanders for access and convenience in banking. Other measures of the volume of resources devoted to banking in New England and the efficiency with which these resources have been used suggest that New England is no more overbanked than the rest of the nation.

Nevertheless, the overhang of bad loans carried by New England's banking industry has made it unprofitable, both absolutely and relative to banking in the rest of the nation. The region's banks need to build capital to absorb the losses associated with loan charge-offs. The sooner they rid their balance sheets of these loans, the sooner the additional costs associated with these loans will disappear. Once these extraordinary costs are eliminated, the underlying profitability of New England banking will reemerge.

## Appendix I: Alternative Methods of Calculating Adjusted Overhead Ratio

As noted in the text, many New England banks relaxed their credit standards between 1985 and 1988, contributing to the rapid increase in the volume of bank assets and, therefore, net interest income, during this period. This development, as opposed to reduction in capacity or improvement in efficiency, may have contributed to the reduction of the region's adjusted overhead ratios. In order to control for this possibility, the adjusted overhead ratios of the region's large banks were recalculated under the assumption that net interest income increased only as fast as noninterest expense. The revised calculations and their results are presented in the following table:

Appendix Table I  
*Banks with Assets Greater than \$300 Million (Large Banks), First District, 1985 to 1988*  
\$000

	Non-Interest Expense (1)	Non-Interest Income (2)	Net Interest Income (Actual) (3)	Net Interest Income (Constrained) (4)
1985	3,262,111	1,404,718	3,193,996	3,193,996
1986	3,881,417	1,644,388	3,930,818	3,800,216
1987	4,520,041	2,007,633	4,699,771	4,425,232
1988	5,115,630	2,456,170	5,162,069	5,002,372
	Adjusted Overhead Ratio (1)/[(2) + (3)]		Constrained Adjusted Overhead Ratio (1)/[(2) + (4)]	
1985	.709		.709	
1986	.696		.713	
1987	.674		.703	
1988	.671		.685	

## Appendix II

Appendix Table II  
*Liability Mix of Commercial Banks, First District versus the Rest of the United States, by Size Group, 1972 to 1990*  
Percent of Total Liabilities

	Large Banks (Money Center Banks Excluded)					
	First District			Rest of the United States		
	Demand Deposits	Time and Savings Deposits	Other Liabilities	Demand Deposits	Time and Savings Deposits	Other Liabilities
1972	40.29	28.98	30.73	34.80	36.57	28.63
1973	37.17	34.71	28.12	31.88	40.08	28.04
1974	33.34	38.51	28.15	29.79	40.66	29.56
1975	33.07	38.60	28.33	29.49	41.95	28.57
1976	29.64	36.22	34.14	26.96	38.91	34.14
1977	27.58	35.43	36.99	26.59	38.27	35.15
1978	26.52	36.22	37.27	25.71	38.55	35.74
1979	24.49	35.66	39.85	24.04	36.89	39.07
1980	23.12	36.17	40.71	23.15	36.70	40.15
1981	21.39	37.72	40.89	19.95	39.73	40.32
1982	18.89	39.11	42.00	17.07	43.17	39.76
1983	18.66	40.52	40.82	17.11	45.46	37.43
1984	18.70	33.18	48.13	16.62	35.06	48.32
1985	19.21	47.28	33.50	16.64	47.10	36.26
1986	19.27	48.72	32.01	17.22	47.27	35.50
1987	16.31	51.72	31.97	16.20	48.87	34.93
1988	13.34	51.99	34.67	15.13	50.82	34.05
1989	12.21	52.79	35.00	14.20	52.54	33.26
1990	11.76	56.18	32.06	13.64	54.80	31.56

Appendix Table II *continued*

*Liability Mix of Commercial Banks, First District versus the Rest of the United States, by Size Group, 1972 to 1990*

Percent of Total Liabilities

	Medium Banks					
	First District			Rest of the United States		
	Demand Deposits	Time and Savings Deposits	Other Liabilities	Demand Deposits	Time and Savings Deposits	Other Liabilities
1972	45.64	40.41	13.95	37.32	49.95	12.72
1973	42.82	43.06	14.13	34.83	51.57	13.60
1974	40.10	45.55	14.35	32.68	53.08	14.24
1975	37.66	48.44	13.90	31.72	54.48	13.81
1976	34.91	52.97	12.12	30.58	57.68	11.73
1977	33.38	54.78	11.84	29.92	58.43	11.65
1978	32.32	55.20	12.47	29.45	58.46	12.09
1979	29.90	54.90	15.20	27.98	59.02	13.00
1980	28.57	55.30	16.14	26.53	60.16	13.31
1981	25.67	57.75	16.58	21.90	64.01	14.09
1982	22.80	61.19	16.01	18.91	66.69	14.40
1983	20.88	65.79	13.34	17.37	69.96	12.68
1984	19.91	48.58	31.51	16.33	52.71	30.95
1985	18.61	69.24	12.15	15.76	72.16	12.08
1986	17.75	70.31	11.94	15.56	72.73	11.71
1987	14.90	71.94	13.17	14.67	73.58	11.75
1988	12.35	74.31	13.34	14.00	74.23	11.77
1989	10.72	75.73	13.55	13.39	74.50	12.11
1990	9.80	78.57	11.63	12.58	75.59	11.84

Appendix Table II *continued*

*Liability Mix of Commercial Banks, First District versus the Rest of the United States, by Size Group, 1972 to 1990*

Percent of Total Liabilities

	Small Banks					
	First District			Rest of the United States		
	Demand Deposits	Time and Savings Deposits	Other Liabilities	Demand Deposits	Time and Savings Deposits	Other Liabilities
1972	43.39	55.61	1.00	36.82	52.13	11.05
1973	41.10	57.95	0.95	35.81	52.92	11.27
1974	38.46	60.31	1.22	33.95	54.30	11.74
1975	35.68	63.04	1.29	32.00	56.29	11.71
1976	33.39	65.07	1.54	30.78	59.22	10.00
1977	32.19	66.46	1.34	29.86	60.07	10.08
1978	30.78	67.59	1.64	29.64	59.98	10.38
1979	27.89	69.91	2.19	28.19	60.79	11.03
1980	26.21	71.26	2.53	25.98	62.72	11.31
1981	23.74	72.90	3.36	20.68	67.29	12.03
1982	21.74	75.05	3.22	17.91	69.68	12.41
1983	20.69	77.84	1.47	15.89	72.31	11.80
1984	19.11	79.68	1.20	14.76	54.00	31.24
1985	18.14	81.05	0.81	13.91	74.62	11.46
1986	18.17	81.27	0.56	13.55	75.46	11.00
1987	15.77	83.67	0.56	13.02	76.10	10.88
1988	13.21	85.43	1.36	12.65	76.37	10.98
1989	11.37	85.89	2.75	12.30	76.62	11.07
1990	10.60	87.37	2.03	11.83	76.83	11.35

Source: Federal Deposit Insurance Corporation, *Reports on Condition and Income*.

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# *A Primer on the Arms Trade*

**A**mong the many consequences of the recent Persian Gulf War was a heightened interest in the international trade in armaments, with some analysts forecasting a substantial increase. While the spotlight has been on the military and political aspects of this trade, economic considerations are also important, and, indeed, are closely interwoven with the political and military aspects. This article presents a survey of the arms trade, focusing chiefly on the economic features.

## *A Profile of the Arms Trade*

According to the leading source, at least 120 countries participated in the arms trade in 1989, the latest year for which data have been published.<sup>1</sup> All 120 were importers, and 47 of them also exported. Ninety-three of those participating in the trade were less developed countries, and they accounted for three-quarters of all arms imports and one-tenth of arms exports, by value. By geographic region, the Middle East was the leading importer, purchasing \$12 billion of foreign-supplied arms, while the Warsaw Pact, with exports of \$21 billion, was the primary exporting region. International transactions in arms have been increasing in both value and quantity since the mid 1980s—but not so rapidly as world trade—and accounted for about 1½ percent of world trade in 1989.

The magnitude of the arms trade, of course, depends on how arms are defined. Stones can be deadly weapons, yet hardly belong in the same category as Scud missiles. In the case of many other items, the decision is not so easy. For example, chemicals that form the essence of certain weapons can also be put to peaceful uses. The unavoidably arbitrary element in classifying such items calls to mind the assertion of Lewis Carroll's Humpty Dumpty: "When I use a word, it means just

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Table 1  
*Arms Exports of Leading Arms-Exporting Countries*

Country	1989			Country	1985-89, Cumulative	
	Arms Exports				Arms Exports	
	In Millions of Dollars	As a Percent of World Total	Percent Change, 1985-89		In Millions of Dollars	As a Percent of World Total
Soviet Union	19,600	43.14	15	Soviet Union	102,200	39.86
United States	11,200	24.65	1	United States	60,600	23.64
United Kingdom	3,000	6.60	100	France	18,300	7.14
France	2,700	5.94	-50	United Kingdom	14,500	5.66
China-Mainland	2,000	4.40	196	China-Mainland	8,275	3.23
West Germany	1,200	2.64	-14	West Germany	6,400	2.50
Czechoslovakia	875	1.93	-45	Czechoslovakia	6,100	2.38
Israel	625	1.38	-14	Poland	5,700	2.22
Sweden	575	1.27	174	Israel	3,155	1.23
Canada	410	.90	-25	Italy	2,840	1.11
North Korea	400	.88	14	Canada	2,735	1.07
Poland	400	.88	-69	Bulgaria	2,185	.85

Source: U.S. Arms Control and Disarmament Agency (1991), Table II.

what I choose it to mean—neither more nor less.”<sup>2</sup>

Recognizing that any definition will be rather arbitrary, we adopt, for purposes of measurement, the definition used by the U.S. Arms Control and Disarmament Agency: arms are military equipment, “including weapons of war, parts thereof, ammunition, support equipment, and other commodities designed for military use.” This ACDA definition embraces tactical guided missiles and rockets, military aircraft, naval vessels, armored and nonarmored military vehicles, communications and electronic equipment, artillery, infantry weapons, small arms, ammunition, other ordnance, parachutes, and uniforms. Dual use equipment—which can be used either for military or civilian purposes—is included when its primary mission can be identified as military, although all foodstuffs, medical equipment, petroleum products, and other such supplies are excluded. Also counted in arms transfers are the construction of defense production facilities and licensing fees paid as royalties for the production of military equipment, when they are incorporated in military transfer agreements by countries other than the United States. Missing from this list is strategic weaponry, but ACDA flatly asserts, “There have been no international transfers of strategic weaponry.”<sup>3</sup>

Which countries, then, are the chief exporters and importers of arms so defined? In Tables 1 and 2 the leading exporting and importing countries are listed in order of magnitude of their exports and imports. Among the exporters, the dominance of the Soviet Union is striking, although the United States also is prominent, with exports far greater than all countries but the Soviet Union. Between them the Soviet Union and the United States accounted for nearly two-thirds of the world’s arms exports over the period 1985-89, and for slightly more than two-thirds in 1989.

Remarkable changes in arms exports are reported for some countries. Between 1985 and 1989 increases of 100 percent or more accrued for the

<sup>1</sup> Unless otherwise indicated, data are from U.S. Arms Control and Disarmament Agency (1991).

<sup>2</sup> Lewis Carroll, *Through the Looking-Glass and What Alice Found There*, in *The Complete Works of Lewis Carroll* (New York: Random House, 1974), p. 214.

<sup>3</sup> The information in this paragraph, including the quotations, is from U.S. Arms Control and Disarmament Agency (1990, p. 137). That page also notes that the ACDA definition of arms transfers includes military services such as construction, training, and technical support—except for the United States, which ordinarily makes much larger transfers of such services than other countries do.

Table 2  
*Arms Imports of Leading Arms-Importing Countries*

1989				1985-89, Cumulative		
Country	Arms Imports			Country	Arms Imports	
	In Millions of Dollars	As a Percent of World Total	Percent Change, 1985-89		In Millions of Dollars	As a Percent of World Total
Saudi Arabia	4,200	9.27	11	Saudi Arabia	23,200	9.05
Afghanistan	3,800	8.38	485	Iraq	22,500	8.78
India	3,500	7.72	35	India	16,200	6.32
Greece	2,000	4.41	567	Iran	10,100	3.94
Iraq	1,900	4.19	-59	United States	10,000	3.90
United States	1,600	3.53	-11	Afghanistan	9,750	3.80
Japan	1,400	3.09	40	Cuba	8,700	3.39
Iran	1,300	2.87	-32	Vietnam	8,300	3.24
Vietnam	1,300	2.87	-13	Syria	7,100	2.77
Cuba	1,200	2.65	-50	Israel	6,025	2.35
Turkey	1,100	2.43	144	Angola	5,950	2.32
Syria	1,000	2.21	-38	Soviet Union	5,900	2.30

Source: U.S. Arms Control and Disarmament Agency (1991), Table II.

United Kingdom, China, and Sweden. By contrast, France, Czechoslovakia, and Poland experienced major percentage decreases in their arms sales (Table 1).

While only two countries account for the preponderance of arms exports, no such dominance is to be found among the arms-importing countries. Although Saudi Arabia has led the pack of importers, it absorbed only about 9 percent of the world's arms imports during 1985-89, and Iraq was close on its heels (Table 2). Of course, among the leading importers are countries, including a number in the Middle East, that have been involved in conflict or have been imminently threatened with it, including civil strife. Extraordinary percentage increases in imports between 1985 and 1989 are reported for Afghanistan, Greece, and Turkey.

A nation's arms trade may loom large relative to that of other countries but still be small relative to the nation's total economic activity. As can be seen in Table 3, the country whose arms exports have been the largest in relation to its gross output is Israel, followed closely by North Korea. Other countries that rank very high by this criterion over the period 1985-89 include a number of communist or formerly communist countries.

From the table it is obvious that being an arms

seller does not assure prosperity for a country. Per capita GNP is low by world standards for most of the 12 countries that led the world in terms of arms exports as a share of GNP in 1989. Conspicuous by its absence from this list is the United States, whose arms exports averaged 0.27 percent of GNP in 1985-89 and 0.22 percent in 1989, and whose 1989 GNP per capita amounted to \$20,910.

If arms exports do not assure prosperity, arms imports can represent a direct economic burden. One measure of that burden—arms imports as a percent of GNP—is reported in Table 4 for the highest-ranking countries.<sup>4</sup> The Middle East is well represented on this list, as are countries that have suffered internal strife. None of the 12 is among the world's wealthy countries in terms of per capita GNP, and most are among the world's poorest.

The exports of some countries are much more heavily concentrated, or specialized, in armaments, than are the exports of others. In Table 5 "relative export specialization" is the ratio of a country's arms exports to its total exports, divided by the ratio of

<sup>4</sup> This measure overstates the burden to the extent that arms are granted to, rather than purchased by, the recipient. Comprehensive data on arms grants are not available.

Table 3  
*Leading Countries in Arms Exports as a Percent of Gross National Product (GNP), 1989 and 1985–89*

Country	1989		1985–89 Average <sup>a</sup>	
	Arms Exports as Percent of GNP	GNP per Capita (in U.S. Dollars)	Country	Arms Exports as Percent of GNP
Israel	1.39	10,340	Israel	1.61
North Korea	1.33	1,427	North Korea	1.32
Soviet Union	.74	9,226	Czechoslovakia	1.14
Czechoslovakia	.71	7,876	Bulgaria	.98
Chile	.69	1,809	Soviet Union	.85
Egypt	.53	1,342	Jordan	.75
United Kingdom	.36	14,580	Poland	.73
China—Mainland	.33	547	Chile	.73
Bulgaria	.32	5,530	Yugoslavia	.54
Sweden	.31	21,900	France	.45
France	.28	17,000	United Kingdom	.40
Yugoslavia	.26	2,474	Portugal	.36

<sup>a</sup>A simple average of arms exports as a percent of GNP taken individually for each year 1985–89, using current dollar figures. Afghanistan, Cambodia, Iraq, Laos, Lebanon, Mongolia, and Vietnam are excluded from the 1985–89 average rankings because ACDA lists their GNP data as not available for some or all of the years.

Note: Because of problems with data, Mali and Cape Verde are excluded from these rankings.

Source: U.S. Arms Control and Disarmament Agency (1991), Tables I and II.

Table 4  
*Leading Countries in Arms Imports as a Percent of Gross National Product (GNP), 1989 and 1985–89*

Country	1989		1985–89 Average <sup>a</sup>	
	Arms Imports as Percent of GNP	GNP per Capita (in U.S. Dollars)	Country	Arms Imports as Percent of GNP
Nicaragua	38.88	305	Nicaragua	42.95
Yemen (Aden)	18.07	509	Angola	22.86
Ethiopia	15.52	120	Yemen (Aden)	22.02
Angola	12.44	727	Mozambique	17.60
Sao Tome & Principe	11.11	368	Sao Tome & Principe	14.98
Mozambique	10.85	78	Ethiopia	14.48
Vietnam	9.15	219	Guinea-Bissau	12.36
Equatorial Guinea	8.00	347	Jordan	10.02
Yemen (Sanaa)	6.20	976	Syria	8.17
Guinea-Bissau	5.99	171	Yemen (Sanaa)	6.01
Syria	5.18	1,608	Cuba	5.37
Saudi Arabia	4.58	5,600	Saudi Arabia	5.36

<sup>a</sup>A simple average of arms imports as a percent of GNP taken individually for each year 1985–89, using current dollar figures. Afghanistan, Cambodia, Iraq, Laos, Lebanon, Mongolia, and Vietnam are excluded from the 1985–89 average rankings because ACDA lists their GNP data as not available for some or all of the years.

Source: U.S. Arms Control and Disarmament Agency (1991), Tables I and II.

worldwide arms exports to total world exports. Thus, it is a measure of how concentrated a country's exports are in armaments relative to the same kind of concentration for the world's exports. Also, the measure is equivalent to the ratio of a country's arms

exports to worldwide arms exports, divided by the ratio of the country's total exports to world total exports.

Among the leading arms exporters, the Soviet Union has ranked highest in relative export special-

ization in armaments. As indicated in the table, the share of its exports accounted for by arms has been almost 10 times as great as the share of the world's exports accounted for by arms. Put another way, the Soviet Union's share of world arms exports has been nearly 10 times its share of all world exports. None of the other leading arms suppliers comes close to this degree of specialization in armaments. Israel is a distant second, followed by Poland and the United States.

A corresponding measure of the concentration of imports in armaments reveals that Afghanistan, Iraq, and Syria have ranked foremost among the leading arms importers for which data are available (Table 5). For Afghanistan, torn by civil war involving superpower rivalry, the reported share of imports consisting of arms has been more than 90 times the corresponding share for the world. In other words, Afghanistan's share of world arms imports has been more than 90 times its share of all world imports. As might be expected, countries with the highest degrees of relative export specialization do not display the highest degrees of relative import concentration.

This profile of the arms trade is not etched in granite. The trade is continually changing with the course of events, and is surely being reshaped by the remarkable developments of the past few years, including the revolutionary changes in the Soviet Union and Eastern Europe and the war in the Persian Gulf.

### *The Arms Trade of the United States*

A more detailed discussion of the arms trade requires more detailed data, but such data are meager both in quantity and in quality. For the United States, if not for other countries, more detailed data are available, but discrepancies between data published by different sources pose a dilemma for the analyst. The problem is nicely illustrated by the differing figures for U.S. arms exports that are reported by the Arms Control and Disarmament Agency and by the Commerce Department, which issues the more detailed data in terms of value. For total exports in 1989, for example, ACDA reports the figure of \$11.2 billion (Table 1), while Commerce reports the figure of \$8.3 billion (Table 6). Thus, the share of total U.S. merchandise exports consisting of arms in 1989 would be 3.1 percent by ACDA's reckoning but only 2.3 percent by Commerce's tally.

Although no reconciliation of this difference is

available, some contributing factors can be identified. Perhaps most important, the ACDA data include transfers from U.S. military facilities abroad to foreign residents, while the Commerce data exclude these transfers. Also, shipments of military goods from the United States to foreigners through Defense Department channels may be reported more fully to ACDA than to Commerce. And ACDA data include

Table 5  
*Relative Export Specialization and Import Concentration in Armaments, for the Ten Leading Arms Exporters and Importers, Cumulative 1985-89*

Country	Relative Export Specialization	Relative Import Concentration
<b>Leading Exporters</b>		
Soviet Union	9.72	.60
United States	2.13	.24
France	1.23	.07
United Kingdom	1.11	.21
China-Mainland	2.04	.46
West Germany	.22	.16
Czechoslovakia	1.95	1.14
Poland	2.22	2.09
Israel	3.63	4.66
Italy	.25	.10
<b>Leading Importers</b>		
Saudi Arabia	.02	11.12
Iraq	.15	22.32
India	.05	9.23
Iran	0	9.78
United States	2.13	.24
Afghanistan	0	91.75
Cuba	.02	10.58
Vietnam	n.a.	n.a.
Syria	.09	19.58
Israel	3.63	4.66

Note:

$$\text{Relative export specialization} \equiv \frac{A_{EM}}{A_{ET}} \bigg/ \frac{W_{EM}}{W_{ET}} = \frac{A_{EM}}{W_{EM}} \bigg/ \frac{A_{ET}}{W_{ET}}$$

$$\text{Relative import concentration} \equiv \frac{A_{IM}}{A_{IT}} \bigg/ \frac{W_{IM}}{W_{IT}} = \frac{A_{IM}}{W_{IM}} \bigg/ \frac{A_{IT}}{W_{IT}}$$

where A = country A, B = country B, W = world, and the subscripts E, I, M, and T refer to the value of exports, imports, military goods, and total goods of all kinds, respectively.

n.a. = not available.

Source: U.S. Arms Control and Disarmament Agency (1991), Table II.

some services as well as goods, while an effort is made to exclude all services from these Commerce data.

Even though Commerce's merchandise export data exclude goods transferred to foreigners from the U.S. military abroad, those data, as well as Commerce data on imports, do provide a useful itemization of the kinds of military goods being traded, as shown in Table 6. From this itemization it is clear that military aircraft, along with engines and turbines for them, have constituted the largest dollar category of military goods exported from U.S. territory for many years. This is not surprising, in light of the U.S. comparative advantage in the aircraft industry. As indicated in the table, total military goods exports (as defined by Commerce) have comprised a fluctuating share of all U.S. merchandise exports, a share that has shown no readily discernible trend but has not exceeded 3.1 percent over the past eleven years.

On the other side of the ledger, total military

imports have constituted an even smaller share of all U.S. merchandise imports. Imports of military aircraft and parts have been appreciable, however, in spite of U.S. competitive prowess in this industry. Thus, at least in this category, intra-industry trade has been noteworthy for the United States.

Which countries are the best customers of the United States for the military goods exports included in Table 6? Japan is number one, as indicated in Table 7. None of the countries listed accounts for a major share of these exports, which are widely distributed. By contrast, U.S. imports of military-type goods come predominantly from just two countries, the United Kingdom and Canada (Table 7).

A somewhat different picture of the geographic distribution of U.S. arms exports is obtained from the ACDA data, which include transfers from the U.S. military abroad and cover the period 1985-89 (Table 8). According to these more comprehensive data, Israel rather than Japan is the foremost recipient of

Table 6

*U.S. Exports and Imports of Military-Type Goods, by End-Use Category, 1980-90*

(In Millions of Dollars Unless Otherwise Specified; Census Basis)

Item	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
<b>Merchandise Exports (f.a.s.)<sup>a</sup></b>											
Total	3,274	4,188	6,531	5,849	4,975	5,446	4,364	5,453	5,369	8,252	9,185
Military Aircraft—Complete	950	1,713	2,388	1,847	1,582	2,023	1,502	2,630	2,159	1,505	1,484
Military Launching Gear, Parachutes, etc. <sup>b</sup>										16	19
Engines and Turbines for Military Aircraft	94	114	173	226	170	182	149	200	278	856	841
Military Trucks, Armored Vehicles, etc.	137	157	376	267	199	202	125	128	149	799	674
Military Ships and Boats	15	9	344	307	15	30	22	19	20	14	15
Tanks, Artillery, Missiles, Rockets, Guns, and Ammunition	883	1,051	2,013	1,679	1,336	1,451	963	894	878	1,609	2,200
Military Apparel and Footwear	16	24	35	66	40	28	35	28	37	335	532
Parts; Special Category Goods Not Elsewhere Classified	1,180	1,118	1,203	1,460	1,634	1,530	1,568	1,555	1,849	3,118	3,422
Total as Percent of All U.S. Merchandise Exports	1.5	1.8	3.1	2.9	2.3	2.6	1.9	2.1	1.7	2.3	2.3
<b>Merchandise Imports (Customs Value)</b>											
Total	218	597	745	547	1,147	1,168	1,478	1,595	1,740	1,037	1,101
Military Aircraft and Parts	206	570	710	516	1,060	1,039	1,314	1,402	1,513	750	843
Other Military Equipment	13	27	36	31	87	129	164	193	227	288	258
Total as Percent of All U.S. Merchandise Imports	*	.2	.3	.2	.3	.3	.4	.4	.4	.2	.2

Note: Detail may not add to totals shown because of rounding.

<sup>a</sup>Excludes goods transferred to foreign residents by U.S. military abroad.

<sup>b</sup>Included in another category for years before 1989.

\*Less than 0.1 percent.

Source: U.S. Department of Commerce: International Trade Administration, Compro Data Base for exports for 1980-88, and Bureau of Economic Analysis for remaining data.

Table 7  
*Leading Trading Partners of the United States in Military-Type Goods,  
 Cumulative 1989-90 (Census Basis)*

U.S. Military Exports (f.a.s.) <sup>a</sup>			U.S. Military Imports (Customs Value)		
Country of Destination	In Millions of Dollars	As Percent of Total Military Exports	Supplying Country	In Millions of Dollars	As Percent of Total Military Imports
Japan	1,991	11.4	United Kingdom	639	29.7
West Germany	1,265	7.3	Canada	484	22.5
United Kingdom	1,235	7.1	Israel	183	8.5
South Korea	1,212	7.0	Netherlands	136	6.3
Israel	1,015	5.8	West Germany	111	5.2
Canada	905	5.2	France	90	4.2
Taiwan	815	4.7	Singapore	79	3.7
Egypt	803	4.6	Spain	71	3.3
Spain	781	4.5	Belgium & Luxembourg	55	2.6
Netherlands	704	4.0	Italy	46	2.1
Australia	666	3.8	South Korea	35	1.6
Turkey	665	3.8	Sweden	34	1.6
France	569	3.3	Australia	34	1.6
Saudi Arabia	474	2.7	Japan	23	1.1
Singapore	360	2.1	Denmark	23	1.1

<sup>a</sup>Excludes goods transferred to foreign residents by U.S. military abroad.

Source: U.S. Bureau of Economic Analysis.

U.S. arms transfers. U.S. arms exports still appear to be widely dispersed, however.

### *Dynamics of the Arms Trade: Some Basic Questions*

The arms trade is shaped by many forces, ranging from greed to altruistic concern for the threatened or oppressed. Any attempt to quantify the impacts of these diverse influences is almost certainly doomed, not only because of the difficulty in fully specifying cause-and-effect relationships but because of a sparsity of reliable data. In the circumstances, advanced statistical techniques such as regression analysis must yield to less elaborate approaches which offer no illusion of precision but which can still provide a basis for tentative inferences and can perhaps stimulate further research.

With these considerations in mind, we address several basic questions concerning the arms trade in this section. More specifically, what are the typical relationships, if any, between the size of a country's military market, or outlays, and its military exports and imports? Do countries with large military exports

Table 8  
*Leading Recipients of U.S. Arms  
 Transfers, Cumulative 1985-89*

Country	Amount Transferred	
	In Millions of Current Dollars	As Percent of Total U.S. Arms Transfers
Israel	6,100	10.1
Japan	5,300	8.8
Saudi Arabia	5,000	8.3
Australia	4,100	6.8
United Kingdom	3,200	5.3
Taiwan	3,000	5.0
Egypt	2,900	4.8
Spain	2,800	4.6
West Germany	2,600	4.3
South Korea	2,600	4.3
Turkey	2,500	4.1
Netherlands	2,200	3.6
Greece	1,800	3.0
Belgium	1,400	2.3
Italy	1,200	2.0

Source: U.S. Arms Control and Disarmament Agency (1991), Table III.

also tend to have large military imports? Have arms transfers to a country from the Warsaw Pact generally stimulated competitive transfers to the same country from the members of NATO, and conversely? As a country has imported more arms in relation to its GNP, has it usually become more dependent on one of the major competing military alliances?

First, consider the relationship between a nation's military outlays and its military exports. For sophisticated weapons, it is often reported that the cost of production per unit declines as output increases until the total value of production becomes relatively large. Because of such economies of large-scale production, nations with relatively limited demand for these weapons reportedly find it uneconomical to produce them in the absence of substantial export sales. Thus:

European defense industries always have had more incentive to export than their American counterparts. The small size of European defense budgets as compared with that of the United States has encouraged exports as a means of reducing unit costs. European countries producing military aircraft exclusively for domestic use were likely to limit production to several hundred planes at most, whereas the United States air forces would frequently require 1,000 aircraft. While the difference in unit cost is relatively small if 2,000 planes are manufactured instead of 1,000, the unit cost difference is substantial if 1,000 aircraft are produced instead of 200. Thus, by spreading out production costs and recouping research and development expenditures, European defense companies and defense ministries benefit significantly. . . . The French claim that without export orders maintaining aircraft production at Dassault-Breguet would be impossible.<sup>5</sup>

No doubt economies of scale are substantial in certain arms industries and provide a strong incentive for export sales by those industries in countries with relatively small domestic purchases. But are such economies of scale important enough to determine the general relationship between a country's total military outlays and its military exports? More precisely, for the country with relatively small military expenditures—with a limited military market—are military exports larger in relation to military expenditures than for the country with an appreciably greater military market?

As can be seen in Figure 1, the answer seems to be negative. For the 124 countries that could be included for the years 1985 to 1989, the ratio of arms exports to military expenditures exhibits no general decline as military expenditures increase across coun-

tries. Because the transactions of the United States and the Soviet Union are a different order of magnitude from those of the other countries, the question arises whether the foregoing conclusion would be the same if those two huge transactors were excluded. Figure 2, which excludes them, does indeed support that conclusion. Thus, while economies of scale surely provide impetus for export sales by some industries in some countries, this impetus is not so strong as to dominate the overall relationship between arms exports and total military expenditures. Not only do the countries with the largest military markets boast the largest military exports, but their military exports usually are as large in relation to their markets as in the countries with small markets.

If arms exports tend to increase with military expenditures, is the same true of arms imports? Not according to the data presented in Figure 3. What is striking about this chart is not only the absence of any obvious relationship between military expenditures and arms imports, but also the marked aversion to imports on the part of both the Soviet Union and the United States. A number of other countries with much smaller military expenditures purchased about as much or more in foreign arms. This is further testimony to the relative self-sufficiency, approaching autarky, of these two dominant arms producers.

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*Arms imports seem generally  
unrelated to military  
expenditures.*

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Even if the United States and the Soviet Union are excluded from the analysis, however, the conclusion holds that arms imports seem generally unrelated to military expenditures.

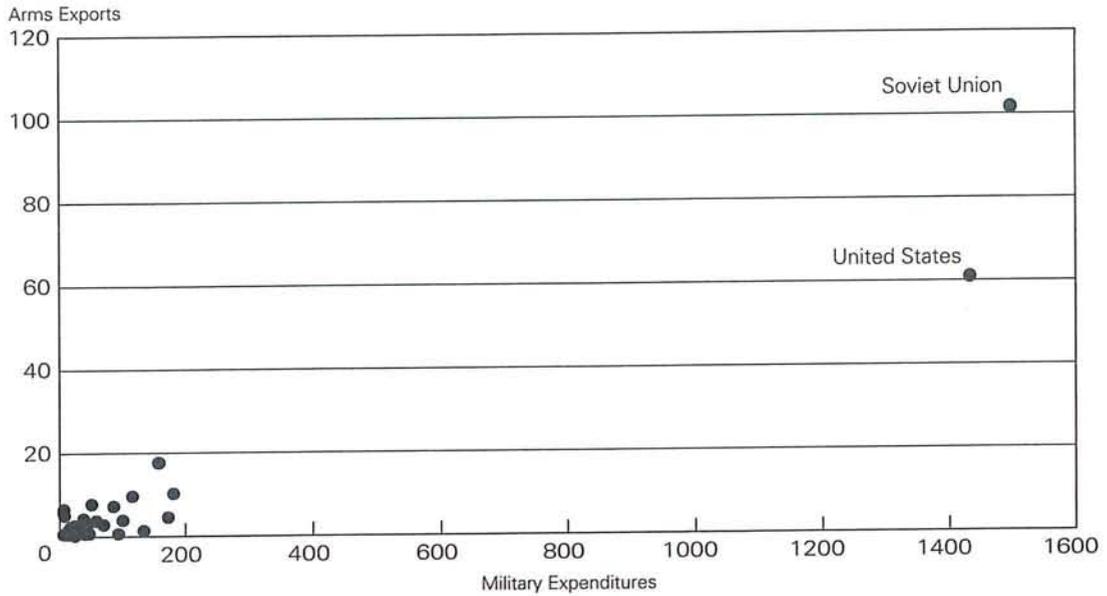
For many industries, it is common for a country to export some of the products of the industry while importing others. Such intra-industry trade is more likely if the various products of the industry are subject to economies of scale and if a variety of products is desired, as these factors encourage countries to specialize in and exchange different product lines. If intra-industry trade were pronounced for the

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<sup>5</sup> Ferrari, Madrid, and Knopf (1988, p. 10); also see Snider (1987, pp. 41–43).

Figure 1

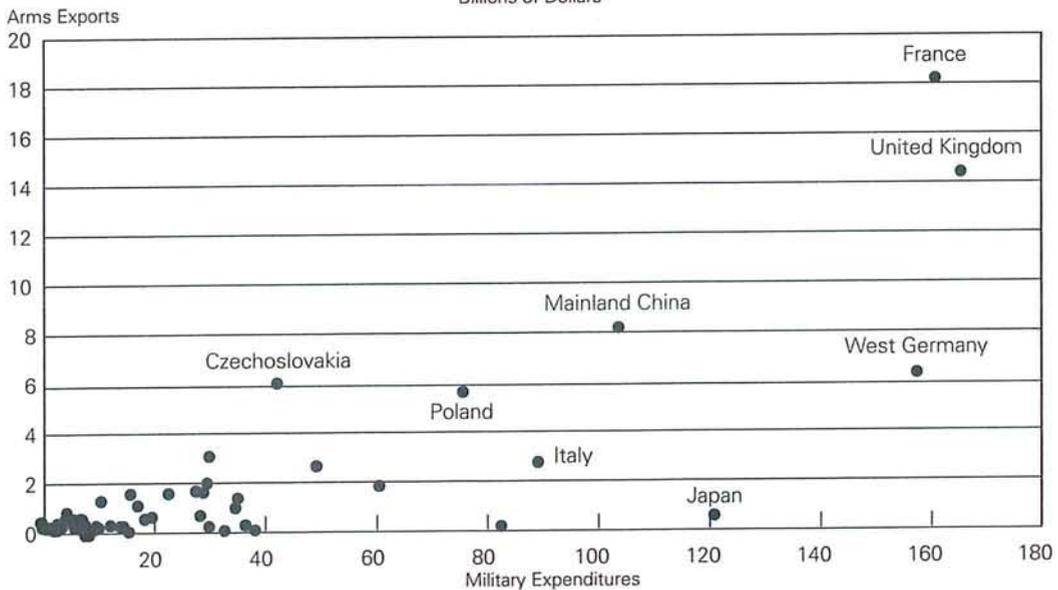
*Countries' Military Expenditures and Arms Exports,  
Cumulative 1985 to 1989*  
Billions of Dollars



Note: Included are only those countries, 124 in all, for which data were available for at least two years. The coefficient of correlation for the data plotted is 0.966.  
Source: U.S. Arms Control and Disarmament Agency (1991), Tables I and II.

Figure 2

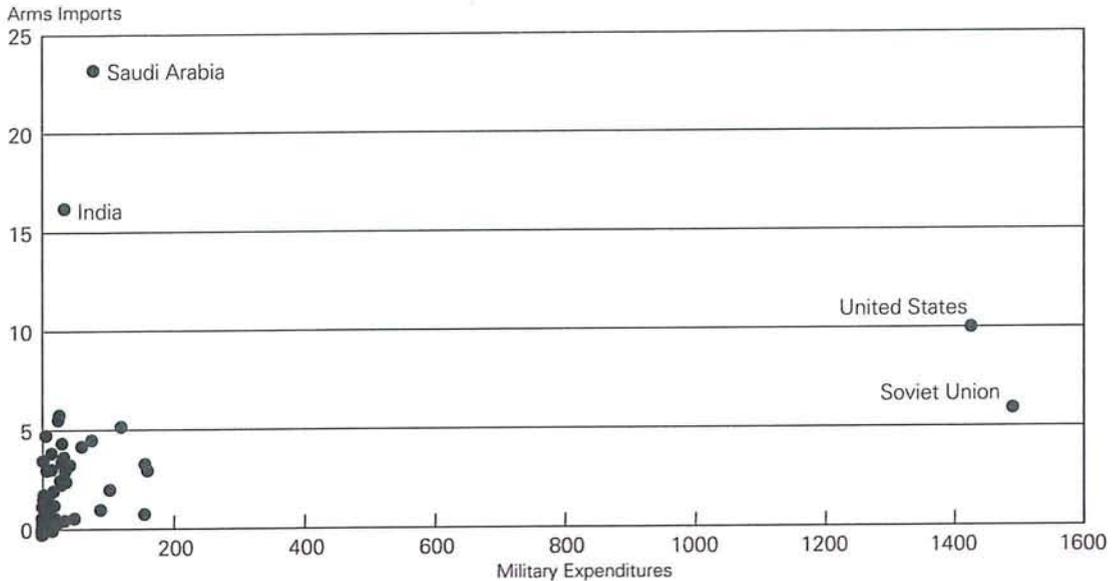
*Countries' Military Expenditures and Arms Exports,  
excluding the United States and the Soviet Union,  
Cumulative 1985 to 1989*  
Billions of Dollars



Note: Included are only those countries, 122 in all, for which data were available for at least two years. The coefficient of correlation for the data plotted is 0.831.  
Source: U.S. Arms Control and Disarmament Agency (1991), Tables I and II.

Figure 3

*Countries' Military Expenditures and Arms Imports,  
Cumulative 1985 to 1989*  
Billions of Dollars



Note: Included are only those countries, 124 in all, for which data were available for at least two years. The coefficient of correlation for the data plotted is 0.350.  
Source: U.S. Arms Control and Disarmament Agency (1991), Tables I and II.

armaments industries, countries with sizable arms imports would also deliver sizable arms exports.

The arms trade seemingly marches to a different drummer. As already noted, the imports of the United States and the Soviet Union are dwarfed by their arms exports. Nor do arms imports and exports exhibit much correspondence in other countries (Figure 4). In fact, of the 142 countries for which 1985–89 data were available, 78 were importers with no reported exports. Consequently, while intra-industry trade in armaments does occur, it is hardly a salient feature.

If the arms trade differs in key respects from much other trade, many observers would argue that international power politics are largely responsible. For example, governments commonly seek to block arms exports from their countries to hostile countries. On the other hand, they may promote arms exports to countries with which they seek to gain influence. Such influence-seeking could inspire fierce competition in the arms trade, with opposing governments pushing their military wares in an effort to recruit to their camps those countries that were relatively neu-

tral and strategically important (Ferrari, Madrid, and Knopf 1988, p. 84).

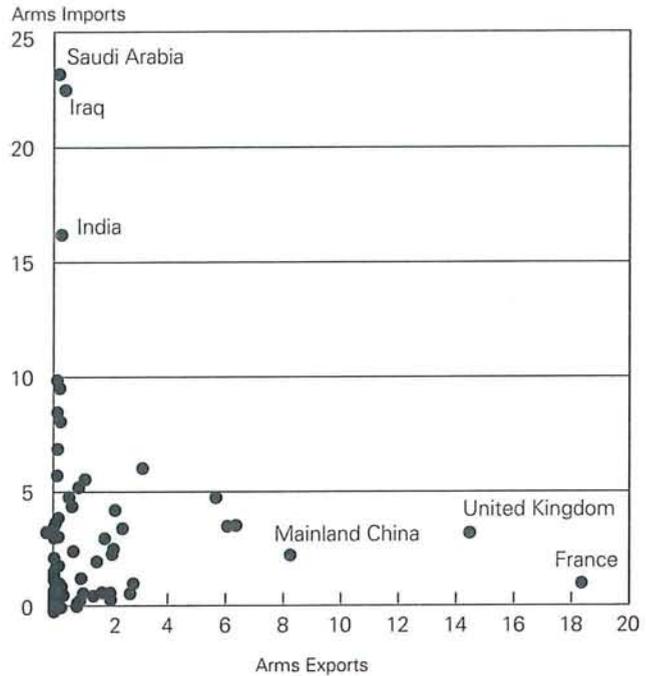
If this kind of competition had raged between NATO and the Warsaw Pact in recent years, one might expect to find that a number of countries had received significant arms transfers from both alliances, neither of which had captured the markets in the recipient countries. But as indicated in Figure 5, such recipients are rare. The chart includes countries that received arms shipments from the major suppliers within NATO or the Warsaw Pact during the years 1985 to 1989, but excludes the member countries of those alliances. If arms transfers to a country by one of the alliances had normally evoked competitive transfers to the same country by the other alliance, the points plotted would form a pattern sloping upward and to the right. The picture is quite different, however. In their arms dealing with these two alliances, most countries seem to have been overwhelmingly committed to one or the other. By and large, arms transfers from one of the alliances preempted the market of the recipient.<sup>6</sup>

Of course, political considerations have contrib-

Figure 4

*Countries' Arms Imports and Exports, excluding the United States and Soviet Union, Cumulative 1985 to 1989*

Billions of Dollars



Note: 142 countries are included. The coefficient of correlation for the data plotted is 0.078.  
Source: U.S. Arms Control and Disarmament Agency (1991), Table II.

uted heavily to this outcome. For example, the U.S. government would hesitate to approve the sale of advanced equipment to a country that was acquiring substantial armament from the Soviet Union, for fear that the technology might fall into Soviet hands. But economic factors have also played a role. For many weapons, it may not be feasible to simultaneously utilize competing varieties from different suppliers, especially when specialized training is required to operate the weapons.<sup>7</sup> And having selected a particular weapon, the recipient may be able to procure replacement parts only from the original supplier; one analysis reports that since 1964 spare parts and support services, including training and construction, have accounted for a much larger share of U.S. arms transfer agreements than have weapons and ammunition (Louscher and Salomone 1987, p. 24).

*Efforts to Control the Trade<sup>8</sup>*

The Gulf War and revelations about prewar arms sales to Iraq have provoked recommendations for

tighter restrictions over the flow of arms to the Third World. The underlying concern has been heightened by two predictions: that the impressive performance of U.S. weapons in the Gulf War would enhance Third World demand for such advanced arms; and that industrial country suppliers would readily accommodate the new demand, seizing the opportunity to make up for decreasing sales to their own governments brought about by the easing of the Cold War.

<sup>6</sup> Caveat: Not all the relevant arms transfers are captured by the ACDA data. For example, it is well known that significant quantities of U.S. arms were conveyed into Nicaragua. ACDA reports that its data "represent arms transfers to governments and do not include the value of arms obtained by subnational groups" (U.S. Arms Control and Disarmament Agency 1990, p. 137).

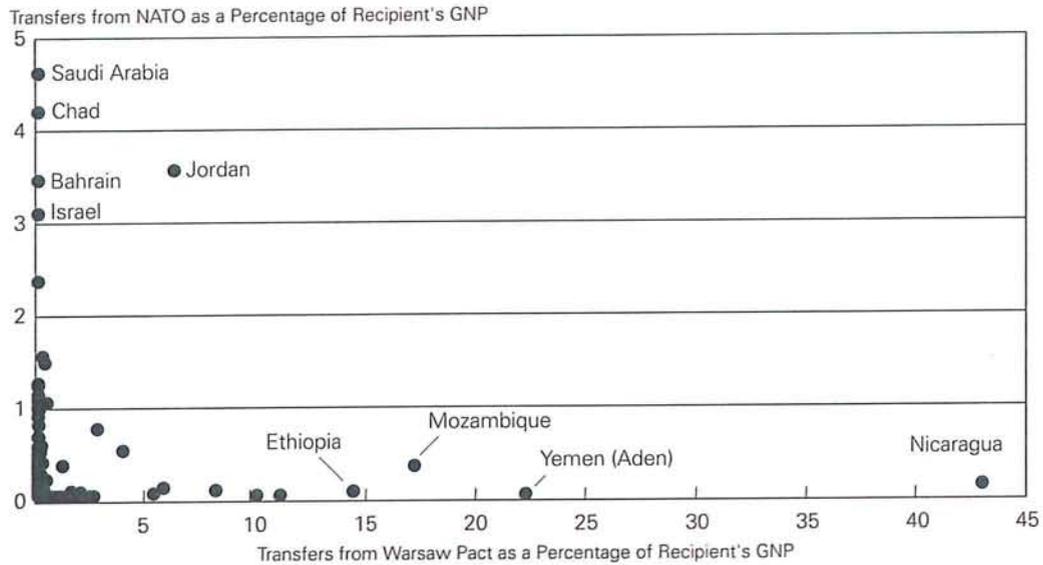
<sup>7</sup> "Mixing arms from several countries can result in noncomplementary systems that could degrade the military effectiveness of the weapons on hand," according to Ferrari, Madrid, and Knopf (1988, p. 86).

<sup>8</sup> This section is based largely on the following sources: National Academies of Sciences and Engineering and Institute of Medicine (1991); U.S. Congress, House of Representatives, Committee on Government Operations (1991); and U.S. Department of State (1990).

Figure 5

*Arms Transfers from NATO and the Warsaw Pact, as a Percentage of Recipient's GNP, Cumulative 1985 to 1989*

Billions of Dollars



Note: 105 countries are included. Member countries of NATO and the Warsaw Pact are excluded. NATO here is France, West Germany, the United Kingdom, the United States, and Other Europe as defined in U.S. Arms Control and Disarmament Agency (1991), Table III. The coefficient of correlation for the data plotted is -0.069. Source: U.S. Arms Control and Disarmament Agency (1991), Tables I and III.

Restrictions are not new to the arms trade. Perhaps the best known of the current controls are those under the aegis of the Coordinating Committee for Multilateral Export Controls (CoCom), which was formed in 1949 as an informal forum associated with NATO. The purpose of CoCom, which came to include Australia and Japan as well as NATO members (excluding Iceland), has been to prevent or delay the Soviet bloc and communist China from acquiring goods and technology that would enhance their military prowess. To this end, CoCom has sought the cooperation of third countries in enforcing its export controls.

CoCom has maintained three lists of items to be controlled: (1) an International Munitions List, including goods and technologies with purely military applications; (2) an International Atomic Energy List, including goods and technologies with nuclear applications; and (3) an International Industrial List of goods and technologies with commercial as well as military applications (also known as the "dual-use" list). Placement of an item on a list does not neces-

sarily prohibit its export to the targeted countries but does indicate that a proposed export is to be reviewed and approved in advance by CoCom members, except for certain specified, less sensitive items that may be exported subject only to subsequent notification to CoCom. All decisions by CoCom, including formulation of the lists, are by consensus, meaning that any member can exercise a veto.

In addition to CoCom, several other regimes have been established to prevent the proliferation of particular weapons and weapons technology. The targeted items are nuclear weapons, chemical weapons, and missile technology.

Under the Nuclear Non-Proliferation Treaty launched in 1968, participating nations possessing nuclear weapons pledge to work toward nuclear disarmament and to share peaceful nuclear technology with signatory nations lacking such technology. In return, the nations receiving the peaceful technology pledge not to acquire nuclear weapons. In addition, groups of countries have committed themselves to refrain from exporting certain nuclear materials or

technology to "non-weapon" states without obtaining safeguards to assure peaceful use.

In order to impede the proliferation of chemical weapons, the "Australia Group" was formed in 1984. Chaired by Australia, this group of 20 nations identifies chemicals important to the development of chemical weapons, recommends appropriate controls over the export of these "precursor" chemicals, and shares information on the efforts of countries to acquire them.

Finally, the Missile Technology Control Regime was created in 1987 to restrict the export of goods and technology useful for producing missiles capable of carrying nuclear payloads. To this end, the 14 member nations have promulgated a set of export guidelines that each country executes in accordance with its national legislation (without seeking group approval).

It is clear from these efforts that the threat of proliferation has sparked preventive measures, but several analyses have argued that relatively more of the arms control effort should be directed toward this threat and relatively less toward the presumably diminishing threat posed by communism. In fact, some progress in this direction has been made. With respect to the communist threat, for example, during the past year and a half CoCom has sharply reduced the number of dual use items to be controlled (Green-

house 1991; Browning and Lachica 1991). With respect to proliferation, on the other hand, last July the United States, the Soviet Union, China, France, and the United Kingdom espoused the goal of eliminating all weapons of mass destruction from the Middle East. Accordingly, these five major arms suppliers agreed to develop "stringent national and, as far as possible, harmonized controls" on transfers to the region of nuclear, chemical, and biological weapons or technology for such weapons. Moreover, they pledged to observe "rules of restraint" in conventional weapons transfers to the region (Riding 1991).

The United States not only participates in all of the foregoing multilateral export control schemes but also maintains additional restrictions over selected exports of military significance. For example, the nation requires that each supercomputer export be individually authorized, or licensed, regardless of destination. And proposed exports of equipment used to manufacture armaments are reviewed to forestall shipments that would contribute to destabilization of the country or region of destination.

Of course, these controls are not watertight. Precise information is not available on the degree to which the controls are circumvented, but the data in Table 9 may serve as crude indicators of the year-to-year fluctuations in illegal arms shipments from the United States. While the number of seizures by U.S. Customs officials was no higher in 1989 and 1990 than in 1983 and 1984, the value of items seized was substantially greater, even allowing for increases in prices.<sup>9</sup> Thus, the volume of illegal trade may have grown appreciably in recent years.

Although they do not advocate illegal shipments, a number of analysts have argued that U.S. arms controls are unduly restrictive—and that they unjustifiably handicap U.S. manufacturers in meeting foreign competition, in light of the less restrictive controls maintained by other countries. A major study published this year by the National Academy of Sciences concluded that the negative impact of export controls on the U.S. economy has stemmed overwhelmingly from measures taken by the United States that are not duplicated by other countries participating in the control regimes. Among these

Table 9  
*Seizures by U.S. Customs Officials of  
Illegal Export Shipments of Items Having  
Military Applications, 1982-90*

Fiscal Year	Number of Seizures	Value of Items Seized (Millions of Dollars)
1982	765	56
1983	1,444	86
1984	1,459	86
1985	750	75
1986	802	52
1987	1,044	76
1988	723	82
1989	1,424	105
1990	1,348	132

Note: For an item to be seized, the export license documentation must be deemed invalid or deficient, and a violation of export control regulations must be presumed.  
Source: U.S. Customs Service.

<sup>9</sup> Which of the available indexes to use in adjusting for price changes for arms is debatable. One plausible choice would be the producer price index for manufactures, which rose by 17 percent from 1983 to 1990, compared to an increase of 53 percent in the value of seizures.

damaging unilateral U.S. measures, the study listed the following (p. 19):

- controls on reexports of U.S. items to third countries and the requirement for written assurances regarding end use and reexport;
- controls on U.S.-owned foreign entities;
- controls on foreign products that use (or are made with) technologies of U.S. origin;
- controls on foreign products that have U.S.-origin components in them;
- control of some dual use items as munitions that other CoCom nations regulate less restrictively as dual use products;
- selective imposition of unilateral product and technology controls;
- more burdensome and complex licensing regimes; and
- more stringent enforcement mechanisms.

Except in rare cases where the United States is the sole supplier of an item, such unilateral measures fail to prevent the proscribed countries from acquiring the item from a non-U.S. source. Even more harmful to U.S. industry has been a loss of sales to *nonproscribed* countries where prospective purchasers have been concerned that their business operations might be complicated or disrupted by the intrusion of unilateral U.S. measures such as those listed above. In particular, the U.S. policy of formally requiring foreigners to secure its permission for the reexport of U.S. goods or technology from foreign territory is without parallel among U.S. allies.

Criticism of U.S. controls has not been limited to their unilateral content. In addition, administration of the controls is widely perceived to be extremely inefficient. More than a dozen government agencies, with differing missions, differing constituencies, and differing statutes to interpret, are involved in the licensing of exports, generating confusion and inter-agency disputes over where responsibility lies and what type of license is required. Again, one likely result is that U.S. firms forfeit sales to foreign competitors, whose governments generally process license applications more quickly. To remedy this inefficiency, a congressional committee has recommended, among other things, that an agency be created with sole authority for the issuance of all export licenses, that all authority to impose and maintain export controls be combined in a single statute, and that all authority to enforce export controls over dual-use goods be consolidated in the Customs Service (U.S. Congress, House of Representatives, Committee on Government Operations, 1991, pp. 50-53).

### *Throttling Back on Arms Exports: The Economic Impact*

As the foregoing discussion indicates, considerable objection has been raised to U.S. arms control measures that succeed only in transferring business from U.S. firms to their foreign competitors. To be sure, lost sales can mean lost profits and lost wages. This line of reasoning is enlisted by the State and Defense Departments to help justify substantial federal financing of U.S. arms sales. In their joint *Congressional Presentation for Security Assistance Programs: Fiscal Year 1992*, which proposed federal financing of about \$4¾ billion, these agencies argued as follows (p. 6):

Security assistance is not a philanthropic effort, but one which produces direct domestic benefits. These assistance and sales programs have a positive net impact upon our domestic economy. For example, that part of the production of U.S. defense industry which is composed of arms sales abroad provides jobs for American workers and increases exports to help the U.S. balance of trade. In addition, these sales provide economies of scale (e.g., longer production runs) which reduce the cost of weapons systems of continued interest to the U.S. Armed Forces.

No doubt an abrupt cessation of U.S. arms transfers could beget, in the very short run, a corresponding reduction in total U.S. exports and output. The longer-run consequences for U.S. exports, output, and employment would be less severe than the initial reduction in U.S. exports would suggest, however, and might even be positive. The ultimate net impact would depend on a number of factors, some imponderable. To illustrate, the initial worsening of the U.S. balance of trade probably would induce some depreciation of the dollar's foreign-exchange value, which would help to reverse the drop in exports and output. Moreover, if the federal government were to spend domestically the funds that it had previously been granting to foreign governments to finance their acquisitions of U.S. arms, the result, again, would be to bolster U.S. output. Also, if the Federal Reserve were striving to attain a certain level of nominal GNP, it would ease monetary conditions in reaction to the initial decrease in exports and output, another response that would tend to restore the preexisting level of output.

Even though the long-run net impact of a reduction in arms sales would differ substantially from the immediate impact, the immediate impact is still of

Table 10  
*Estimated U.S. Employment Related to Exports of Military-Type Goods in Table 6, for the Year 1990*

Industry	Description	1990 Employment (Thousands)
Manufacturing Sector:		
SIC Code		
28	Chemicals and Allied Products	.2
34	Fabricated Metal Products	22.8
35	Machinery, Except Electrical	4.5
36	Electric and Electronic Equipment	3.4
37	Transportation Equipment	34.0
38	Instruments and Related Products	7.1
	Total	72.0
Nonmanufacturing Sector <sup>a</sup>		70.0
Total Employment		142.1

Note: Detail may not add to totals because of rounding.

<sup>a</sup>Ratio of total U.S. export-related employment in manufacturing to nonmanufacturing multiplied by total manufacturing employment related to military-type goods exports, or  $2,258/2,318 \times 72$ . See U.S. Bureau of the Census, *Exports from Manufacturing Establishments: 1985 and 1986* (Washington, D.C.: 1989), Table 1.

Source: Appendix; and U.S. Bureau of the Census, *op. cit.*, Tables 1 and 4a.

interest as an indicator of the magnitude of adjustment facing the economy. Suppose, for example, that none of the arms exports in 1990 detailed in Table 6 had been permitted. How many would have become unemployed if everyone involved in producing these exports had been laid off? The answer, according to Table 10, is about 142,000—or 0.1 percent of the total labor force. Something like this number may have been employed in producing the exports of military-type goods reported for 1990 in Table 6. The bulk of the manufacturing employment was in industries turning out transportation equipment and fabricated metal products.

To interpret these figures correctly, one must have at least a rough understanding of how they were derived. The Census Bureau publishes data from which it is possible to estimate the employment related to manufactured exports, with employment defined to include workers who manufacture components that become incorporated in the products to be exported. Because these Census data are presented for 1986, we evaluated the military goods exports reported for 1990 (in Table 6) at 1986 rather than 1990 prices. Using a series of relationships computed from

the aforementioned Census publication, we then translated these export data into plant shipments and employment. A fuller account of the methodology is set forth in the Appendix Table and the footnote to Table 10.

This procedure makes no allowance for any productivity gains between 1986 and 1990 and, on this count, may somewhat overstate the employment related to military goods exports for 1990 as reported in Table 6. Even so, the estimated employment is a tiny fraction of the total labor force. If the size of that fraction is any guide, the nation should suffer little economic trauma from a cutback in arms exports, although particular localities might be significantly affected.

This kind of analysis cannot readily be extended to other arms-exporting countries, because the necessary data are lacking. Some general observations on spending for military purposes can be offered, however.

From 1972 through 1988 military expenditures consumed about 5 percent of the world's output each year. For less developed countries the share was closer to 5½ percent, and in some of these countries relatively large military expenditures undermined economic growth by diverting resources from meritorious projects (Hewitt 1991b, pp. iv, 1–5). Thus, it is not surprising that some substantial aid donors, including Germany, Japan, the International Monetary Fund, and the World Bank, reportedly are curtailing their assistance to countries whose military expenditures they consider excessive (Kinzer 1991; "Japan to Link Aid to Arms Trade" 1991; Sampson 1991). That such policies should have some success in limiting military spending is implied by a recent study that finds such spending to be sensitive to the level of concessional financing a country receives (Hewitt 1991a).

Of course, economic hardship will not put an end to military spending. For one thing, as Adam Smith said long ago, "defence . . . is of much more importance than opulence. . . ." <sup>10</sup> But some military expenditures are not so much for defense against foreign threats as for maintaining dictatorial regimes. Insofar as military spending is for external defense, the pity is that more nations do not negotiate mutual reductions that would allow them all to be better off.

<sup>10</sup> Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (New York: Random House, 1937), p. 431.

## Summary and Conclusion

The war in the Persian Gulf focused more attention on the international trade in armaments, with some analysts forecasting a substantial increase. At least 120 countries participate in this trade, which accounts for about 1½ percent of total international trade. In recent years two-thirds of all arms exports have come from the Soviet Union and the United States, which have ranked first and second, respectively, among the world's suppliers. However, the overall exports of the Soviet Union have been concentrated much more heavily in arms than have the exports of the United States or other major arms suppliers. For the United States, military aircraft, along with engines and turbines for them, have been the largest dollar category of military exports for many years.

In spite of Soviet and U.S. preeminence among arms exporters, arms sales have been less important to the economies of these two countries than to some others, especially Israel's and North Korea's. But prosperity is not associated with a high ratio of arms exports to economic output. Nor does poverty bar the acquisition of arms; the nations that spend the largest shares of their income on arms imports are mostly among the world's poorest.

An inquiry into the dynamics of the arms trade yields several tentative conclusions. Economies of

large-scale production are not important enough to determine the overall relationship between a country's military expenditures and its arms exports. In addition, while arms exports tend to rise with military expenditures from country to country, no such relationship is readily discernible between military expenditures and arms imports, nor is intra-industry trade in arms a salient feature. Finally, the competition for influence between NATO and the Warsaw Pact in recent years seldom resulted in significant arms transfers from both alliances to the same country. In their arms dealings with these two alliances, most nonmember nations seem to have been overwhelmingly committed to one or the other.

A number of multilateral efforts have been undertaken to control the arms trade. In addition to participating in these efforts, the United States maintains other restrictions over selected exports of military significance. Because U.S. control measures have generally been more stringent than those in other exporting countries and could have been administered more efficiently, arms sales by U.S. firms have been rather pointlessly forfeited to competing foreign sellers. On the other hand, a drastic reduction in authorized U.S. arms exports would not have a dramatic impact on the U.S. economy, especially in the long run, although particular localities might well suffer.

## Appendix

### *Derivation of Estimated Export-Related Manufacturing Employment Related to Exports of Military-Type Goods in Table 6, for the Year 1990*

Standard Industrial Classification		1990 Exports		Estimated Direct Export Shipments f.o.b. Plant <sup>c</sup>	Estimated Total Export-Related Shipments <sup>d</sup>	Estimated Export-Related Employment (Thousands) <sup>e</sup>
		At 1990 Prices <sup>a</sup>	At 1986 Prices <sup>b</sup>			
Code	Description					
28	Chemicals and Allied Products	41	34	29	48	.2
34	Fabricated Metal Products	814	699	626	2,153	22.8
35	Machinery, except Electrical	469	440	386	565	4.5
36	Electric and Electronic Equipment	167	153	134	310	3.4
37	Transportation Equipment	6,913	6,203	5,470	6,480	34.0
38	Instruments and Related Products	781	664	578	691	7.1
	Total	9,185	8,193	7,224	10,247	72.0

Note: Exports in millions of dollars.

<sup>a</sup>Allocation by SIC based on approximate data supplied by U.S. Bureau of Economic Analysis.

<sup>b</sup>Deflated by SIC-based price indexes from U.S. Bureau of Labor Statistics, using annual averages.

<sup>c</sup>Based on application of f.o.b. adjustment factors by SIC, from U.S. Bureau of Census, *Exports from Manufacturing Establishments: 1985 and 1986* (Washington, D.C.: 1989), Appendix B.

<sup>d</sup>Based on ratios of total export-related shipments to direct export shipments, by SIC, derived from U.S. Bureau of Census (1989), Table 4A.

<sup>e</sup>Based on ratios of total export-related manufacturing employment to total export-related shipments, by SIC, derived from U.S. Bureau of Census (1989), Table 4A.

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