

Economic Review



FEDERAL RESERVE BANK OF KANSAS CITY

September/October 1984

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Individual Income Tax

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at Commercial Banks

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Why Not PLAM's?

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Alternatives to the Current Individual Income Tax

By Glenn H. Miller, Jr.

The personal income tax is the cornerstone of the federal government's revenue-raising structure. Now entering its eighth decade of existence, the modern income tax came into being after the ratification of the Sixteenth Amendment to the Constitution in 1913. About 350,000 returns were filed in 1913 compared with over 95 million in 1982. In 1914, its first full year of operation, income tax receipts were \$41 million. In 1982, individual income taxes brought in nearly \$300 billion, almost half of total federal budget receipts.

Despite its potency as a revenue raiser, there has been increasing dissatisfaction with the income tax in recent years and mounting concern over some of its effects. As a result, fundamental changes in the tax system are being discussed, with the focus primarily on the income tax. Some observers believe that concern about very large projected federal

budget deficits may be the catalyst for a fundamental change in the income tax.¹

Tax reform, the label often applied to fundamental changes in the tax system, is thus on the national economic policy agenda. The President, in his budget message to Congress in January 1984, stressed the need for a simpler and fairer tax system that would also increase savings, investment, and work incentives. To that end, he directed the Treasury Department to complete a study of the tax system and recommend changes by the end of the year. Substantial alteration of the tax system is also being discussed in Congress, the media, the economics profession, and among the general public.

This article briefly examines several alternatives to the current individual income tax and some of the issues surrounding them. Emphasis is on the basic concepts of those alternatives, although some indication is also given

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¹ "Mounting Deficits Could Spur Total Overhaul of the Tax System," *Congressional Quarterly Weekly Report*, December 24, 1983, pp. 2731-37.

of the effects of using them as substitutes for the income tax or complements to it. The two broad alternatives discussed here are (1) income base broadening and rate reduction culminating in a flat rate tax on a comprehensive income base and (2) the substitution of consumption spending for income as the tax base through either a personal expenditure tax or an indirect consumption tax such as a value-added tax (VAT) or a retail sales tax.

Objectives of a tax system and the current income tax

The main purpose of a tax system is to raise revenue by transferring resources from the private sector to the public sector so as to satisfy such socially determined public wants and needs as national defense, public education, and income security and health care for certain groups. A good tax system is expected to be fair, neutral, and simple.² Revenue should be raised so that the tax burden is distributed as fairly as possible, in terms of both horizontal equity (seeing that people in similar situations are treated similarly) and vertical equity (seeing that people in different situations are treated differently).³ Ideally, taxes would be as neutral as possible in terms of minimizing their interference with economic decisions and behavior. The effect of the tax system on choices between working more or taking more

leisure time, for example, or on choices between saving or consuming from income, would be minimized.⁴ Administration of the system by the tax collector and compliance with the law by the taxpayer would be as simple and efficient as possible.

The following brief description of how tax liability is determined under the current income tax shows how it is believed to fall short of the goals of a good tax system. This description also provides a starting place for examining alternatives to the current income tax.

Joseph A. Pechman has listed the factors necessary for determining income tax liability.

The personal income tax is determined by the definition of income, allowable deductions, personal exemptions, tax rates, and tax credits. These elements can be combined in various ways to produce a given amount of revenue.⁵

The taxation of income, therefore, requires that an income tax base first be established. In the current personal income tax, total income is computed by adding up income from such sources as wages and salaries, interest, dividends, capital gains, rents, and royalties. Exclusions are then applied. In 1983, for example, interest on obligations of state and local governments was not taxable, the first \$200 of dividend income on a joint return was excluded, 60 percent of net long-run capital

² Richard A. Musgrave and Peggy B. Musgrave, *Public Finance in Theory and Practice*, Second Edition, McGraw-Hill Book Co., New York, 1976, pp. 210-11; Joseph A. Pechman, *Federal Tax Policy*, Fourth Edition, Brookings Institution, Washington, 1983, pp. 5-7.

³ The current federal income tax is moderately progressive—that is, those in higher income classes pay a larger share of their income in income tax than do those in lower income classes. But it is estimated that the total U.S. tax system (federal, state, and local) is much less progressive, perhaps roughly proportional over most of the income range—that is, people in nearly all income classes pay about the same share of their income in taxes.

⁴ The tax system may, of course, be consciously used to influence economic behavior, such as by giving an investment tax credit to stimulate capital formation. Often, however, the impact of the tax system on economic decisions and behavior may not be explicit or even recognized, leading in many instances to distortion in the allocation of resources or to restrictions on the growth of output or productivity.

⁵ Joseph A. Pechman, *Federal Tax Policy*, Fourth Edition, p. 74.

gains was excluded, and royalties income could be reduced by the appropriate depletion allowance. Total income so computed is then adjusted to give adjusted gross income. For example, payments into Individual Retirement Accounts (IRA's) or Keough retirement plans can be deducted. Taxable income is then computed by subtracting from adjusted gross income the dollar value of personal exemptions claimed for taxpayer status, dependency, age and blindness, and the dollar value of allowable deductions. Deductions now include extraordinary medical expenses, interest paid on home mortgages and taxes paid on owner-occupied houses, charitable contributions, income and sales taxes paid to state and local governments, and certain expenses of earning income.

The appropriate tax rates are then applied to taxable income to determine income tax liability before various tax credits. Rates for 1984 for married people filing joint returns are shown in Table 1. The range of taxable income is divided by brackets, and the income in each bracket is taxed at the percentage rate shown. These bracket rates, also known as marginal rates, apply only to the slice of income in a particular bracket and not to all income. The graduated increases in rates from one bracket to the next as income increases are primarily responsible for the progressivity of the current income tax system.⁶ Subtraction of the value of various tax credits, such as for the costs of home energy conservation or for political contributions, gives income tax liability after credits.

Dissatisfaction with the current income tax arises from concerns that it falls short of the goals of a good tax system. First, income tax law and the filing of returns are seen as having become exceedingly complex, thus making taxpayer compliance difficult, time-consuming, and expensive.⁷ Second, the fairness of

the distribution of the tax burden is questioned, both in terms of horizontal equity and in terms of vertical equity. The principles of simplicity and fairness have suffered from a tendency over the years to try to do too much with the income tax. Special provisions such as tax credits to stimulate capital formation or to promote energy saving, exclusion from the tax base of certain types of income like capital gains, deductions of mortgage interest payments and property taxes on houses, and similar tax preferences make the current income tax more complex and narrow the tax base.

Narrowing of the taxable income base leads to perceived violation of the principle of horizontal equity by making it possible for people with the same incomes to have different tax liabilities. There is also concern that the current income tax does not meet the principle of vertical equity.

Specifically, there is a concern whether a progressive tax structure best meets the ability-to-pay criterion for distributing the tax burden. For instance, some argue that the range in marginal rates is too large and that the marginal rates are too high at the upper end of the income scale.

⁶ A couple with taxable income of \$25,000 would pay a marginal rate of 25 percent on \$400, 22 percent on \$4,400, and so on. Their average rate on \$25,000 of taxable income would be about 14 percent. A couple with taxable income of \$16,000 would pay an average rate of about 11 percent. Tax paid as a percent of a broader income base concept gives the effective tax rate. A schedule of such rates by income class is considered to be a more meaningful indicator of the distribution of tax burden. The broader income base used may be adjusted gross income (income before the subtraction of personal exemptions and allowable deductions) or, even more broadly, total income (before the exclusion of various forms of income).

⁷ It has been estimated that about 300 million hours are spent every year filling out personal income tax forms and that about 40 percent of taxpayers use professional help in preparing their returns. *Revising the Individual Income Tax*, Congressional Budget Office, Washington, 1983, p. 2.

Lastly, the current income tax is believed to have too much influence on economic decisions and behavior. This concern reflects the belief that the current income tax leads to choices that reduce work effort, saving, and investment, with deleterious effects on the growth of output and productivity.

The federal individual income tax has not been a static system. Many changes have been made over the past 40 years.⁸ The biggest changes in recent years were the Economic Recovery Tax Act of 1981 (ERTA), which sharply reduced individual income tax rates, and the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA), which recaptured some of the revenue loss to ERTA while keeping ERTA's rate reductions intact. Even including these changes, alterations in the tax code have stopped far short of the large-scale overhaul now being discussed.

Not everyone is convinced that a sweeping overhaul of the tax system is inevitable in the near future—or even necessary.⁹ But, the coming together at this time of a recognition of the budget deficit problem, a perception of need for more fairness and simplicity in personal taxation, and a belief that the current tax system inhibits necessary growth in work effort, savings, and investment makes the issue of substantial alteration of the tax system worthy of attention. This article now examines vari-

⁸ For a chronology of changes, see David Paris and Cecelia Hilgert, "70th Year of Individual Income and Tax Statistics, 1913-1982," U.S. Department of the Treasury, *Statistics of Income Bulletin*, Winter 1983-84, pp. 2-3.

⁹ "[There is no] reason to make radical changes in the federal tax system in the expectation that they will produce miracles. Notwithstanding its defects, the U.S. federal tax system is probably the best in the world. It produces a large amount of revenue, but it is less burdensome than most systems. It is moderately progressive, and compliance is high." Joseph A. Pechman, "Tax Policies for the 1980s," p. 169, in Pechman and N. J. Simler, eds., *Economics in the Public Service*, W. W. Norton & Co., New York, 1982.

TABLE 1
Federal individual income tax rates, 1984
(Married persons filing joint returns)

<u>Taxable income (dollars)</u>	<u>Tax rates (percent)</u>
Up to \$ 3,400	0
3,400-5,500	11
5,500-7,600	12
7,600-11,900	14
11,900-16,000	16
16,000-20,200	18
20,200-24,600	22
24,600-29,900	25
29,900-35,200	28
35,200-45,800	33
45,800-60,000	38
60,000-85,600	42
85,600-109,400	45
109,400-162,400	49
\$162,400 and over	50%

Source: Internal Revenue Code.

ous alternatives to the current income tax.

Tax base broadening

One approach to income tax reform that has received considerable support in recent years is base broadening with associated reductions in rates. The larger the tax base established by the definition of taxable income, the lower the tax rates necessary for a given amount of revenue. Many economists and other tax experts contend that the erosion of the income tax base through the application of various exclusions and deductions has created problems of fairness in distributing the tax burden and higher tax rates than would otherwise be needed. As a result, many commentators recommend a broadening of the income tax base by removing most, if not all, the exclusions

and deductions.¹⁰

Comprehensive broadening of the tax base could ease some of the dissatisfactions with the current income tax.¹¹ Simplification of tax law by removing the current exclusions from taxable income, allowable deductions, and tax credits would make compliance and administration easier. Horizontal equity could also be improved by not taxing different kinds of income differently, and taxpayers with similar incomes before taxes would thus be more likely to be taxed at similar rates. Broadening the base would also allow the same revenue to be raised with significantly lower marginal tax rates, reducing the influence of high marginal rates on economic decisions and behavior. The structure of the new lower rates would be open to consideration. A graduated rate structure could be retained with whatever degree of progressivity was wanted. Rate brackets might also be widened, reducing the number of steps in the progressivity ladder.

¹⁰ Such a movement toward a comprehensive income tax base is in the direction of what is recognized in much of the public finance literature as the ideal income tax base—the Haig-Simons definition of income. This definition, also known as the accretion concept, defines income as the sum of consumption and accumulation (or savings) in a given period. For Simons, personal income for tax purposes “is merely the result obtained by adding consumption during the period to ‘wealth’ at the end of the period and then subtracting ‘wealth’ at the beginning.” Haig emphasized the power to satisfy economic wants conferred by the acquisition of income, whether spent or saved. “Income is the *money value of the net accretion to one’s economic power between two points in time.*” Both quoted in Richard Goode, “The Economic Definition of Income,” in Joseph A. Pechman, ed., *Comprehensive Income Taxation*, The Brookings Institution, Washington, 1977, p. 8.

¹¹ One difficulty with comprehensive base broadening is that every income exclusion, allowable deduction, and personal exemption exists under current law because it benefits some group, and those groups would be reluctant to give up their benefits. Public opinion polls have shown that a solid majority of Americans favor a broad based, low-rate tax structure, but far more people oppose the repeal of specific major deductions, such as home mortgage interest payments and medical expenses. *Revising the Individual Income Tax*, p. 33.

One illustrative design for a comprehensive income tax is provided in a recent study by Pechman and Scholz. The design includes in the tax base a number of sources of income currently excluded, restricts the use of itemized deductions, and increases both the zero bracket amount (standard deduction) and the size of personal exemptions. The result is a larger estimated taxable income in 1984 than under the current income tax, and one that would yield about 25 percent more revenue at current tax rates. Tax liabilities would change substantially for some income classes. Both taxable income and tax liability would be less than under current law for taxpayers with incomes under \$20,000 and more for taxpayers with incomes over \$20,000.¹²

The same illustrative broader base would also allow for a reduction of tax rates by an average of 22 percent while still providing the same total revenue given by the current income tax base and rates. If all of the increase in the tax base were used for general rate reductions so that the same total revenue was raised, the present distribution of tax burden across income classes could be preserved with a marginal rate structure containing seven taxable income brackets with rates ranging from 9 percent to 28 percent of the comprehensive income base.¹³ That structure would be compared with 14 taxable brackets for the current income tax with rates ranging from 11 percent to 50 percent. Rate reductions would not be spread evenly across taxpayers, however. Those now benefiting from tax preferences would owe more taxes when their particular exclusions, deductions, exemptions, or credits were returned to the tax base. Those

¹² For details and further discussion and analysis, see Joseph A. Pechman and John Karl Scholz, “Comprehensive Income Taxation and Rate Reduction,” *Tax Notes*, October 11, 1982, pp. 83-93. Other designs are also presented in the article.

not now benefiting from such preferences would owe less.

In summary, if this particular broad base concept were adopted without changing current tax rates, substantially more revenue would be raised and the tax burden would be reduced for those with incomes less than \$20,000 and increased for those with incomes more than \$20,000. Tax liabilities would increase substantially for those with incomes over \$50,000. On the other hand, using this broad base concept to raise the same revenue as the current income tax without changing the distribution of the tax burden, marginal tax rates could be reduced for nearly all income classes and tax brackets could be widened. In the extreme case of bracket widening, a single flat tax rate could be adopted so that all taxpayers would pay the same marginal tax rate on increases in their incomes.

Flat rate income tax

The flat rate income tax has received considerable attention and support in recent discussions of tax reform. Instead of a graduated

rate schedule, such as is used in the current income tax, a flat rate income tax applies a single rate to the income base. The definition of income used as a base for a flat rate tax is open to choice, and affects the level of the flat rate needed to raise the desired revenue. To produce the same revenue from a flat rate tax as from the current income tax, for example, a much higher flat rate would be required if no changes were made in the current tax base than if a more comprehensive tax base were adopted. Flat rate tax proposals usually call for some base broadening both to simplify compliance and administration and to allow a lower tax rate.¹⁴

Consideration of the substitution of a flat rate tax for the current income tax also involves the effect a reduction of high marginal tax rates might have on work effort, savings, and investment. Though considerable uncertainty remains, it is widely believed that high marginal tax rates paid by upper income groups tend to restrict labor supply and work effort and to reduce savings. Research shows generally that, at best, relatively small increases in labor supply and saving result from reductions in marginal tax rates.¹⁵

One appeal of the flat rate tax is that proponents believe that it would distribute the income tax burden more equitably than a progressive income tax. Both the flat rate tax and the progressive income tax are said to be based on the notion of ability to pay. The difference is that the progressive tax presumes that the ability to pay criterion is met when those with higher incomes pay a larger share of their income in taxes. With a flat rate tax

¹³ Tax Rate Schedule, 1984,
For Illustrative Broad Base Concept*

Taxable income (dollars)	Rate (percent)
Up to \$4,000	0
4,000-9,000	9
9,000-14,000	15
14,000-24,000	18
24,000-34,000	21
34,000-54,000	24
54,000-74,000	26
\$74,000 and over	28%

*One rate schedule for all taxpayers. Two-earner married couples receive a deduction of 25 percent of lower earner's earned income.

Source: Pechman & Scholz, p. 88.

¹⁴ For further discussion of the potential for greater simplicity and ease of administration of a flat rate tax, see *Revising the Individual Income Tax*, pp. 39-41, 44.

¹⁵ For a brief review of these issues, see *Revising the Individual Income Tax*, pp. 32-38.

the ability to pay criterion is presumably met when higher income taxpayers pay a higher dollar amount in taxes even though the share of income paid is the same for all taxpayers. Flat rate tax proposals often include a personal exemption that, by leaving some income untaxed, would provide a measure of relief for low-income taxpayers.

Questions of equity in taxation are especially difficult. They involve problems of interpersonal comparisons regarding both ability to pay and the appropriate distribution of the tax burden among taxpayers. Thus part of the argument for or against a flat rate tax rests on the public's attitude toward the equitable distribution of tax burden, and substitution of a flat rate tax for the current income tax would involve significant changes in that distribution.

Together, the flat tax rate, the taxable base adopted, and the extent (if any) of low-income relief determine the distribution of tax liability by income class and by individual tax returns. Table 2 shows estimates of the flat tax rate needed to generate the same revenue as the current income tax for various tax bases, and how such different tax structures would affect the distribution of tax liabilities by income classes.¹⁶ These estimates indicate that if the tax base were broadened by including all capital gains and eliminating all personal exemptions and deductions (System 1), a flat rate of 11.8 percent would generate the same revenue as 1984 tax law.¹⁷ With no changes in the current tax base, a flat tax rate of 18.5 percent would be needed to raise the same revenue

(System 2).

Given the progressivity of the current income tax structure, some redistribution of the tax burden would result from adoption of a flat rate tax. Table 2 shows estimates of the redistribution by income class for various flat rates. Under Systems 1 and 2, taxpayers in the lowest income groups would receive large tax increases, and high-income taxpayers would receive large tax reductions. A flat rate of 11.8 percent applied to a broad base as in System 1 would increase taxes for all income classes below \$30,000. Taxpayers in the \$15,000 to \$20,000 income class would pay an average of about \$470 more than under 1984 law. Every income class above \$30,000 would pay lower taxes, and those with incomes above \$100,000 would pay about 50 percent less than under 1984 law.

With no change in the current tax base (System 2), the flat rate—here, 18.5 percent to generate the same revenue—is obviously a reduction in tax rates for high-income taxpayers and an increase for low-income taxpayers. There would be some differences in outcomes from System 1, because current exclusions and deductions would still be used. Tax payments would be higher than under the current law for lower income groups, including those in the \$30,000 to \$50,000 range, and lower for groups with incomes above \$50,000.

Because of the increase in tax payments for low-income groups under flat tax rate plans such as Systems 1 and 2 of Table 2, most flat tax rate proposals include some form of low-income relief. System 3 of Table 2 shows a flat rate plan with low-income relief, both direct and indirect. Indirect low-income relief is achieved by broadening the tax base to include some of the currently excluded income of higher income groups. The base is broadened by adding all long-term capital gains to the System 2 base (1984 law taxable income)

¹⁶ From Joseph J. Minarik, "The Future of the Individual Income Tax," *National Tax Journal*, September 1982, p. 237.

¹⁷ Income levels in 1981 were used in making the estimates. The earned income credit, the two-earner couple deduction, and the IRA and Keough provisions were excluded from the 1984 law and from the flat rate systems to facilitate comparisons.

TABLE 2
Distribution of tax liabilities
under alternative flat rate tax systems
Compared with 1984 Tax Law at 1981 Income Levels

Income (thou- sands)	Number of taxable returns (thousands)	Tax liability 1984 law (millions)	System 1			System 2			System 3		
			Tax liability (millions)	Change (percent)	Change (dollars per return)	Tax liability (millions)	Change (percent)	Change (dollars per return)	Tax liability (millions)	Change (percent)	Change (dollars per return)
Up to \$5	6,482	\$403	\$5,479	1.260%	\$783	\$1,574	291%	\$181	\$1,996	395%	\$246
5-10	15,057	5,772	14,280	147	565	8,752	52	198	5,345	-7	-28
10-15	13,092	12,526	19,700	57	548	17,610	41	388	12,698	1	13
15-20	10,737	17,462	22,496	29	469	22,665	30	485	18,802	8	125
20-30	16,800	44,080	49,701	13	335	52,871	20	523	48,170	9	243
30-50	13,568	63,833	60,579	-5	-240	66,419	4	191	68,804	8	366
50-100	3,580	38,687	27,389	-29	-3,156	30,486	-21	-2,291	36,104	-7	-722
100-200	631	18,656	9,872	-47	-13,921	10,743	-42	-12,540	14,344	-23	-6,834
Over \$200	164	16,385	7,675	-53	-53,107	7,129	-56	-56,438	11,843	-28	-27,692
TOTAL	80,110	\$217,803	\$217,172	-0.3%	\$-8	\$218,249	0.2%	\$6	\$218,106	0.1%	\$4

Source: Joseph J. Minarik, "The Future of the Individual Income Tax," *National Tax Journal*, September 1982, p. 237.

System 1: 11.8 percent tax on adjusted gross income with long-term capital gains included in full.

System 2: 18.5 percent tax on 1984 law taxable income less zero bracket amount.

System 3: 18.7 percent tax on 1984 law taxable income less zero bracket amount, with long-term capital gains included in full, and no itemized deductions, with increased exemption and zero bracket amount.

and allowing no itemized deductions. Direct low-income relief is achieved with an increase in the personal exemption from \$1,000 under current law to \$1,500, and an increase of the zero-bracket amount from \$3,400 to \$6,000 for joint returns. With these changes, the flat rate needed for the same revenue under System 3 is 18.7 percent. The rate is little more than under System 2, but the low-income relief of System 3 shifts the burden away from low-income groups toward those with higher incomes. Compared with Systems 1 and 2, the tax increases are smaller with System 3 for groups with incomes below \$30,000 and tax reductions are smaller for those with incomes above \$50,000.

The illustrative flat tax rate structures in Table 2 show that, in order to raise the same revenue as under the current law, lower income groups would pay more tax and higher

income groups would pay less with a flat rate tax even if the tax base were broadened and direct low-income relief were added. Taxpayers in the middle-income ranges would also pay more tax following a switch to a flat rate tax. Furthermore, the illustrations indicate only what would happen on average; some taxpayers would be affected more than others. Those now benefiting from tax preferences that would be lost with base broadening would be worse off following a change to a flat rate tax than those without such preferences. For example, homeowners no longer able to deduct mortgage interest payments and local real estate taxes would have greater tax increases than renters with the same incomes. While it might be argued that these tax preferences for homeowners were not equitable in the first place, the change would be drastic, probably affecting the net worth of homeown-

ers as well as their disposable incomes.

An expenditure tax

An expenditure tax is a way of taxing consumption instead of income. Most simply put, under an expenditure tax system an individual would be taxed on his income less his savings. He would count his income as cash receipts from all sources—including wages and salaries; interest, dividends, and rent; proceeds from the sale of assets; and funds borrowed. From this total, he would subtract his savings—such as additions to financial accounts, purchases of real or financial assets, and debt repayments. The difference would be his expenditure tax base. Presented in this simple form, a comprehensive tax base is used for computing expenditure tax liability.

Support for taxing consumption can be traced from Thomas Hobbes in the seventeenth century to John Stuart Mill in the nineteenth century and to Irving Fisher in the first half of this century. Recent discussion of an expenditure tax began with the publication of Nicholas Kaldor's book in 1955 and picked up momentum in the 1970s.¹⁸ Much of this discussion addresses whether, in terms of fairness, income or consumption is the appropriate base for personal taxation. Recently, however, taxation of consumption expenditures has been proposed as a replacement for the income tax on grounds that tax system disincentives for saving and investment could be

removed or greatly reduced by excluding savings from taxation.

The main reason for changing from an income tax to an expenditure tax would be to remove the inhibitions to saving under the current income tax. While there are some forms of preferential treatment for saving in the current income tax system, such as the deductibility of IRA's, the expenditure tax approaches the matter directly and comprehensively by exempting all current period savings from taxation in that period. The expenditure tax, therefore, is expected to increase the incentive to save by increasing the after-tax rate of return. The important question is the magnitude of the increase. As Pechman has said:

The expenditure tax would encourage saving more than an equal-yield income tax distributed in the same proportions by income classes. However, since the elasticity of saving with respect to the rate of return is not known, there is no way to predict how much saving would increase if the income tax was replaced by an expenditure tax.¹⁹

Advocates of the expenditure tax believe that consumption is a fairer base for taxation than income. Exercising the power to consume marketable output, they maintain, is a better measure of ability to pay than income, which is the sum of consumption plus the accretion of power to consume. Furthermore, in a line of reasoning descended from Hobbes, they argue that "consumption, a measure of what people take *out* of the economic system, is a more appropriate basis for taxation than income, a measure of what they contribute to the economic system in productive perform-

¹⁸ Nicholas Kaldor, *An Expenditure Tax*, George Allen and Unwin Ltd., London, 1955; William D. Andrews, "A Consumption-Type or Cash Flow Personal Income Tax," *Harvard Law Review*, April 1974, pp. 1113-88; U.S. Department of the Treasury, *Blueprints for Basic Tax Reform*, 1977; Institute for Fiscal Studies, *The Structure and Reform of Direct Taxation* (the Meade Committee Report), Allen & Unwin, London, 1978; and Joseph A. Pechman, ed., *What Should Be Taxed: Income or Expenditure?* The Brookings Institution, Washington, 1980.

¹⁹ Pechman, "Tax Policies for the 1980s," p. 158.

ance."²⁰

Not all tax experts, however, are persuaded of the greater fairness of taxing consumption. Some hold that ability to pay is better measured by income, which is the means of controlling resources for both consumption and investment. In a practical sense, an expenditure tax would tend to make taxes higher during the years of youth and old age and lower during the middle years of life.

As with an income tax, the broader the base of an expenditure tax, the lower the rates needed to provide the same revenue. The argument that an expenditure tax would be simpler than the current income tax rests largely on the use of a comprehensive tax base. In practice, however, such deductions as state and local income taxes, charitable contributions, and health care costs could be applied to an expenditure base just as they are now to an income base. An expenditure tax base could be subject to the same eroding pressures as the income tax base, with the result that it might lose some of its attraction as a cleaner and simpler approach to personal taxation.

Recent discussion of an expenditure tax has assumed a graduated rate structure, with the degree of progressivity open to choice. In fact, adoption of an expenditure tax implies progressivity, for if roughly proportional taxation of consumption were wanted, an indirect consumption tax, such as a value-added tax or a federal retail sales tax, could be used.²¹

The Congressional Budget Office, using estimates of saving rates by income class, has designed illustrative graduated rate schedules

for two expenditure tax bases.²² Both schedules are designed for the same revenue yield and for the same overall distribution of tax burden by income class as estimated for the current income tax in 1984 (Table 3).

For the broad based consumption tax shown in Table 3, taxable consumption equals adjusted gross income under current law (that is, no itemized deductions are allowed) less personal exemptions and the zero bracket amount, less estimated net saving, plus currently excluded long-term capital gains. To produce the same revenue and distribution of the tax burden as under 1984 income tax law, tax rates on consumption would range from 10 percent to 35 percent in five brackets. The table also shows that removing certain elements from the expenditure tax base would require higher rates to give the same revenue yield. The narrow base of Table 3 is simply taxable income under current law with all savings deductible. Rates required to produce 1984 income tax law revenue on that consumption base would range from 10 percent to 60 percent in seven brackets. Obviously, other revenue yields and distributions of the burden of the expenditure tax could be achieved with other rate schedules.

Questions about the desirability of an expenditure tax include the treatment of gifts and bequests, the potential for increasing the concentration of wealth, and the transition from an income tax system to an expenditure tax system.

The questions of the treatment of gifts and bequests, and of potential increases in the concentration of wealth, are related. Savers can give gifts in their lifetimes or make bequests at their deaths. Both gifts and bequests could be treated as consumption by the givers and

²⁰ David F. Bradford, "The Case for a Personal Consumption Tax," in Pechman, ed., *What Should be Taxed: Income or Expenditure?* p. 102.

²¹ Michael J. Graetz, "Expenditure Tax Design," in Joseph A. Pechman, ed., *What Should Be Taxed: Income or Expenditure?* pp. 162-63.

²² *Revising the Individual Income Tax*, pp. 127-29.

TABLE 3
Marginal consumption tax rates
and taxes due by taxable consumption class

Taxable consumption (in dollars)	Broad based consumption tax*		Narrow based consumption tax†	
	Marginal tax rate (in percent)	Tax due at bracket bottom (in dollars)	Marginal tax rate (in percent)	Tax due at bracket bottom (in dollars)
Up to \$2,100	10%	0	10%	0
2,100-4,200	10	210	10	210
4,200-8,500	10	420	10	420
8,500-12,600	15	850	25	850
12,600-16,800	25	1,465	30	1,875
16,800-21,200	30	2,515	40	3,135
21,200-26,500	30	3,835	40	4,895
26,500-31,800	30	5,425	50	7,015
31,800-42,400	30	7,015	50	9,665
42,400-56,600	30	10,195	50	14,965
56,600-82,200	35	14,455	50	22,065
82,200-106,000	35	23,415	50	34,865
106,000-159,000	35	31,745	55	46,765
159,000-212,000	35	50,295	60	75,915
\$212,000 and over	35%	\$68,845	60%	\$107,715

Source: Congressional Budget Office.

* Taxable consumption equals adjusted gross income under current law less personal exemptions and zero bracket amount, less estimated net saving, plus excluded portion of nominal long-term capital gains.

† Taxable consumption equals taxable income under current law, less zero bracket amount, less estimated net saving.

thus included in their tax bases. Or, they could be taxed when used for consumption by the receivers. Taxing both seems unfair, and the logic of the expenditure tax suggests that taxing the receivers when they use the gifts or bequests for consumption would be more appropriate. But this approach would make possible the accumulation of untaxed wealth that could be passed on to further untaxed accumulation, leading to greater concentration of wealth. While this problem might be handled through gift and estate taxes, or even

some form of wealth tax, proponents of an expenditure tax argue that such taxes would offset some of the stimulus to saving that the expenditure tax is intended to create.

Problems would also likely characterize the transition from the current income tax system to an expenditure tax system. These problems include the taxation of consumption from wealth accumulated before the changeover and already taxed as income. (Wealth not taxed when acquired under current law, such as IRA's, would present no problem.) One solu-

tion would be to require that all taxpayers declare their accumulated wealth at the time of changeover and include this wealth in receipts for the first year of the expenditure tax. Consumption from that wealth would then be fully taxed. Such an approach, however, would give incentive to conceal wealth at the time of declaration. And it would also impose special difficulties on taxpayers in or near their retirement years, who were depending on their already-taxed savings to support their consumption spending. In these cases, some kind of relief would probably be needed.

It appears that a drastic change from the current income tax to an expenditure tax would allow, at best, mixed gains in simplicity and fairness, and limited and uncertain gains in the stimulation of saving.

An indirect consumption tax

A progressive expenditure tax is only one way of moving the tax system away from an income base toward a consumption base. Consumption taxes also can be indirect taxes levied on commodities or transactions as well as direct taxes levied on people according to their consumption expenditures. Some indirect consumption taxes, such as excise taxes on specific commodities, are narrow based. A broad based indirect tax is viewed as a preferable means of taxing consumption, because narrow based taxes tend to distort consumption decisions as well as to produce less revenue. Selection of a broad based indirect consumption tax can be reduced to a choice between the value-added tax and the retail sales tax—both of which are essentially flat rate consumption taxes.

The value-added tax is collected from firms at every stage of production throughout the economy. In its consumption-type form, which exempts investment goods from tax-

tion, the tax is levied on the difference between a firm's sales and the value of its purchased inputs, including capital goods. This is the "value added" to output by the firm.²³ Tax liability can be computed by applying the tax rate to total sales and deducting the tax paid on total purchases of intermediate and capital goods. This is called the tax credit method. Alternatively, the tax rate could simply be applied to the firm's net sales (sales less input purchases). Though both methods give the same tax outcome, the tax credit method is believed to give better compliance because one firm's tax liabilities become another's credits.

With taxes being passed on at every stage of production, the final consumer bears the burden of the VAT, making it a general consumption tax. The VAT is, therefore, essentially equivalent in base and outcome to a general retail sales tax—both are indirect, broad based consumption taxes. While the VAT is now widely used in western Europe, the retail sales tax is better known in the United States where it is levied in nearly all states and by many local governments. Although both the VAT and the retail sales tax are collected from sellers, the latter is a single-stage tax collected only at the retail level.

Some tax experts find little reason for choosing between the VAT and the retail sales tax, with regard to either equity or efficiency.²⁴ A federal retail sales tax might be preferred over a VAT because it could be eas-

²³ Other types of VAT's may extend the tax to net investment and to gross investment. See Dieter Pohmer, "Value-Added Tax After Ten Years: The European Experience," in Sijbren Cnossen, ed., *Comparative Tax Studies: Essays in Honor of Richard Goode*, North Holland Publishing Co., Amsterdam, 1983, pp. 247-48.

²⁴ For example, Pechman, *Federal Tax Policy*, Fourth Edition, p. 199; and John G. Head and Richard M. Bird, "Tax Policy Options in the 1980's," in Cnossen, ed., *Comparative Tax Studies*, p. 20.

ier to administer. Consumers and businesses are already familiar with retail sales taxes, fewer taxpaying firms would be involved, and determination of tax liability would be simpler.

As consumption taxes, both the VAT and a federal retail sales tax have received support as contributing to increased saving and investment when compared with the current income tax.²⁵ At the same time, both taxes are seen as sharing a number of problems. In terms of effective tax rates on income, both the retail sales tax and the VAT are regressive, that is, low-income taxpayers who spend more of their income on consumption would bear a heavier tax burden relative to high-income taxpayers. Substitution of such consumption taxes for some or all of the current income tax would make the total tax structure more regressive. Proponents of the VAT or the retail sales tax have suggested that some of the regressivity of these taxes could be mitigated by exempting from taxation certain classes of consumer spending, such as for food, medical care, clothing, and housing.

Other criticisms of a VAT or federal retail sales tax also have been raised. Prices of consumer goods would rise with the imposition of a VAT or a sales tax, giving at least a one-time boost to the overall price level. Inflationary effects could follow, for example, through the impact of such a price level increase on indexed wage contracts. Adoption of a federal broad based consumption tax such as a VAT or a retail sales tax would also put the federal government in a field of taxation that has historically been reserved to state and local governments. Those governments could very well argue that their capacity to raise revenue was

being impaired.

Despite such criticisms, a broad based consumption tax such as a VAT or a federal retail sales tax continues to attract support as a replacement or complement to the current income tax. The attractiveness of such a tax comes both from its presumed stimulus to saving and from its potential revenue yield. Even with exemptions for low-income relief, a national broad based consumption tax would be a powerful producer of revenue. The Congressional Budget Office estimates that, after exempting some forms of consumption, such as housing, food, and medical care, a national consumption tax base of about \$1.2 trillion would remain in 1985. Applied to that tax base, a rate as low as 5 percent would yield \$60 billion in revenues.²⁶ With the same tax base, a rate of over 25 percent would be required for a broad based consumption tax to replace all of the \$340 billion in revenue now projected to be received from individual income taxes in fiscal year 1985.

Summary

Recent years have brought increasing concern about the current federal income tax. Questions have been raised about its fairness and complexity and about its effects on incentives to work, save, and invest. One result of such concerns is active discussion of alternatives to the current income tax, among them a flat rate income tax and taxation of consumption instead of income. While some of the alternatives could be structured more simply than the current system, especially through base broadening, the realities of pressure from taxpayers might prevent such simplification.

²⁵ See "The New Focus on Consumption Taxes," *The Morgan Guaranty Survey*, April 1983, pp. 1-6.

²⁶ Congressional Budget Office, *Reducing the Deficit: Spending and Revenue Options*, Washington, February 1984, p. 196.

Significant shifting of the tax burden toward lower income groups would result from use of a simple flat rate tax on income. Use of an expenditure tax raises questions of equity, and of difficulties in compliance and administration, that have to be weighed against potential benefits in reducing tax disincentives for saving. While sales taxes, whether of the retail sales type or the VAT type, have great potentials for raising revenue they also have drawbacks, such as a regressive distribution of the tax burden, that have to be set against their

benefits.

It appears, therefore, that the substantial changes in the tax system represented by these alternatives bring difficulties of their own. Careful consideration of such difficulties must be a part of the expected debate over fundamental changes in the federal tax system. The best solution may not be the jettisoning of the current income tax, but serious efforts to improve its fairness and simplicity, along with some complementary and perhaps temporary revenue enhancement actions.

Capital Adequacy at Commercial Banks

By Karlyn Mitchell

Growing competition among financial institutions combined with sharp swings in economic activity has put tremendous strains on commercial banks in recent years. In the early 1970s, greater volatility in financial markets forced banks to develop more sophisticated portfolio management strategies to maintain profitability. Starting in the late 1970s, financial market deregulation added to the strain on banks by quickening the pace of change in the financial services industry. By 1980, banks with loans to U.S. farmers and Latin American countries had suffered declines in loan quality. In 1982 and again in 1983, record numbers of banks failed as the effects of severe economic recession lingered.

These events have reopened the issue of capital adequacy at commercial banks. Bankers, the agents of bank shareholders, try to maintain capital adequate to attract deposits and operate profitably. Bank supervisors, the agents of the public, try to maintain capital

adequate to protect the deposit insurance fund and promote a sound financial system. In recent years, however, bank capital has increased little relative to bank assets despite circumstances that seemed to make higher capital levels advantageous for bank shareholders and the public. Concern over this situation led to the International Lending Supervision Act of 1983, which empowers federal banking agencies to set and enforce minimum capital requirements. Pursuant to the Act, these agencies recently proposed new capital requirements.

This article argues that although minimum capital requirements are an imperfect means of limiting the risks posed by inadequate bank capital, they are necessary in light of current and prospective trends in the financial services industry. Without enforceable minimum capital requirements, banks would tend to maintain capital levels that posed too great a risk to the financial system. The first section of the article provides background information on the bank capital issue, including evidence of a long-run decline in bank capital ratios. The

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second section argues that low bank capital ratios have recently resulted in a riskier banking system. The third section discusses policy options for reducing banking sector risk and concludes that enforceable minimum capital requirements are the best means of restoring safety and soundness to the banking system.

Background on bank capital and regulation

Definitions and functions of bank capital

Although unequivocal to accountants, the definition of capital is a matter of controversy among bankers and bank supervisors. To accountants, capital is equivalent to ownership or equity, which is raised either by selling stock or retaining part of earnings. But because equity does not coincide with the functions that capital performs the term "capital" has acquired alternative definitions.¹

Capital performs two functions: it finances the purchase of fixed assets and it protects creditors. Because equity performs both functions, it is included in all definitions of capital. Equity is well suited to financing purchases of fixed assets because it represents long-term funding. Equity protects creditors by enabling a firm to survive losses sustained over several periods. This is because owners can liquidate some of a firm's assets to pay creditors if losses would otherwise cause the firm to default.

Bankers have argued that loan loss reserves and long-term debt should also be included in the definition of bank capital because these accounts perform some of the functions of capital for banks. Loan loss reserves represent

earnings retained to absorb losses. When a loss occurs, bankers reduce the reserve account instead of current earnings. By absorbing losses, loan loss reserves protect creditors, thereby performing one function of capital. Long-term debt, mainly subordinated notes and debentures, represents long-term loans to banks. Because this debt is long term, it can be used to finance fixed assets. Because long-term creditors are paid after depositors if the bank fails, long-term debt protects depositors. Thus, long-term debt serves both functions of capital.

Bankers' arguments have gained some acceptance among bank supervisors. Supervisors now agree that loan loss reserves should be counted as capital. Only recently, however, have supervisors begun to accept long-term debt as capital on grounds that excessive use of debt could cause a bank to fail.

Differences between the accounting definition of capital and the various functional definitions can be illustrated with aggregate bank balance sheet data. On December 31, 1983, the domestic offices of insured commercial banks held \$2,018.5 billion in assets, \$140.0 billion in equity, \$17.4 billion in loan loss reserves, and \$6.5 billion in subordinated notes and debentures. According to the accounting definition, banks had capital of \$140.0 billion and a capital-asset ratio of 6.9 percent. Broadening the definition to include loan loss reserves, banks had capital of \$157.4 billion and a capital-asset ratio of 7.8 percent. Broadening the definition of capital still further to include subordinated notes and debentures, banks had capital of \$163.9 billion and a capital-asset ratio of 8.1 percent.

Regulation of bank capital

To ensure the safety and soundness of the financial system, U.S. banks have been regu-

¹ Although market values are more appropriate, capital and capital ratios are measured in terms of book values throughout this article.

lated since colonial times. The more specific objectives of bank regulation have been to protect depositors, to promote a stable money supply by preventing financial panics, and to foster an efficient and competitive banking system that facilitates financial intermediation. To achieve these objectives, the government has limited the activities and practices of banks and controlled the environment in which banks operate. In addition, the government has created several regulatory agencies to supervise bank activities.

Bank supervisors have long been concerned about bank capital because of the central role capital plays in the safety and soundness of individual banks. Determining the amount of capital needed to ensure the safety and soundness of the financial system, though, has always been one of the thorniest problems facing supervisors. From time to time, supervisory agencies have set informal capital guidelines for the banking industry based on their assessments of the level of risk facing the industry. But because capital adequacy also depends on bank-specific factors, such as investment policies and management quality, supervisory agencies have relied mainly on periodic on-site bank examinations to determine if individual banks hold enough capital. After reviewing a bank's loan portfolio, financial statements, and operating policies, supervisors either accept the bank's capital as adequate or request that additional capital be raised.

The standards for capital adequacy have changed frequently over the years. In 1914, the Comptroller of the Currency stated that banks should maintain capital (equity)-deposit ratios of 10 percent. Capital adequacy was defined in terms of a capital-deposit ratio because the greatest risk facing banks then was the risk of sudden sizable deposit withdrawals. The 10 percent ratio remained the

norm until the 1930s, when the newly created Federal Deposit Insurance Corporation (FDIC) began using capital-asset ratios to gauge capital adequacy. Capital adequacy was redefined in terms of a capital-asset ratio because defaults on loans had replaced deposit withdrawals as the greatest risk facing banks. With the rapid expansion of federal debt during World War II, the capital-asset ratio ceased to be a useful measure of a bank's exposure to risk because virtually default-free Treasury securities comprised a large part of banks' assets. Bank supervisors came to gauge capital adequacy by the capital-risk asset ratio, where risk assets are defined as total assets less cash and Treasury securities. A 20 percent capital-risk asset ratio remained the norm until the 1950s, when bank supervisors began to develop more refined measures of capital adequacy.

Until recently, supervisors' standards for capital adequacy did not carry the force of law. Although supervisors could issue cease and desist orders against banks that refused to comply with requests for more capital, orders were rarely issued. Instead, supervisors relied heavily on persuasion to obtain compliance. Because increasing capital often hurts bank shareholders by diluting earnings, bankers' responses to requests for additional capital were based on a careful weighing of the costs of compliance and noncompliance. This situation changed last year with passage of the International Lending Supervision Act, which empowered federal banking agencies to establish minimum capital requirements and enforce them by issuing directives to capital-deficient banks. These directives may require banks to submit and adhere to plans to achieve supervisors' minimum capital requirements and are enforceable in the courts.²

Pursuant to the International Lending Supervision Act, the three federal bank supervisory

agencies—the FDIC, the Comptroller of the Currency, and the Federal Reserve—proposed new standards for bank capital adequacy last July. These standards are highlighted in Table 1. A notable feature of the standards is their uniformity across bank size. Heretofore, small banks had to maintain higher capital ratios than large banks on grounds that poor access to financial markets and poorly diversified portfolios made them riskier. But this argument has been invalidated by the ongoing integration of banking markets. Another feature of the proposed standards is their similarity across supervisory agencies. Although the Federal Reserve’s standards differ from the FDIC’s and the Comptroller’s, the differences are far smaller than in the past, thus reducing banks’ incentive to minimize regulation by changing supervisory agencies. Finally, the proposed standards represent an increase in capital requirements at large banks and a decrease at small banks.³

In addition to proposing different capital standards, the three federal bank supervisory agencies propose different approaches toward

enforcing these standards. The FDIC and the Comptroller regard their standards as rigid rules, the violation of which would result in a directive issued to the undercapitalized bank. In contrast, the Federal Reserve regards its standards as guidelines, the violation of which might not immediately result in a directive. The Federal Reserve prefers guidelines to rules because it regards rigidly defined standards as inappropriate in a rapidly changing world. By taking a flexible approach, the Federal Reserve believes it can maintain the safety and soundness of the banking system while allowing for unique circumstances at individual banks.

Historical trends in bank capital

In banking, as in other industries, the long-run trend has been toward lower capital ratios. Trends in various bank capital ratios since 1900 are shown in Chart 1. The equity-asset ratio declined almost continuously until after World War II, rose slightly during the 1950s, then declined again, leveling out at around 7 percent in the 1970s. Broadening the defini-

² In a sense, the establishment of legally binding capital requirements did not represent a radical departure from the past. Until recently, bankers and bank supervisors generally presumed that supervisors had the authority to enforce their capital guidelines, even though some believed that supervisors did not always use this authority effectively. Early last year, however, the Fifth Circuit Court of Appeals reversed a cease and desist order issued by the Comptroller to First National Bank of Bellaire on grounds of inadequate capital. Uncertainty about supervisors’ authority to enforce their guidelines undoubtedly motivated the section in the International Lending Supervision Act establishing minimum capital requirements.

³ Under the current standards, in force since December 1981, the FDIC defines benchmark capital adequacy as a 6 percent ratio of adjusted capital to adjusted assets. Lower ratios are allowed for certain banks judged to be sound in all respects, usually large banks. But the minimum ratio is 5 percent. (Adjusted capital is equity plus loan loss reserves less classified and some doubtful loans; adjusted assets are total assets less classified and some doubtful loans.)

In contrast to the FDIC, the Federal Reserve and the Comptroller currently define two capital standards for three size categories of banks. The minimum primary capital ratio is 6 percent for banks with assets of \$1 billion or less and 5 percent for larger banks. Three zones are defined for the total capital requirement, similar to the proposed standards. The lower limit of Zone 2, essentially the minimum total capital ratio, is 6 percent for banks with assets of \$1 billion or less, and 5.5 percent for banks with assets exceeding \$1 billion and with no multinational ties. The 17 largest banks, the multinationals, have no total capital requirement. (The primary capital ratio is equity plus loan loss reserves divided by total assets. The total capital ratio is essentially equity plus loan loss reserves plus some long-term debt divided by total assets.)

In comparison to the proposed capital standards, the current standards are more heterogenous across bank size, more stringent for small banks, and less stringent for large banks. In addition, the current standards are more heterogenous across supervisory agency.

TABLE 1

Federal bank supervisors and proposed capital standards

Federal Bank Supervisors

FDIC—Supervises all federally insured state banks that are not members of the Federal Reserve System in cooperation with state authorities.

Comptroller of the Currency—Supervises all national banks.

Federal Reserve—Supervises all member state banks in conjunction with state authorities, plus all holding companies.

Proposed Capital Standards

Primary Capital—The minimum ratio of primary capital to adjusted assets proposed by all three agencies is 5.5 percent.

Total Capital—The minimum ratio of total capital to total assets proposed by the FDIC and the Comptroller is 6 percent. The Federal Reserve proposes to gear the nature and intensity of its supervisory action to the zone within which a bank's ratio of total capital to adjusted assets falls.

Zone 1	at least 7 percent
Zone 2	6 to 7 percent
Zone 3	below 6 percent

Banks in Zone 1 have adequate capital provided the primary capital requirement is met. Banks in Zone 2 will be presumed to have adequate capital provided they are sound in all other respects. Banks in Zone 3, absent extenuating circumstances, will be presumed to have inadequate capital, even if the primary capital requirement is met.

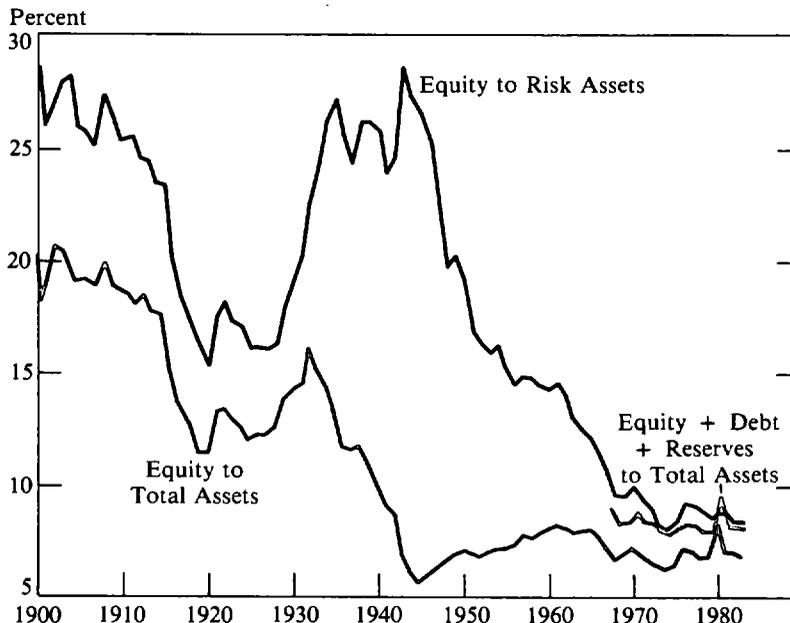
Notes:

All three federal supervisors regard the minimum ratios as a floor and expect most banks to maintain capital ratios above the minimum.

The three federal bank supervisors define primary capital, total assets, and adjusted assets identically. Primary capital is essentially equity plus loan loss reserves. Adjusted assets are total assets less intangible assets.

The supervisors define total capital, the sum of primary and secondary capital, differently. Debt with an original weighted average maturity of seven years essentially composes secondary capital for the FDIC and the Comptroller. All debt with at least five years to maturity, 80 percent of debt with four to five years to maturity, 60 percent of debt with three to four years to maturity, 40 percent of debt with two to three years to maturity, and 20 percent of debt with one to two years to maturity essentially composes secondary capital for the Federal Reserve, subject to the limitation that secondary capital not exceed 50 percent of primary capital.

CHART 1
Capital ratios of commercial banks



tion of capital to include loan loss reserves and long-term debt does not substantially raise the capital-asset ratio. While the ratio of equity to risk assets shows a slightly different pattern, its long-term trend has also been downward.

Although the banking industry appears better capitalized today than in the mid-1940s, judging by the equity-asset ratio, this conclusion is weakened when foreign offices of domestic banks are included. Foreign offices accept deposits and hold assets but provide virtually no additional equity. Hence, when the balance sheets of a bank's domestic and foreign offices are combined, the equity-asset ratio is lower. In 1983, for example, the average equity-asset ratio for domestic banks and their foreign offices was 6 percent, nearly as low as the equity-domestic asset ratio in 1945.⁴

Causes and consequences of the long-run decline in bank capital

The major question raised by today's historically low capital ratios is whether the banking system is riskier as a result. This section argues that while low capital ratios do not necessarily mean a riskier banking system, current low capital ratios do expose the banking system to greater risk. The first part of the section discusses the factors influencing bankers' and bank supervisors' preferred capital ratios and explains why bankers usually prefer lower capital ratios than bank supervisors. The

⁴ The equity-domestic asset ratio is also overstated due to "double leveraging" between banks and bank holding companies, which is discussed later. Briefly, double leveraging overstates capital ratios because some equity at banks affiliated with holding companies was purchased on credit by holding companies and, therefore, is little different than debt.

second part examines major factors that led to the long-run decline in bank capital ratios and explains why much of the decline did not adversely affect the riskiness of the banking system. The third part investigates why risk to the banking system probably increased recently.⁵

Capital preferences of bankers and bank supervisors

Throughout much of the history of bank capital regulation, bank capital ratios have differed—sometimes significantly—from bank supervisors' capital guidelines. These differences arise because bankers and bank supervisors consider different sets of competing objectives when choosing preferred capital ratios.

Bankers, as agents of bank shareholders, tend to choose capital ratios that maximize shareholders' expected welfare. Bankers maximize expected welfare by choosing capital ratios representing the optimal tradeoff between the two criteria by which expected welfare is judged: expected return and riskiness. For a given level of risk, shareholders are made better off by decisions that increase expected return. For a given level of expected return, shareholders are made better off by decisions that reduce risk. In maximizing shareholders' expected welfare, bankers make tradeoffs between expected return and risk because greater returns can usually be earned only by assuming greater risk.⁶

Bankers' capital decisions affect shareholders' expected welfare by affecting both expected return and risk. Expected return is

⁵ Throughout this section, capital is defined as shareholders' equity and the term "capital ratios" is used to refer to capital relative to such financial accounts as total assets, deposits, and risk assets.

normally reduced by increases in a bank's capital ratio, other things equal, since expected profits must be divided among a larger number of shares. An increase in capital ratios tends to reduce riskiness, other things equal, since capital increases a bank's ability to absorb losses and reduces the likelihood that the bank will fail. The effect on shareholders' expected welfare of an increase in capital ratios depends on the relative strengths of the return-reducing and risk-reducing effects. Bankers weigh these opposing effects in adjusting capital ratios.

Bank supervisors, as agents of the public, try to maximize society's welfare by choosing capital ratios representing the optimal tradeoff among the three objectives of bank regulation: to protect depositors, to promote a stable money supply by preventing financial panics, and to foster an efficient and competitive banking system that facilitates financial intermediation. Supervisors make tradeoffs because they cannot set capital requirements that best achieve all three objectives simultaneously. High capital requirements protect depositors and prevent financial panics by increasing banks' ability to absorb losses and withstand unexpected shocks.⁷ But high capital

⁶ It could be argued at a theoretical level that shareholders should not be concerned about risk because they hold well-diversified portfolios. As a practical matter, this is probably true only for shareholders in the largest banks and bank holding companies. Smaller banks are often either closely held private firms or publicly owned firms with shares traded in thin markets on local and regional exchanges. The illiquidity of small bank stocks causes investors in these stocks to be concerned about risk because investors cannot adjust their portfolios quickly and costlessly.

⁷ There is at least one plausible reason why high capital requirements might fail to protect the financial system. High capital requirements could increase the cost of bank funds and, therefore, the rates of return banks must earn on assets to maintain the same degree of profitability. Since less creditworthy borrowers must pay higher rates for loans, banks would have an incentive to make riskier loans. Riskier loan portfolios, in turn, would pose a threat to the financial system.

requirements hinder financial intermediation by limiting the growth of the banking sector and increasing the spread between lending and borrowing rates. Correspondingly, low capital requirements foster financial intermediation at the expense of depositor safety and financial stability. In setting capital requirements, therefore, supervisors weigh the social costs of achieving alternative objectives.

Because bankers and bank regulators consider different sets of competing objectives when choosing preferred capital ratios, their preferences rarely coincide. Bankers usually prefer lower capital ratios because they do not consider the social costs of a bank failure, such as confidence lost in the banking system and the out-of-pocket costs to depositors that withdraw funds from "shaky" banks. Supervisors prefer higher capital ratios because, as agents of the public, they believe the public wishes to minimize these costs. Because bank supervisors lacked effective means to enforce their preferred capital ratios until recently, the decline in capital ratios since 1900 mainly reflects bankers' preferences.

Factors in the decline in bank capital ratios

Current low bank capital ratios are mainly the result of four factors: greater economic stability, formation of bank holding companies, federal deposit insurance, and inflation. Most of these factors allowed bankers to reduce capital ratios by increasing banks' ability to absorb losses and withstand unexpected shocks. As a result, lower capital benefited bank shareholders without increasing the riskiness of the banking system. More recently, though, some of these factors have resulted in low capital ratios that benefited bank shareholders while increasing the riskiness of the banking system.

Greater economic stability. A striking fea-

ture of the postwar era is the absence of severe economic recessions accompanied by financial panics, such as characterized in the 1800s and the early 1900s. Several factors contributed to this stability. One was the transition from a less stable agricultural and manufacturing economy to a more stable services and high-tech industry-based economy. Another was the development of national money markets, which increased liquidity and made an activist monetary policy possible. A third factor was a change in national economic policy, evidenced by the Federal Reserve's greater willingness to act as a lender of last resort and the federal government's greater willingness to pursue high employment and high production policies, as articulated in the Employment Act of 1946.

Greater economic stability contributed to declining bank capital ratios in two ways. First, it reduced the severity of the worst-case scenario for which bankers had to plan, thus reducing the amount of capital needed to protect creditors against deposit runs and earnings shortfalls. Second, it allowed bankers to substitute liquidity—in this case, the ability to raise funds and sell assets in money markets—for capital. For both reasons, greater economic stability allowed bankers to reduce capital ratios without subjecting shareholders to additional risk or decreasing shareholders' expected welfare.⁸ For the same reasons, lower capital ratios did not increase the riskiness of the banking system.

Bank holding companies. One of the most significant recent developments in the banking industry is the rise of bank holding compa-

⁸ For corroboration of this point, see Wesley Lindow, "Bank Capital and Risk Assets," *National Banking Review*, September 1963, pp. 34-35; and Roland Robinson and Robert Pettway, *Policies for Optimum Bank Capital*, Association of Reserve City Bankers, Chicago, 1967, pp. 39-40.

nies. Whereas bank holding companies controlled less than 13 percent of total domestic commercial bank deposits in 1965, they controlled 84 percent by 1983. Multibank holding companies controlled 53 percent of total domestic commercial bank deposits in 1983, while one-bank holding companies controlled 31 percent. The dramatic change in the organizational form of banking firms was motivated by bankers' desire to expand product lines, diversify geographical markets, and exploit certain tax benefits. Financial considerations were also important.

The bank holding company movement contributed to low capital ratios at subsidiary banks by enabling them to substitute liquidity for capital to protect creditors. This is because affiliation with a holding company, especially a multibank company, increases a bank's ability to raise funds quickly. Affiliation improves fund raising by giving banks access to credit markets. Because of their larger size, holding companies can raise funds in credit markets and "downstream" them to subsidiary banks, which are usually too small to borrow directly. Holding companies can also raise funds in credit markets and use them to buy new shares in subsidiary banks. This practice, known as double leveraging, is used extensively to increase subsidiary bank capital. Affiliation also improves fund raising by giving banks access to the earnings of sister banks and nonbank affiliates in the event of a cash shortfall.⁹ Ready access to credit markets and affiliates' earnings partially explains why banks belonging to holding companies have tended to operate at lower capital ratios than

independent banks: affiliation permits subsidiary banks to operate at lower capital ratios without increasing risk, and thus without reducing shareholders' expected welfare or increasing the riskiness of the banking system.¹⁰

Federal deposit insurance. One of the most important institutional changes adopted as a result of the financial collapse in the 1930s was the federal deposit insurance program. Administered by the FDIC, the program fully insures deposits at FDIC-member banks up to a specified amount, currently \$100,000, in the event of bank failure. Federally insured banks pay a premium equal to 1/12 of one percent of deposits, although annual rebates reduce the effective insurance premium. If an insured bank fails, the FDIC either pays off insured depositors and liquidates the bank's assets or arranges for a healthy bank to take over the failed institution. Either way, no insured depositor has lost money in a failed bank since the introduction of federal deposit insurance.

Federal deposit insurance contributed to the secular decline in bank capital ratios both by increasing deposit safety and by allowing banks to shift risk to the FDIC. Greater deposit safety reduced the amount of capital needed to keep a bank solvent by reducing the likelihood of financial panic. A stronger banking system, in turn, reduced the bank capital ratios needed to give the public the same level of protection. Greater deposit safety probably explains most of the decline in banks' equity-asset ratios between 1933 and 1945 (Chart 1). More recently, federal deposit insurance's

⁹ Access is regulated under Section 23A of the Federal Reserve Act, which limits transactions among bank holding company affiliates. Financial transactions among sister banks are virtually unlimited, whereas transactions between a bank and nonbank subsidiaries are limited by the bank's capital.

¹⁰ See Arnold A. Heggstad and John J. Mingo, "Capital Management by Holding Company Banks," *Journal of Business*, October 1975, pp. 500-05; and John J. Mingo, "Managerial Motives, Market Structure and the Performance of Holding Company Banks," *Economic Inquiry*, September 1976, pp. 411-24.

fixed-rate premium contributed to the decline in capital ratios by allowing insured banks to shift risk to the FDIC. Since the cost of deposit insurance is unrelated to bank risk, banks are not discouraged by rising premiums from maintaining lower, riskier capital ratios. This, together with the fact that banks can usually earn higher rates of return at lower capital ratios, encouraged bankers to maintain lower capital ratios. While the expected returns to bank shareholders from lower capital ratios outweighed any increases in risk, lower capital ratios due to risk shifting increased bank risk to the public.¹¹

Inflation. Inflation was high by historical standards from the mid-1960s to the early 1980s. Persistent high inflation led creditors, including banks, to add an inflation premium to lending rates to compensate for being repaid in smaller dollars.

Inflation contributed to low bank capital ratios during this period by reducing after-tax inflation-adjusted bank profits. Because the tax system is not indexed for inflation, part of the inflation premiums banks added to lending rates were taxed away. As a result, banks' after-tax inflation-adjusted profit rates fell below profit rates at nonfinancial firms, which benefited more than banks from the untaxed appreciation in physical assets.¹² The prospect of persistent inflation and persistently low after-tax inflation-adjusted bank profit rates depressed the prices of bank stocks. Low stock prices, in turn, kept bankers from selling

¹¹ Several statistical studies have shown that both the deposit safety-enhancing and risk-shifting effects of federal deposit insurance exerted a significant influence on bankers' capital decisions after 1933. See Mingo.

¹² The profitability of banks and nonfinancial firms can be compared by comparing price-earnings ratios, which represent rates of return on shareholders' equity. Since 1978, nonfinancial corporations have typically exhibited price-earnings ratios of around 10, whereas banks have exhibited P-E ratios of about 8.

new shares to raise capital because they considered the dilution of earnings too detrimental to banks' current shareholders. Many bankers ruled out retaining more earnings to raise capital on grounds that shareholders could earn higher rates of return by reinvesting dividends outside of the banking industry. Under the circumstances, bankers often found that shareholders' expected welfare was maximized by simply allowing capital ratios to decline.¹³ But the decline in bank capital ratios increased the riskiness of the banking system.

In summary, current historically low bank capital ratios can be explained by the expected welfare maximizing behavior of bankers. Significantly, much of the long-term decline in capital ratios had little effect on the risk faced by either bank shareholders or the public. Specifically, the decline in capital ratios resulting from greater economic stability, enhanced deposit safety through federal deposit insurance, and the bank holding company movement did not increase the riskiness of the banking system because these factors reduced the amount of capital needed to afford the system a given degree of protection. Although the decline in capital ratios due to inflation and risk shifting to the FDIC did increase risk, these factors were probably not important until recently.

Other factors affecting banking risk

Capital ratios are but one of the factors affecting the strength of individual banks and the banking system. Recently, changes in other factors combined with low capital ratios

¹³ See Henry Wallich, "Inflation is Destroying Bank Earnings and Capital Adequacy," *The Bankers' Magazine*, Autumn 1977, pp. 12-16; and Kenneth Spong, Larry Meeker, and Forest Myers, "The Paradox of Record Bank Earnings and Declining Capital," *The Magazine of Bank Administration*, October 1980, pp. 22-27.

probably increased the riskiness of the banking system by increasing the amount of capital needed to afford the system a given degree of protection. Other factors affecting the strength of individual banks include asset quality, management quality, earnings, and liquidity.¹⁴ The most important factor affecting the strength of the banking system is the banking environment.

Declines in asset quality have definitely increased the capital ratios needed to give the financial system the same degree of protection. The most spectacular example is the declining quality of loans to Latin American countries. Since 1982, the debt repayment problems of the principal Latin American debtors—Mexico, Brazil, and Argentina—have sent shock waves through the U.S. banking community, which held \$53 billion in loans to these countries at the end of 1982, representing 75 percent of total capital.¹⁵ Although debt repudiation is unlikely, many banks with large exposures to these countries have seen the prices of their stocks plunge, suggesting that investors perceive a substantial reduction in the quality of Latin American loans.¹⁶

Improvements in the quality of bank managements have probably reduced slightly the

capital ratios necessary for a given level of protection. Bankers are using increasingly sophisticated techniques to make short-run investment decisions and long-run strategic decisions. Furthermore, the bank holding company movement has tended to improve management at small banks. Nevertheless, most of the recent spate of bank failures has been due largely to poor management.¹⁷

While banks' reported earnings have shown surprising strength in recent years, reported earnings have nevertheless increased the capital ratios needed for a given degree of protection. As noted in the discussion of inflation, the interaction of inflation and tax system has substantially reduced banks' inflation-adjusted after-tax earnings, the income available to augment capital. Modest real after-tax earnings have left creditors less well protected and left banks less able to survive losses sustained over several periods.

Trends in bank liquidity have probably had an ambiguous effect on the capital ratios needed to protect the financial system. The bank holding company movement improved liquidity at subsidiary banks by giving them access to financial markets and affiliates' earnings. But shifts in asset composition at all banks reduced liquidity. By December 31, 1983, relatively liquid assets such as cash and Treasury securities comprised only 19 percent of the assets of insured banks, compared with 44 percent at the end of 1960. Loans, which

¹⁴ Capital adequacy, asset quality, management quality, earnings, and liquidity are the five areas in which banks are rated under the CAMEL system introduced by the three federal bank supervisory agencies in May 1978. Banks are given a composite rating of 1 to 5 based on examiners' assessment of a bank's overall strength. Banks rated 1 or 2 are considered sound whereas banks rated as 3, 4, or 5 are considered weak.

¹⁵ Statement by Paul Volcker, Chairman, Board of Governors of the Federal Reserve System, before the Committee on Banking, Finance, and Urban Affairs, House of Representatives, February 2, 1983, Table V.

¹⁶ Another section of the International Lending Supervision Act empowered bank supervisors to require that banks hold reserves against loans to foreign countries with debt repayment problems. This power, however, has not been exercised.

¹⁷ For evidence on improvements in bank management, see Benton E. Gup and David D. Whitehead, "Shifting the Game Plan: Strategic Planning in Financial Institutions," *Federal Reserve Bank of Atlanta Economic Review*, December 1983, pp. 22-33; and Robert J. Lawrence and Samuel H. Talley, "An Assessment of Bank Holding Companies," *Federal Reserve Bulletin*, January 1976, p. 18. For evidence on the role of bank management in recent bank failures, see the interview with John Downey, Chief Bank Examiner, Comptroller of the Currency, *Washington Financial Reports*, January 16, 1984, pp. 163-67.

are relatively illiquid, increased as a percentage of total assets to 54 percent in 1983 from 46 percent in 1960.

Changes in the banking environment as a result of financial market deregulation have undoubtedly increased the capital ratios needed to protect the financial system. Deregulation has increased risk at given capital ratios by forcing banks to compete more closely among themselves and with nonbank firms. Increased competition tends to lower profit margins and reduce earnings, thus increasing the likelihood that prolonged losses will exhaust banks' capital and cause them to fail. Increased competition also increases risk by forcing banks to develop new products and services. Since some products inevitably fail, banks unsuccessful at product innovation suffer losses that could exhaust their capital. Deregulation has probably not yet proceeded far enough for reduced earnings and failed innovations to have measurably affected aggregate bank capital. But these factors are among the ones that will make increasing future bank capital ratios difficult. Hence, to protect the financial system from greater risk in the future banking environment, higher capital ratios are needed today.

On balance, the other factors affecting the strength of the financial system probably increased the riskiness of the banking sector at current low capital ratios. Bankers apparently held this view because they began sharply increasing net chargeoffs and provisions for loan losses in 1982. Bank supervisors undoubtedly held this view because they took steps to increase capital ratios at larger banks, which, as a group, had significantly lower capital ratios than small banks. Congress evidently held this view because it passed the International Lending Supervision Act to strengthen banks.

If the banking environment really did get

riskier, it is reasonable to ask whether the steps taken by bank regulators and Congress are enough to ensure a strong financial system. This question is the subject of the next section.

Policy options

Critics of banking regulation have long argued that regulating bank capital is not the best way to ensure the safety and soundness of the financial system. Over the years, they have proposed several alternative methods for controlling bank risk. Most of the proposals would replace bank capital regulation with one of two plans: market regulation of bank capital or modification of federal deposit insurance. Before discussing these proposals, it is useful to evaluate the arguments against bank capital regulation.

Arguments against bank capital regulation

The major argument against regulation of bank capital is that there is little evidence that capital ratios are reliably related to bank failures and, therefore, bank riskiness. Most statistical studies of the causes of bank failure conclude that low capital ratios are not the primary cause. During the Banking Panic of 1933, for example, many banks with low capital ratios did not fail while many with high capital ratios did. Most of the banks that have failed since the 1930s failed because of embezzlement, mismanagement, and insufficient liquidity due to low earnings, rather than undercapitalization.¹⁸

The weakness of the link between bank capital and bank failures does not mean, however, that capital is irrelevant to bank solvency. Rather, it is evident that simple capital ratios are imperfect measures of capital adequacy, as recent empirical work on bank failures has

shown.¹⁹ Other things equal, the better capitalized a bank is, the safer and sounder it is. Moreover, simple capital ratios have the virtues of being objective measures of bank strength and being easy for bank supervisors to monitor. Because simple capital ratios are poor predictors of bank failures, however, other ways of controlling bank risk have received serious consideration.

Market regulation of bank capital

One alternative is market regulation of bank capital. Under this alternative, current and potential depositors, creditors, and shareholders replace bank supervisors as monitors of bank capital. Market regulation is based on the notion that market forces are better able than supervisors to control risk at banks. Investors' assessments of banking conditions, including risk, are reflected in the rates banks pay for uninsured deposits and long-term debt as well as the prices of bank stocks. A bank that holds too little capital, in the judgment of investors, can expect the price of its stock to fall because it exposes shareholders to a greater risk of loss. To raise the price of their shares, current shareholders pressure bankers into strengthening the bank's capital position. Shareholders do not pressure bankers into adding too much capital, in their own judgment and the judgment of potential shareholders, because too

much capital reduces investors' expected returns, causing the price of the bank's stock to fall again. Hence, market forces should lead banks to maintain capital levels that best balance risk and expected return to shareholders.

Although market regulation is clearly preferable to supervisor regulation in principle, serious objections have been raised to this alternative. Several empirical studies have shown that the price of a bank's stock is either insensitive to the bank's financial condition or inconsistently related to its financial condition.²⁰ Some researchers have argued that the weak relationship between stock price and financial condition shows that the banking industry is currently overcapitalized. But a more plausible explanation is that investors in bank stocks lack the information and expertise needed to assess the risk posed by alternative capital ratios and, therefore, fail to penalize banks with low capital ratios. Another objection to market regulation is that it could not effectively control risk at most banks because their shares are not traded widely on public exchanges. Perhaps the strongest criticism against market regulation is that investors, like bankers, do not consider the social costs of a bank failure and, therefore, require too little capital to ensure the safety and soundness of the financial system. In view of the inability of market forces to control bank risk, some form of capital regulation by bank supervisors seems imperative.

¹⁸ See, for example, Richard V. Cotter, "Capital Ratios and Capital Adequacy," *National Banking Review*, March 1966, pp. 333-46; Vincent Apilado and Thomas Gies, "Capital Adequacy and Commercial Bank Failure," *Bankers' Magazine*, Summer 1972, pp. 24-30; and Anthony Santomero and Joseph Vinso, "Estimating the Probability of Failure for Commercial Banks and the Banking System," *Journal of Banking and Finance*, October 1977, pp. 185-205.

¹⁹ See Yair Orgler, "Capital Adequacy and Recoveries from Failed Banks," *Journal of Finance*, December 1975, pp. 1366-75; and Joseph Sinkey, "Identifying Problem Banks," *Journal of Money, Credit and Banking*, May 1978, pp. 184-92.

²⁰ See, for example, David Humphrey and Samuel Talley, "Market Regulation of Bank Leverage," Research Paper No. 7, Board of Governors, September 1975; H. Prescott Beighly, John H. Boyd, and Donald P. Jacobs, "Bank Equities and Investor Risk Perceptions: Some Entailments for Capital Adequacy Regulation," *Journal of Bank Research*, Autumn 1975; and Richard Pettway, "Market Tests of Capital Adequacy of Large Commercial Banks," *Journal of Finance*, June 1976.

Modification of fixed-rate deposit insurance

Another alternative for controlling bank risk is variable-rate deposit insurance and a reduction or elimination of capital requirements. Under a variable-rate system, the cost of insuring deposits would vary with the riskiness of the bank as judged primarily by capital ratios and the quality of bank assets: banks with riskier assets and lower capital ratios would pay higher premiums. The chief advantage of a properly administered variable-rate system is that it would allow bankers to choose the assets and capital ratios representing the best combination of expected returns and risk for bank shareholders while providing an insurance fund adequate to ensure a strong financial system. The FDIC has recently submitted a bill to Congress that would permit premiums to vary somewhat according to banks' riskiness.²¹

Although a variable-rate deposit insurance system would neatly resolve the conflicting objectives of bankers and bank supervisors, the system would have two practical problems. One would be assessing the riskiness of banks. Risk assessments would probably be made by comparing banks' financial ratios with standards set by the FDIC. The principal danger of this approach is that the standards might reflect risk only after banks became troubled, instead of as they assumed risk. Another difficulty would be setting the fee schedule. The fee schedule would need to compensate society for additional risk taking

by banks. As a practical matter, constructing such a fee schedule would be quite difficult. Hence, even if a variable-rate deposit insurance system were adopted, minimum capital requirements would still be needed to protect the financial system.²²

Conclusion

Despite their limitation as a means of controlling bank risk, enforceable minimum capital requirements are necessary to ensure the safety and soundness of the financial system. Recent changes in bank asset quality and inflation-adjusted after-tax profits together with the prospect of highly uncertain change in the financial services industry have increased the capital ratios needed to provide bank creditors and the financial system a given level of protection from widespread bank failures. Without capital requirements, substantial voluntary additions to capital would be unlikely because the profit-eroding effect of inflation has made new equity costly and retained earnings a limited source of capital. Moreover, bankers pick capital ratios that are too low from society's perspective because they ignore the social costs of bank failures. Other methods of controlling bank risk, such as market regulation of bank capital and variable-rate deposit insurance, are superior to minimum capital requirements in theory but not in practice. Under the circumstances, the establishment of minimum capital requirements was imperative.

²¹ *American Banker*, November 17, 1983. For a detailed discussion of variable-rate deposit insurance, see John Kareken and Neil Wallace, "Deposit Insurance and Bank Regulation: A Partial Equilibrium Exposition," *Journal of Business*, July 1978.

²² For a fuller discussion of the disadvantages of variable-rate deposit insurance, see Anthony Santomero, *Current Views on the Bank Capital Issue*, Association of Reserve City Bankers, Washington, 1983, Chapter 6.

Mortgage Finance: Why Not PLAM's?

By Joyce Manchester

Homeownership is an important social and political goal in the United States. Attainment of this goal, however, does not come easily for a large portion of the population. Buying a house represents a major purchase for most families, requiring borrowed funds to finance most of the sales price. To expand the opportunities for homeownership, a system of mortgage finance has developed to serve the needs of borrowers and to encourage the participation of lenders.

For many years, the standard fixed-rate mortgage (FRM) was satisfactory to both borrowers and lenders. Throughout the 1950s and 1960s, a stable economic environment contributed to widespread acceptance of the long-term, fixed-payment contract. In light of the increased economic uncertainty in recent years, however, the standard mortgage is no

longer as satisfactory, especially to lenders. The adjustable-rate mortgage (ARM) is one innovation introduced by lenders to reduce the risk they must bear in making mortgage loans. But many borrowers find the risks of fluctuating payment levels difficult to accept. As a result, alternative forms of mortgages may be needed to meet the needs of both borrowers and lenders in the current uncertain economic environment.

This article argues that the price-level-adjusted mortgage (PLAM) is preferable to both fixed-rate and adjustable-rate mortgages in the current economic environment and could become the dominant form of mortgage finance if certain institutional impediments were removed. The first section explains the problems of standard FRM's in the current economic environment. The second section shows that ARM's, though preferable in many ways to fixed-rate mortgages, pose the threat of undue default risk. The third section argues that PLAM's are preferable to both FRM's and ARM's because they ease the problems of standard mortgages without increasing default

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risk unacceptably. The final section shows that while PLAM's are desirable under current conditions, their adoption is impeded by institutional factors.

Problems with the standard mortgage

To promote the social goal of homeownership with greatest economic efficiency, the method of mortgage finance should have four major characteristics. First, it should allocate the risk of unexpected interest rate changes between borrowers and lenders so that risk is not unduly burdensome to either party. Though mortgage contracts cannot by themselves eliminate interest rate risk, the terms of the contract can provide efficient sharing of that risk. Second, eligibility requirements established to qualify for a mortgage loan should take account of future as well as current financial conditions of prospective borrowers. In particular, households whose income at the time they want to buy a home is lower than their likely future income should not as a consequence be ruled out as qualified borrowers. Third, the fraction of income required to meet mortgage payments should accord with consumers' desired lifetime consumption patterns. Most theoretical models of consumer choice suggest that this condition will be fulfilled if the ratio of mortgage payments to income is relatively constant over the term of the mortgage. Finally, the risk of the borrower defaulting on the loan should be minimized. Since there are real economic costs to both borrowers and lenders from loan defaults, mortgage contracts should be designed so default is avoided whenever possible.

The inadequacies of standard fixed-rate mortgages with respect to these four characteristics have become apparent in recent years. When inflation was low and interest rates sta-

ble, as in the 1950s and 1960s, the deficiencies of standard mortgages were hidden by the favorable economic environment. As a result, fixed-rate mortgages did not substantially impair the efficient flow of funds to homebuyers. As interest rates and inflation increased and became more variable over the past decade, however, the problems of standard fixed-rate mortgages became increasingly evident.

Interest rate risk

A major problem with FRM's is that lenders bear all the interest rate risk. Whenever credit is extended over a long period at a constant nominal interest rate, there is the possibility that actual market rates of interest will differ over the term of the loan from those expected when the loan was made. When this happens, the revenue generated on a lender's loan portfolio differs from the cost of attracting funds to keep the institution active in credit markets. During periods of unexpectedly high interest rates, both lenders' profits and net worth decline. The lender clearly loses.¹

The problems caused by the lender bearing the interest rate risk can be easily illustrated. Suppose that, during an extended period of interest rate stability, lenders acquire large portfolios of fixed-rate mortgages at 8 percent, while paying 7 percent on their deposits. Now

¹ During periods of unexpectedly low nominal interest rates, on the other hand, the lender gains at the expense of the borrower. Most emphasis in this article is on the effects of unanticipated increases in nominal interest rates for two reasons. First, recent experience has been with unanticipated increases in market rates, not decreases. Second, the loss to borrowers resulting from unanticipated decreases in nominal interest rates can be avoided through use of the prepayment option. Under this option, borrowers can refinance their loans whenever they desire.

For a good description of the value of the prepayment provision, see Arden R. Hall, "Valuing the Mortgage Borrower's Prepayment Option," Federal Home Loan Bank of San Francisco, WP 9-584.

suppose there is a general unanticipated increase in interest rates. While the interest rate on outstanding mortgages remains unchanged, suppose that the rate on new mortgages increases to 10 percent, while the deposit rate rises to 9 percent.

Over the short run, such an unanticipated increase in interest rates has deleterious effects on the lender's cash flow. Existing mortgages are being repaid at an 8 percent annual rate, while the lender must pay 9 percent to attract funds. If the institution cannot offer the current market rate, investors will move their funds elsewhere. The institution has cash-flow problems as long as market interest rates remain higher than the interest received on its mortgage portfolio.

Lending institutions have even more serious problems over the long run as the rate earned on assets and the cost of funds continue to diverge. Disintermediation, the large-scale withdrawal of funds from financial institutions, prevents new loans generating higher rates of return from being made. The net worth of the institution suffers as the market value of existing loans declines with the increase in interest rates. No investors would pay the full price for a loan with an 8 percent return when new loans with a 10 percent return are available. Thus, with an unexpected increase in interest rates, the lender could face both cash-flow problems and net worth problems.

The design of the fixed-rate mortgage contract implies that lenders bear all interest rate risk regardless of the source of the risk. Under FRM's, whether risk results from unanticipated increases in the real rate of interest or from unanticipated increases in inflation, lenders lose and borrowers gain.²

Recent experience shows the problems caused by mortgage lenders bearing all interest rate risk. Large declines have occurred in the

net worth and profit margins of mortgage lending institutions due to unexpectedly high nominal interest rates. The thrift industry, which accounts for more than half of the outstanding mortgage debt held by private financial institutions and holds most of this debt in FRM's, has been especially affected.³

In contrast to the adverse impact on mortgage lenders, standard mortgages offer clear-cut benefits to mortgage borrowers during periods of unexpectedly high interest rates. For example, households that took out mortgage loans in the 1960s, when interest rates were low, enjoyed large capital gains in the 1970s and early 1980s as interest rates trended upward. The capital appreciation can be seen most clearly for borrowers with assumable mortgage loans having rates below those prevailing in the market. Because buyers are willing to pay a premium price on houses with loans that can be assumed at favorable rates, individuals holding such loans experienced an increase in the market value of their property as mortgage rates rose. Even individuals with unassumable loans benefited indirectly from holding FRM's because their house payments were lower than if they were to buy an identical house with funds from a loan at the higher market interest rates. Thus, all past borrowers

² For an analysis of the return on a nonindexed financial asset during times of unexpected inflation, see Stuart E. Weiner, "Why Are So Few Financial Assets Indexed to Inflation?" *Economic Review*, Federal Reserve Bank of Kansas City, May 1983, pp. 3-6.

³ According to the Federal Home Loan Bank Board, the total worth of the nation's savings and loan associations eroded by \$4.6 billion in 1981, or by 15 percent, and a \$4.3 billion loss was accrued in 1982. Federal regulators arranged a record 23 mergers of failing savings and loans into healthier institutions in 1981. Such mergers had to be stopped in 1982 because the Federal Savings and Loan Insurance Corporation could no longer afford to finance them. Mutual savings banks lost \$1.4 billion in 1981, and the Federal Deposit Insurance Corporation spent \$1.7 billion arranging nine mergers in 1982.

benefited from holding a fixed-rate mortgage loan during the 1970s.

The picture for prospective borrowers, however, was not so bright during the late 1970s. Having experienced liquidity and net worth problems as a result of past interest rate increases, lending institutions became more cautious in making fixed-rate loans. One aspect of this increased caution may have been an increased risk premium included in mortgage rates to protect against further increases in nominal interest rates. Thus, prospective borrowers may well have been charged a higher interest rate to compensate lenders for bearing the entire risk of interest rate changes.

Mortgage eligibility

A second problem with standard mortgages is that they make it very difficult for households to qualify for a loan during times of high and volatile interest rates. The interest rate on FRM's must be high enough to reflect current and expected short-term interest rates plus a risk premium to protect the lender against future unexpected increases in short-term interest rates. These high interest rates increase monthly payments and the risk of default. To screen out households subject to high default risk, mortgage lenders look carefully at the ratio of mortgage payments to income. If this ratio is too high, the risk of default is excessive and the loan is not approved. As mortgage rates rise, then, it becomes more difficult for borrowers to qualify for mortgages. In particular, younger households that have not reached their full earning potential often cannot qualify on current income. Because U.S. capital markets generally preclude borrowing against expected future earnings, these households are either shut out of the housing market or forced to buy lower priced houses.

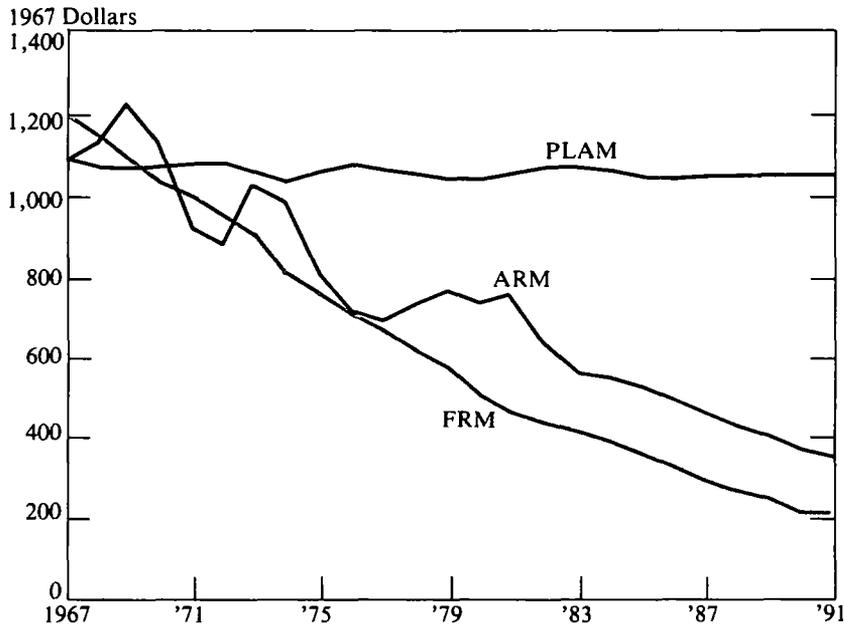
Tilt

A third problem with FRM's is that the real burden of mortgage payments typically declines steadily over the term of the mortgage during inflationary periods. One reason for this "tilt" in the real burden of mortgage payments is that inflation causes a decline in the real, or inflation-adjusted, value of a fixed mortgage payment. The tilt in the real value of mortgage payments is depicted in Chart 1 for a hypothetical FRM issued in 1967. The mortgage is assumed to be a 25-year mortgage for \$15,000 with a fixed 6.5 percent rate. As can be seen in the chart, inflation would have reduced the real value of payments by over 50 percent between 1967 and 1983. Assuming inflation continues, further erosion in the real value of mortgage payments would continue thereafter, with the real value of payments in the final year perhaps only about 25 percent of the real value in the first year.⁴

A second reason for a tilt in the real burden of mortgage payments is that real incomes typically increase over time. Increasing real income reduces the burdensomeness of making mortgage payments of constant real amounts. Thus, when growing real incomes accompany relatively high inflation, as has

⁴ The Federal Home Loan Bank Board *Journal*, Table S.51, December 1977, reports the average maturity on new home loans was 25.1 years in 1970. The National Association of Realtors began reporting the median house price on sales of existing single-family homes in 1968, when the median price was \$20,100. Assuming a 75 percent loan-to-value ratio, the initial principal value is \$15,000 for 1967. The 1984 *Economic Report of the President*, Table B-67, reports the new-home mortgage yield on conventional mortgages was 6.46 percent in 1967. Actual inflation between 1967 and 1982 is measured by the personal consumption expenditure deflator. Estimates of expected inflation generated by a vector autoregressive procedure are used as deflators between 1983 and 1991. The estimates begin at 5.0 percent in 1983, increase to 7.5 percent in 1986, then gradually decline to 6.8 percent in 1991.

CHART 1
Real payment values for hypothetical mortgage contracts



been the case in recent years, the ability to make mortgage payments increases even as the real value of those payments declines. As a result, the real burden of a fixed nominal mortgage payment would be even more skewed than is indicated by the example in Chart 1 if account is taken of increasing real incomes over time.

Many young households that are establishing careers or taking on the responsibilities of children are not likely to prefer the tilt in the real burden of mortgage payments. Theoretical models of consumer choice over the life-cycle indicate that the greatest utility comes from a constant real level of consumption.⁵ These

⁵ James Tobin and Walter Dolde, "Wealth, Liquidity, and Consumption," in *Consumer Spending and Monetary Policy*. Federal Reserve Bank of Boston, Boston, 1971, pp. 99-160.

same models suggest that most households would prefer housing expenditures that were a fairly constant share of income.⁶ The severe tilt in the real burden of payments with fixed-rate mortgages is counter to this preference.

Default risk

The one attractive feature of the standard FRM is that it has low and declining default

⁶ Assuming a time-invariant utility function, households will prefer a constant ratio of real housing consumption to real permanent income over time. Borrowing constraints and transactions costs imply that the highest possible level of housing services is optimal at the outset, suggesting again that real housing expenditures should be spread into the future rather than decline over time. For a more complete analysis, see Joyce Manchester, "Evidence on Possible Default and the Tilt Problem Under Three Mortgage Contracts," Federal Reserve Bank of Kansas City, RWP 84-08, August 1984.

risk over the life of the contract. Because nominal mortgage payments are constant, there is no possibility that “payment shock” will lead to default. Moreover, the tilt factor means that payments decline over time relative to income, thereby reducing the risk of default. These favorable features with regard to default risk may be one reason fixed-rate contracts historically have been so prevalent despite their other shortcomings.

The advantages of the standard mortgage contract regarding default risk are a consequence of its disadvantages in other respects. The allocation of all interest rate risk to the lender implies that unexpected changes in interest rates do not lead to unexpected variability in nominal mortgage payments, thereby minimizing the chance of default. Because the ratio of payments to income typically declines over time and eligibility tests are based on initial income levels, default risk declines over the term of the mortgage.

Advantages and disadvantages of the adjustable-rate mortgage

Adjustable-rate mortgages (ARM’s) have several advantages over the standard fixed-rate mortgage. Because they force the borrower to bear more interest rate risk, however, they could have excessive default risk.

Under an ARM, the interest rate is tied to some current nominal interest rate, such as the yield on U.S. Treasury securities or the cost of funds to savings and loan associations. The resulting change in the mortgage interest rate gives rise to periodic payment adjustments, with the frequency ranging from every six months to every five years.

An example corresponding to the previous example for a FRM illustrates how interest rate risk is shifted to the borrower with an ARM. As in the previous example, the mort-

gage is assumed to be a 25-year loan for \$15,000 issued in 1967. The mortgage rate is assumed to be lower—5.5 percent rather than 6.5 percent—because the lender does not need to charge an interest rate risk premium on the ARM. The mortgage rate in this example is indexed to the 6-month U.S. Treasury bill rate, with both the rate and the payments adjusted annually. Under this contract, as shown in Table 1, mortgage payments would total \$1,101 in 1967. A year later, the Treasury bill index had increased by 0.8 percentage points, so the mortgage rate would increase to 6.3 (5.5 + 0.8) percent. As a result, mortgage payments would rise to \$1,190 in 1968, or \$89 more than in 1967. Thus, nominal payments increase during the period shown for the ARM, in contrast to the steady nominal payments for the standard mortgage.

The increase in nominal payments would enable lenders to pay a market rate to attract funds. This would alleviate the lenders’ cash-flow and net worth problems that result when the increased cost of funds is not matched by an increased rate of return on assets, as is the case with standard mortgage contracts. By issuing ARM’s, the lender receives a rate of return that moves in step with market rates of interest.

While the liquidity and net worth problems experienced by lenders under a standard mortgage are shifted to the borrower under the ARM, the problem of qualifying for a loan is less severe for ARM’s than for the standard mortgage. Because the initial interest rate is lower, more households are eligible for mortgage financing on a given size loan at the lower payment level, and problems caused by the inability to borrow against expected increases in income are eased.

The adjustable-rate mortgage does not eliminate the problem of tilt, however. Chart 1

TABLE 1
Principal, interest rate, and payment
for hypothetical mortgage contracts

	<u>Year</u>	<u>Standard Mortgage</u>	<u>Adjustable- Rate Mortgage</u>	<u>Price-Level- Adjusted Mortgage</u>
Outstanding Principal	1967	\$15,000	\$15,000	\$15,000
	1968	14,750	14,710	15,078
	1969	14,485	14,439	15,413
	1970	14,201	14,200	15,789
Mortgage Interest Rate	1967	6.5%	5.5%	5.5%
	1968	6.5	6.3	5.5
	1969	6.5	7.7	5.5
	1970	6.5	7.4	5.5
Nominal Payment	1967	\$1,210	\$1,105	\$1,105
	1968	1,210	1,190	1,132
	1969	1,210	1,339	1,182
	1970	1,210	1,308	1,238
Real Payment	1967	\$1,210	\$1,101	\$1,105
	1968	1,163	1,143	1,105
	1969	1,112	1,230	1,105
	1970	1,063	1,148	1,105

Note: See footnote 4 for explanations and sources of assumptions used in constructing these hypothetical mortgage contracts.

shows the decline in real ARM payment values over the life of a loan based on assumptions comparable with those of the standard mortgage. As for the FRM, the tilt would be even more pronounced if account were taken of increasing real incomes. Thus, the ARM is still subject to the same tilt problem as standard mortgages.

The increase in the risk of default when interest rates are rising is a serious concern regarding ARM's. Not only do nominal payments rise as market interest rates rise, but real payments may increase if the nominal index rate adjustment is more than current inflation. As shown by Chart 1, real payments fluctuate much more under the ARM than under the fixed-rate mortgage. Real payments

increased sharply between 1967 and 1969 and between 1972 and 1973 as Treasury bill rates rose more than measured inflation. Such payment increases, if not expected by households, could have put financial strains on them, perhaps resulting in defaults. Although real income growth would ease the "payment shock," the timing of payment adjustments relative to income adjustments is crucial. Some nominal incomes might be fixed by three-year contracts, for example, while mortgage payments changed every six months.

The possibility of severe default risk stems directly from the ARM characteristics. Any unanticipated increases in nominal interest rates lead to sharp nominal payment adjustments not always matched by contemporane-

ous increases in nominal incomes. Eligibility tests cannot anticipate the burden of such payment increases in a satisfactory fashion. While the overall decline in the ratio of payments to income augurs well for default risk in the long run, there is substantial risk of default during the early years of the loan.

Adjustable-rate mortgages issued today often differ from the pure ARM. Many include payment caps or rate caps to limit the change in payments. About 40 percent of the ARM's issued by savings and loans, commercial banks, and mortgage banks in the first six months of 1983 had such caps.⁷ These caps, motivated in part by a desire to reduce the risk of default, limit the borrower's interest rate risk in the short run by shifting part of the risk back to the lender. Unless the lender absorbs the costs exceeding allowable adjustments, however, limiting the payment or rate adjustment only increases the value of the loan to be repaid in the future.

ARM's with caps can cause cash-flow shortages for lending institutions. Mortgage payments may not be adequate to cover the full monthly interest cost when interest rates are rising. In that case, negative amortization may occur, with the principal value increasing from one period to the next. As long as the rates or payments are fully adjusted by the time the loan term is completed, however, the solvency of lending institutions is not threatened.

Recent developments in mortgage markets suggest that caps on interest rate adjustments may become more widespread. The Federal National Mortgage Association (FNMA) announced in April 1984 that it would not purchase ARM's from lending institutions unless

they limited interest-rate adjustments to two percentage points a year. In setting this standard, FNMA was trying to reduce the payment shock resulting from sharp upward adjustments in nominal interest rates. In so doing, it is encouraging lenders to share the interest rate risk that has long plagued nominal mortgage contracts.

Advantages of price-level-adjusted mortgages

Price-level-adjusted mortgages combine the best features of fixed-rate and adjustable-rate mortgages. They are designed to perform well even during periods of uncertain and variable economic conditions. As a result, the system of mortgage finance would function more efficiently if this type of contract were adopted.

Unlike FRM's and ARM's, both of which allocate all of the interest rate risk to one party or the other, the PLAM allows interest rate risk to be shared between borrowers and lenders. Real rate risk, arising from unexpected changes in the real rate of interest, is allocated to the lender. An unexpected increase in demand for credit by businesses, households, or the government not matched by an increase in the supply of credit, for example, could cause an unexpected increase in the real rate of interest. Inflation risk, arising from unexpected changes in the inflation rate, is allocated to the borrower. Unexpected increases in energy prices or a setback in food production, for example, could lead to an unanticipated rise in the inflation rate.

The allocation of interest rate risk is accomplished under PLAM's by allowing the outstanding principal to vary with the general price level, rather than tying the mortgage interest rate to some reference rate as under ARM's. The mortgage rate is a fixed real rate. During periods of inflation, periodic upward

⁷ Federal Home Loan Mortgage Corporation, "What Makes an ARM Successful? A Report on the Market for Adjustable Rate Mortgages," Publication No. 53C, 1984.

reevaluation of the outstanding balance leads to increases in nominal mortgage payments. Real payments, however, remain constant. The rise in nominal payments protects the lender against increases in interest rates caused by inflation, while the constant real payments protect the borrower against increases in interest rates caused by real factors.

A simple example illustrates how nominal payments increase and real payments remain constant under PLAM's. Consider a \$100 mortgage with 25 years to maturity issued on the first day of Year 1. Assume for simplicity that both real rates and inflation rates remain constant at 5 percent for the entire term of the loan. Monthly payments in Year 1 would total \$6.96. Of this amount, \$2.01 would go to amortizing the principal. The principal remaining on the last day of Year 1 then would be adjusted upward by the percentage change in the price level to compute the new principal outstanding on the first day of Year 2. The new principal would be \$102.89 $[(100 - 2.01) \times 1.05]$. The 5 percent real interest rate is again applied to the new principal to yield the sum of monthly payments in Year 2, which would total \$7.32. The real value of mortgage payments would remain the same in the second year, since \$7.32 expressed in Year 1 dollars is equal to \$6.96. The process continues until Year 25 when the loan is paid off. Thus, throughout the term of the mortgage, nominal payments would increase at the same rate as the overall price level, keeping real payments constant.⁸

By allocating real rate risk to the lender and inflation rate risk to the borrower, the PLAM improves on the problem of interest rate risk as compared with both the FRM and the

ARM. For example, Table 1 shows a PLAM comparable with the FRM and ARM discussed previously—a 25-year mortgage for \$15,000 issued in 1967. Because the lender can protect itself against real rate risk, the interest rate is assumed to be the same as for the ARM, 5.5 percent. Mortgage payments in the first year under the PLAM would total \$1,105. The principal at the end of 1967 would be \$14,712, and this is adjusted by the rate of inflation, 2.5 percent, as measured by the percentage change in the personal consumption expenditure deflator. The 5.5 percent real rate is applied to the adjusted principal of \$15,079 $(14,712 \times 1.025)$ to calculate total mortgage payments in 1968. Nominal payments in 1968 would total \$1,132, having the same real value as mortgage payments in 1967. Since the lender bears the real rate risk, payments are not affected if the real rate of interest rises. The borrower does pay more in nominal terms, however, when inflation increases.

The difference in the levels of nominal and real mortgage payments for the PLAM as compared with the standard mortgage or ARM is seen clearly in Table 1. While nominal payments increase from \$1,105 to \$1,238 between 1967 and 1970 under the PLAM, the nominal payment levels remain constant at \$1,210 under the standard mortgage and fluctuate between \$1,105 and \$1,339 under the ARM. The pattern of real payments is markedly different, however. The real value of PLAM payments remains constant at \$1,105, while the real value of standard mortgage payments falls from \$1,210 to \$1,063 and the real value of ARM payments fluctuates between \$1,101 and \$1,230.

Under PLAM's, interest rate risk would be absorbed by the party most capable of doing so. The upward trend in real personal income shows borrowers are better able to handle inflation risk than lenders. Due to this upward

⁸ Even in the more realistic case in which the inflation rate varies, the PLAM keeps real payments constant.

trend, constant real payments would not be burdensome for most households. On the other hand, hedging opportunities open to institutions, but not most individuals, allow lenders to protect themselves at least partially against real rate risk. Lenders have access to futures contracts for foreign exchange, Treasury bills, and other assets. These instruments allow banks to limit the variability in real returns on their portfolios. In addition, if secondary mortgage markets for PLAM's existed, the inflation-adjusted principal could be sold to generate additional cash flow. Households, on the other hand, cannot use futures markets effectively because of the large minimum denomination of most futures contracts.

In addition to a better sharing of interest rate risk, the PLAM offers advantages relative to both FRM's and ARM's in terms of the ease of qualifying for a mortgage, especially in periods of high expected inflation. Since the mortgage rate applied to the principal represents only the real rate, there is no adjustment for expected inflation as in other mortgage contracts. Nor is there any inflation risk premium. In general, the real interest rate on a PLAM will be lower than the nominal interest rate on a FRM or ARM. With the lower interest rate, payments for a given size loan are also lower, making it easier for households to show they are eligible for loans.

Also, the PLAM ameliorates the tilt in the burden of making mortgage payments that characterizes both fixed-rate and adjustable-rate mortgages. With a PLAM, tilt exists only to the extent that real incomes are growing. Inflation itself does not lead to a decrease in the real value of mortgage payments as for FRM's and ARM's, as can be seen in Chart 1. According to most models of consumer choice, many households would prefer this pattern of constant real payments. It would especially be preferred by younger households

facing many demands on relatively low incomes but expecting increases in real incomes later. Also, lenders could rely on a constant stream of real payments, regardless of actual inflation. This assurance enhances long-run planning and profitability.

Finally, the problem of excessive default risk that plagues ARM's is substantially reduced with a PLAM. As Chart 1 shows, real payments under the PLAM are relatively constant over time. The small variations arise from divergence of the mortgage index rate (adjusted by movements in the Treasury bill rate) from actual inflation (measured by the percentage change in the PCE deflator). Although the real payments are greater than with a standard mortgage or an ARM after the first four years, there are no increases in real payments comparable with the increases under an ARM. As a result, real payment shock that poses severe risk of default with an ARM is eliminated altogether with a PLAM. Households, however, must expect higher nominal mortgage payments during times of inflation. Because borrowers' income would increase at about the same rate as mortgage payments, however, the increase in nominal mortgage payments would not cause unacceptable default risk.

Prospects for the adoption of PLAM's

Both economic conditions and institutional arrangements are important in providing an environment conducive to the PLAM. Recent economic trends have favored adoption of indexed contracts. Although few PLAM's have been issued, the likelihood of these trends continuing could spur both demand by borrowers and supply by lenders.⁹ Some institutional impediments would need to be removed, however, before these mortgages are adopted on a large scale.

The desirability of PLAM's

Economic conditions play an important role in establishing a need for indexed contracts. As long as real rates and inflation rates are not volatile, neither borrowers nor lenders are much concerned about the costs of bearing interest rate risk. Also, when interest rates are low, fewer households have problems qualifying for a mortgage or making mortgage payments.

Recent trends in price volatility, real income growth, and market rates of return, however, suggest that more interest in PLAM's might be expected. Economic models suggest that an increase in price volatility makes inflation-indexed contracts more attractive to borrowers, provided two conditions exist.¹⁰ First, real incomes must continue increasing with prices. Second, the real market rate of return must vary inversely with prices. Because both of these conditions seem to have held throughout most of the past 30 years, and because price instability has increased in recent years, borrowers presumably would prefer PLAM's to nominal rate contracts.¹¹

⁹ The Utah State Retirement Board issued PLAM's in 1981 at the real rate of 4.5 percent. Weiner reports that PLAM's had been offered in three other states.

¹⁰ Stanley Fischer developed models of the index bond market applicable to ultimate borrowers and lenders that were adapted to apply to the mortgage market by Manchester. See Fischer, "The Demand for Index Bonds," *Journal of Political Economy*, Vol. 83, No. 3, 1975, pp. 509-34, in which the demand for index bonds arises from households who maximize utility and have the choice of investing in real bonds, equity, and nominal bonds. Fischer, "Corporate Supply of Index Bonds," NBER Working Paper No. 331, March 1979, presents a capital asset pricing model in which corporations supply index bonds as they seek to maximize profits. Manchester, "The Market for Housing and House Prices in the U.S.," Harvard Ph.D. thesis, 1982, adapts these models to the supply of and the demand for PLAM's in a world of households and financial intermediaries.

¹¹ Zvi Bodie, "Common Stocks as a Hedge Against Inflation," *Journal of Finance*, Vol. 31, No. 2, May 1976, pp. 459-70.

Evidence that price variability has increased substantially in recent years is shown in Table 2. The variance and the coefficient of variation of the consumer price index (CPI) and the personal consumption expenditure (PCE) deflator increased markedly in the 1970s and especially in the five-year period ending in 1983. In light of this increase in the variability of inflation, borrowers could be expected to prefer PLAM's. By the same reasoning, the relatively low variability in the earlier years helps explain the previous lack of interest in such instruments.¹²

Lenders also should prefer inflation-indexed mortgages when inflation is more variable. Because the real value of PLAM payments remains constant over time, the real rate of return to lenders holding PLAM assets remains constant over time. This is especially important given the recent deregulation of rates payable by banks and savings and loan associations on deposits. As deposit interest rates become more closely linked to variable market interest rates, the protection provided by PLAM's against declines in the rate of return on mortgage assets will be increasingly valuable. Without this protection, the rate of return adjusted for inflation becomes highly uncertain, thereby hindering long-run planning.

Impediments to adoption

Lack of consumer understanding is a major barrier to PLAM acceptance. Borrowers must be willing to accept inflation risk and forego the advantages that accrue to them under fixed-rate mortgages when inflation is unexpected. While increases in nominal payments

¹² Again see Stuart E. Weiner, "Why Are So Few Financial Assets Indexed to Inflation?" for a more complete analysis of the nonexistence of inflation-indexed instruments.

TABLE 2
Measures of inflation variability

<u>Period</u>	<u>CPI</u>		<u>PCE Deflator</u>	
	<u>VAR</u>	<u>CV</u>	<u>VAR</u>	<u>CV</u>
1954-83	13.949	3.035	8.261	1.961
1954-58	2.300	1.506	1.202	0.657
1959-63	0.141	0.110	0.409	0.249
1964-68	1.863	0.650	1.433	0.536
1969-73	4.918	0.906	2.255	0.465
1974-78	7.803	0.974	5.975	0.836
1979-83	20.698	2.446	8.474	1.190

Note: VAR is the variance of the annual percentage growth for each of the price indexes from December to December. CV is the coefficient of variation for each of the price indexes, defined to be the variance of the annual percentage growth divided by the mean percentage growth.

could be a hardship to borrowers who do not expect the increase or whose incomes do not keep pace with inflation, the advantages of PLAM's should outweigh the disadvantages for most borrowers.

The deductibility of nominal interest payments from individual income taxes provides another impediment. The impediment arises because lower real interest payments under a PLAM as compared with nominal interest payments under a FRM or ARM result in less tax savings. Particularly during the early years of a nominal-rate mortgage, when most of the mortgage payment is interest, households in high tax brackets holding a FRM or ARM benefit from a large reduction in the after-tax cost of housing. According to current practice, only the real interest payments on the fluctuating principal of a PLAM could be deducted. The result would be a smaller proportional decline in the after-tax cost of borrowing and less absolute tax savings.¹³ This difference will remain as long as nominal interest payments are deductible or until tax laws are changed to provide more equitable treatment.

The difference between the rate of return

earned on PLAM's and the rate paid on deposits at lending institutions presents a third impediment and perhaps the most serious problem. Because the interest rate financial institutions pay on their deposits is a nominal interest rate while the interest rate received on PLAM's is a real interest rate, the rate of return on PLAM's during times of inflation would be considerably less than the rate paid on deposits. A severe cash-flow problem could result if the institution could not generate cash flow from other sources or change the nature of its liabilities.

This impediment caused by the mismatch between revenues and payout could be overcome through increased use of secondary markets or the introduction of inflation-indexed deposits. To generate additional cash flow, the

¹³ Joseph McKenzie, an economist at the Federal Home Loan Bank Board, confirmed that the real interest payment based on the current nominal outstanding principal of the PLAM was deductible. For a discussion of four possibilities for tax treatment of PLAM's, see Richard Peiser, Kenneth Ferris, and Robert Rene, "Income Taxation and Price-Level-Adjusted Mortgages," *Housing Finance Review*, Vol. 2, No. 1, January 1983, pp. 1-18.

increased value of the mortgage principal could be sold on the secondary market after each principal revaluation. Although such an effort would require considerable paperwork and the capital gain would be taxed when the increase in principal was sold, the liquidity of the lending institution would be enhanced. Alternatively, to improve the match between income and payment flows, price-level-adjusted deposits could be used instead of nominal deposits as the financial institution's main type of liability. In other words, a real interest rate could be paid on inflation-adjusted deposit balances.¹⁴

A fourth impediment to the adoption of PLAM's is the inability of lending institutions to establish a perfect hedge against real rate risk. Because the real rate on a 25-year PLAM is fixed over the life of the mortgage, any increase in the market real rate of interest means an increase in the cost of funds not matched on the revenue side. One possible solution to this risk involves hedging in the financial futures market. The use of foreign exchange futures together with Treasury securities futures has been mentioned as an imperfect hedge subject to exchange rate risk. Better hedging methods are attainable, however. If a CPI futures contract were available, lending institutions could invest in Treasury bill futures offset by CPI futures to guarantee a specific real rate of return over a given investment period. The Commodity Futures Trading Commission is investigating the possibility of a CPI futures contract presently.¹⁵

¹⁴ The probability of withdrawal would still threaten short-term cash flows, but this threat could be eased by increasing the proportion of fixed-term deposits relative to those that have no stated term to maturity.

¹⁵ Both political and legal problems must be overcome before the CFTC will approve the CPI futures contract. I am grateful to James Culver at Merrill Lynch Commodities for useful discussion of this issue.

The legal intricacies of the index mortgage could be the biggest stumbling block. Every state has its own laws concerning lien priority—who has claim to what part of the asset in case of default. In most states, the future increases in the inflation-adjusted principal might not belong to the lending institution. This situation complicates title insurance, with the result that this insurance may not be available for houses financed through price-level-adjusted mortgages.

Conclusion

Price-level-adjusted mortgages would improve the efficiency of the mortgage finance system by allocating each component of interest rate risk—real rate variability and the inflation rate variability—to the party best able to bear it. Lending institutions, with their access to hedging opportunities, secondary mortgage markets, and a variety of sources of funds, would bear all the risk of real rate fluctuation. Households, whose incomes tend to more than keep pace with inflation over time, would bear all the inflation risk. Moreover, by eliminating the tilt associated with nominal interest rate contracts, the stream of real payments remains constant over the life of the mortgage, improving long-run financial planning without posing unacceptable default risk.

Several changes would need to be made before PLAM's are widely adopted. Borrowers and lenders must be willing to accept this type of contract. Tax laws would need to be altered to provide more favorable treatment of interest payments by borrowers. The cash flow of lenders receiving revenues in real terms while making deposit payments in nominal terms would need to be altered either by restructuring liabilities or by hedging. Finally, the legal problems of lien priority and title insurance would need to be resolved.

Despite these problems, several factors indicate that the price-level-adjusted mortgage could become the dominant mortgage contract. Adjustable-rate mortgages with interest rate caps or payment caps are becoming more common as borrowers and lenders try to reduce the payment shock accompanying unexpected increases in interest rates. At the same time, concern over defaults resulting from excessive fluctuations in nominal pay-

ments associated with these adjustable-rate mortgages has become widespread. In addition, financial institutions continue seeking new ways of adapting to changing economic conditions. Price-level-adjusted mortgages have the advantages of the sharing of interest rate risk between borrower and lender, constant real mortgage payments over time, reasonable eligibility requirements, and an acceptable level of default risk.

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