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Estimating the Cost of Your Bank's Funds

& Uniformity in Assessment

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Ronald D. Watson

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. . . Nonuniform administration and preferential exemptions can lead to inefficiencies and inequities in the property tax system. Greater uniformity in assessment practices could reduce some of the defects.

Federal Reserve Bank of Philadelphia
100 North Sixth Street
(on Independence Mall)
Philadelphia, Pennsylvania 19106

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Estimating the Cost of Your Bank's Funds

*By Ronald D. Watson**

By the time Franklin National Bank finally succumbed in 1974, it had been assured an honored spot in modern banking theory as the textbook example of how *not* to run a bank. One of Franklin's weaknesses was the incorrect method its management used to estimate the cost of the bank's funds.[1] During a period of high interest rates, the bank consistently underestimated the cost of raising money. In fact, the cost of the money that Franklin borrowed to invest was higher than the return on the investments it was making.

Most bankers are far more sensitive to this problem than Franklin's management was, but being aware of how important it is to know the cost of money and being able to make an accurate estimate of that cost are two very different things. Making good cost estimates takes time and requires a thorough understanding of how investors make their decisions. Further, these estimates must reflect current conditions in the money markets instead of being based on costs in the past; and they must take account of the effect that the bank's choice of a capital structure may have on its cost of funds. Getting an accurate estimate of the cost of funds poses some tough computational problems, but there isn't any other way to find out what rate of return is required to make a profit.

THE OLD WAY: HISTORICAL AVERAGE COSTS

In the past, the most common method of estimating the cost of a bank's funds was to add together all the net expenses (interest, reserve requirements, and other expenses

*Ronald D. Watson is Research Officer, Economist, and Assistant Secretary at the Philadelphia Fed, where he has served since 1971. Holder of an M.B.A. from Cornell and a D.B.A. from Indiana, he specializes in finance, banking, and business.

[1]Sanford Rose, "What Really Went Wrong at Franklin National," *Fortune* (October 1974), p. 118.

less service charge income) of borrowing current funds and divide the total by the amount being borrowed. This gave an historical estimate of the average return that had to be earned on assets acquired with these funds for the bank to break even in its investment activities. If the shareholders were to receive a return on the funds they supplied, a profit margin had to be added to this basic historical cost of funds estimate (see Appendix).

But historical costs can be extremely unreliable as a pricing guide if conditions are changing over time. When interest rates are rising, the average cost of funds already obtained will be below the cost of replacing those funds by new borrowing, and the bank may accept new investments it should reject. When rates are dropping, the historical cost of funds will be higher than replacement costs, and the bank may be led to set too high a standard for new investments, passing up opportunities to make profits. Historical estimates can be unreliable also when a bank's capital structure is changing. If a bank's debt is increasing faster than its equity, for example, it may come to be regarded as a riskier operation, and this perception of added risk may raise the cost of the bank's funds from all sources. It's because of drawbacks such as these that bankers have turned from historical cost estimates to some basic economic principles for generating cost estimates.

THE NEW WAY: A BIT OF THEORY

The theory behind this new cost estimating method starts from a reasonable premise—that bank managers should make investment decisions which make the bank more profitable. This theory rationalizes the rules of thumb that many bankers actually use when they look at profitability—rules such as adding in a desired long-term profit margin as they try to gauge the expected cost of funds over time.

Matching Added Costs With Added Revenues. To obtain the largest profit available, a bank should compare the expected return from an investment with the current cost of obtaining the money needed to finance that investment. If the return (in the long run) from a new loan or security doesn't exceed the probable cost of financing that asset while the bank owns it, the bank would do better not to acquire it.[2] The added amount that would be brought in by lending one more unit of money to a borrower is the *marginal revenue*. The added amount that would be paid out to procure one more unit of loanable funds is the *marginal cost*.

The use of current information in making the cost of funds estimates is extremely important. The cost of a bank's funds normally will change as market interest rates move. Some cost changes, as for CDs and Federal funds, will be highly visible, while others, as for demand deposits and savings accounts, will not be so obvious. The banker must keep abreast of both. As interest rates rise, a banker will find that other financial institutions will compete more vigorously for these funds, and the depositors themselves will make an effort to shift into the more lucrative investments. To attract and hold these monies a bank may have to step up its advertising, resort to premiums, and expand its menu of depositor services. The result will be a higher cost to the bank for funds from these sources.

Less obvious will be the rising cost of equity funds—the bank's common stock. The target rate that a bank's management sets for returns to shareholders should be adjusted to reflect any changes in yields on other long-term investments. Investors who have the alternative of investing in long-term bonds at 8 or 9 percent with little risk must expect to receive more than that from an investment in common stock, or they will stay with the safer security. When long-term

[2] Statement of the MC = MR principle is intentionally very general, so that complications such as tied-product returns and discounted future benefits can be accommodated within the definition.

interest rates rise 1 or 2 percentage points, the return to common shareholders must move by a similar amount. In a competitive money market, the bank's shareholders always will have investment options that offer the current market rates. Even though a bank may not be selling a brand new stock issue in this high-rate environment, it still must aim to earn the competitive rate for its current owners. If it doesn't, the owners would be better off to instruct management to pay the maximum dividend possible. The stockholders then could use the extra dividends to make investments elsewhere at the higher prevailing rates.

When New Costs Don't Match Old. The decision on a new investment should be made on the basis of the cost of new money. Even if a bank were lucky enough to obtain a large pool of funds at rates that are below current market levels, shareholders, who bear the risk of loss, should be the beneficiaries of this good fortune. If historical costs are used to set current loan rates, the benefits of having these relatively cheap funds will be transferred to the borrowers rather than being retained for the common stockholders. If circumstances were reversed, it's unlikely that borrowers would be willing to pay high interest rates on loans from a bank which had unusually *high* average costs. The fact that the bank had the misfortune of being stuck with large amounts of funds acquired when rates were very high wouldn't matter if cheaper sources were available elsewhere. Regardless of costs or the effect on profits available for stockholders, bankers can't charge borrowers a rate that is much higher than rates available elsewhere. So historical costs should not be considered in making today's investment decisions. Rather, the cost of an additional dollar of funds should be compared with the return that will be realized when that additional dollar is invested. So much for the theory.

But how should an estimate of the marginal cost of funds be made? Although averaging historical costs is relatively easy, figuring out the full cost of a new dollar of funds is another matter—especially if it's necessary to estimate the impact that using various sources of funds will have on the cost of other sources.

MARGINAL COST ESTIMATION METHODS

Two basic options are available to the banker who is trying to make a marginal cost estimate. One is to identify the source of funds that the bank currently is using to raise new money. Once this source is identified, an estimate might be made of the cost of raising another block of these funds. This estimate of the marginal cost of a single source will serve as the *hurdle rate*—the minimum required rate of return—for any new investment of average riskiness. The other strategy is to estimate the marginal cost of each of the sources being employed within the bank. By weighting the cost of new dollars drawn from each source by the amount to be raised from that source, bankers can construct a weighted average of marginal costs. The second method sounds more complex, but it has some advantages over the first that make it worth considering.

The Marginal Cost of a Single Source. The most straightforward approach is to determine which source of funds the bank wants to use, compute its marginal cost, and use that estimate as the hurdle rate. Presumably, the source selected will be the cheapest one available to the bank. For example, if CDs are the source a banker turns to, the cost of additional dollars borrowed in that market is the relevant marginal cost. The interest rate on CDs is easy enough to determine, but this rate is only part of the real marginal cost of these funds.

Suppose a bank—for example, the hypothetical Ninth National Bank—wants to borrow $1 million for expansion. If it turns to the CD market and pays 7 percent, that interest rate is the base for the bank's cost

calculations. But the job of estimating the marginal cost of this source is just beginning. The bank will incur a small cost in acquiring and repaying this money, and that cost should be included in the estimate. Also, there will be a reserve requirement against this source of funds (currently 1 percent to 6 percent, depending on term to maturity);[3] any obligation to keep a portion of the borrowed money in the form of idle cash raises the effective cost of the funds. These adjustments to the basic interest cost are relatively easy to make.

A much more difficult adjustment to the cost is the one required to compensate suppliers of other sources of funds for the added risk created by this new borrowing. Ninth National's leverage—its ratio of debt to equity—will be increased by the addition of more CD funds. Since higher leverage produces more risk for the bank, other creditors and shareholders may not be as willing to continue supplying Ninth National with funds at the same interest rates as before. Depositors whose funds are covered by deposit insurance probably won't care. But the holders of big deposits and CDs might, because they are not fully insured, and their concern could cause them to shift their funds to another bank or demand a higher return from Ninth National. In either case, the bank's cost to attract and hold such deposits is likely to rise.

The same thing will occur with the capital note holders and the common stockholders. When they sense that risks are increasing, they'll seek a higher return on their investments. The ones that presently own these securities can't automatically start charging the bank a higher rate for funds that already have been committed, but investors will demand a higher return for any new invested funds. The bank will be obliged to increase its earnings and ultimately its dividends to stockholders in order to compensate them for their higher risk. If it doesn't, the interests of the current shareholders will be harmed, and that would be inconsistent with management's obligation to run the bank in a way which enhances the shareholders' wealth (see THE SINGLE MARGINAL SOURCE CALCULATION).

[3] See "Member Bank Reserve Requirements," Federal Reserve *Bulletin*, August 1977, A9.

THE SINGLE MARGINAL SOURCE CALCULATION

Suppose the management of Ninth National is looking for another $100 and wants to raise the money by issuing CDs. It will be obliged to pay the going market interest rate for funds (say, 7 percent). It must then add to this amount several surcharges which raise the effective rate. The cost of reserve requirements on the CD funds might, for example, be 3 percent (annualized), the cost to acquire such funds 0.5 percent (annualized), and the cost of servicing the funds 0.3 percent (annualized). Using the formula

$$\text{cost of funds} = \left[\frac{(\text{interest rate} + \text{servicing costs} + \text{acquisiton costs} + \text{insurance})}{(1 - \text{reserve requirement})}\right],$$

the explicit cost of the CD funds is found to be 0.0804 or about 8 percent.

This is only part of the job. Since the bank now is being more heavily financed with short-term borrowed funds, the risk is greater. Both the other suppliers of borrowed funds and the shareholders may wish to raise the cost of future funds they provide for this bank. This additional indirect cost must be added to the explicit cost estimate. Suppose that raising $100 of new CD funds created $.20 in added costs for other sources of funds. The *real* marginal cost of the CD funds would be estimated as their explicit cost plus the risk spillover cost:

marginal cost = 8.04 percent + 0.2 percent = 8.24 percent.

Failure to include all of these costs other than interest in the estimate will lead to a hurdle rate for new investments that understates the real cost of new funds.

In any event, it should be clear that the impact which heavy use of one source of funding has on the cost of other sources should be included in any analysis of the cost of marginal funds. This risk spillover cost is very difficult to measure, but it must be included in the calculation. Accordingly, the cost of new CD money can be found only after considering the direct interest cost, any acquisition and servicing costs, reserve requirements, and risk spillover costs.[4]

The same principles apply to estimating the cost of demand and time deposits (handling, acquisition, reserve requirement, and deposit insurance costs are likely to be higher than for CDs) or capital notes (risk spillover may raise the cost of the bank's CDs and uninsured deposits as well as the cost of its common stock). Similarly, the nominal, before-tax cost of new common stock may overstate its real cost because it will have the effect of reducing overall risk and is likely to lower the net cost of other debt sources.

Averaging All Marginal Costs. The other approach to calculating a bank's marginal cost is to presume that the institution will be financed during the next few months in pretty much the same way as it's being financed now. Checking and savings accounts will open and close and the bank will experience deposits and withdrawals. But as long as advertising doesn't diminish and services don't deteriorate, total dollars from each retail source will change only gradually. The bank will wind up paying the going rate to hold funds from each of these sources. Similarly, market rates (plus associated costs) will be paid for any CDs sold even if they are simply replacements for maturing issues. Finally, the bank will have to pay competitive returns for capital if it expects to keep access to these sources of funds. In short, the mix of sources doesn't change and the bank must pay current rates for each source used (see THE AVERAGE OF MARGINAL COSTS CALCULATION).

[4] A more technical explanation of this calculation can be found in Ronald D. Watson, "The Marginal Cost of Funds Concept in Banking," Research Paper No. 19, Federal Reserve Bank of Philadelphia, January 1977; reprinted with revisions in the *Journal of Bank Research* 8 (Autumn 1977), pp. 136-147.

THE AVERAGE OF MARGINAL COSTS CALCULATION

Since figuring out the risk spillover costs is very difficult, the banker might prefer to calculate his explicit marginal costs for each source of funds and average those estimates to find out what the entire pool of funds presently is costing. Suppose that the bank is structured as follows:

	Added Dollars	Explicit Cost*	
Demand deposits	$30	.05	$1.50
Time deposits	40	.07	2.80
CDs	10	.08	.80
Capital notes	10	.09	.90
Common stock	10	.22	2.20
	$100		$8.20

Then Ninth National's estimate would be: marginal cost = $\frac{\$8.20}{\$100.00} = 0.082 = 8.2$ percent.

*With acquisition, servicing, and reserve costs included.

If Ninth National is trying to calculate the overall cost of this pool of funds, it will need an estimate of the marginal cost of each source employed. That estimate must include any explicit interest payments, acquisition and servicing costs, deposit insurance, and reserve requirements. Such a calculation will be straightforward for CDs and capital notes but very difficult for demand and time deposits (even if the bank has a reliable cost accounting system). Estimating the percentage of the advertising budget that goes to keeping demand deposit levels steady or the additional advertising that would be required to increase time and savings deposits by a few percent is a very uncertain undertaking. At best it will involve a substantial amount of informed judgment.

When management is satisfied with these marginal cost estimates, an overall average can be calculated by multiplying each estimate by the fraction of the bank's funds that will be raised from this source in the near future. The weighted average will indicate the cost to the bank of buying the funds that will be used for investments or loans made during that time and it will serve as a minimum target rate of return for a new investment of average risk.

For all its complexity, this estimate has an advantage over the single-source cost estimate. With the weighted average approach there is no need to try to calculate the impact that risk spillovers have on the cost of other sources. The present level of the bank's leverage risk already is reflected in the prices of its liabilities and equity securities. If the composition of the pool of funds doesn't change, the risks aren't going to change significantly. The risk spillover that each source of funds creates for the other sources is neutralized in this pooling process and need not be estimated separately. As a result, estimates of the current marginal cost of each source, averaged across all sources, will provide a correct estimate of the bank's pool of funds without further risk adjustments.

CHOOSE YOUR POISON

Both of the cost estimation methods just described have pitfalls. Calculating the marginal cost of a single source such as CDs looks easy. The interest rate is known and the reserve and handling costs are measurable. But estimating the size of the risk spillover adjustment that should be added to the other costs to get the real marginal cost is very difficult.

In addition, one of the basic principles of economic theory is that businesses should tap each source of funds until the cost of the next dollar raised from that source is the same as the cost of a dollar from each other available source. That's the way to maximize profit, since it keeps money costs as low as possible. If a bank concentrates its attention on the cost of just one source, it may lose sight of the availability of funds from other sources that are cheaper.

Computing a weighted average of marginal costs keeps a banker looking at all of his costs simultaneously. Estimating the marginal cost of the bank's demand and time deposits remains a sticky problem, but the uncertainties of calculating risk spillover adjustments are avoided. This method will not provide the manager with the information needed to balance the marginal cost of one source against the marginal cost of another. For that he needs a marginal cost estimate that includes the risk spillover adjustment for each type of funds used. But the banker doesn't have to worry about risk spillover adjustments when he uses this method. He may not be getting the cheapest mix of funds, especially if he has overlooked a relatively cheap source; but he will be getting an accurate estimate of the cost of the pool of funds he's using. In this he has an advantage over his counterpart who computes the marginal cost of a single source but then continues to raise funds from all of the available sources. If the real marginal costs of each source are not really equal, use of the single-source technique will produce a faulty estimate.

A Sensible Procedure. Both processes produce the right answer when used correctly. And both are difficult to use correctly. The best approach is to remember that both methods *can* give the right answer. Calculate the bank's cost of funds both ways. Use a sharp pencil. Analyze the cost estimates employed. Think about the effect that leverage risk has on the cost of various sources of funds. Analyze what you're really paying for demand deposits.

If both methods can give a correct answer, the calculations you make should give the *same answer.* If they do, you have a cost of funds estimate. If they don't, you had better try to figure out why. Do you need better data about your costs? Is the bank being financed with too expensive a mix of sources? Are the institution's costs under both calculations higher than previously thought? Has the bank been adding new business at a loss rather than a profit?

The exercise may be frustrating. It may be disturbing. But a sharp banker has to go through it if he's to do a first-rate job of managing profits.

For Appendix, see overleaf. . .

APPENDIX

AN EXAMPLE OF HISTORICAL AVERAGE COST CALCULATIONS

Consider the case of the hypothetical Ninth National Bank. This bank gets its funds from demand and time deposits, CDs, subordinated capital notes, and common stock (see BALANCE SHEET). The full cost of each source of funds (interest and servicing cost of all funds obtained from that source) is indicated in parentheses.

NINTH NATIONAL BANK BALANCE SHEET

Cash and due	$100	Demand deposits	(4%)	$300
Investments	300	Time deposits	(6%)	400
Loans	600	CDs	(6%)	100
		Capital notes	(8%)	100
		Common stock	(20%)	100
Total	$1000	Total		$1000

Since management wants to insure that the shareholders' funds earn a return of 20 percent (10 percent after taxes if the tax rate is 50 percent), it must include this profit objective in its average cost of funds estimate.

Demand deposits	.04 x $300 =	$12
Time deposits	.06 x 400 =	24
CDs	.06 x 100 =	6
Capital notes	.08 x 100 =	8
Common stock	.20 x 100 =	20 (before taxes)
	$1000	$70

$$\text{Cost of funds} = \frac{\$70}{\$1000} = 0.07 = 7.0 \text{ percent.}$$

Only if Ninth National is able to average a 7-percent return on all invested funds will it be able to pay shareholders that target 10-percent return (after taxes).

Most banks would have little trouble computing this breakeven return, and it would appear to solve the problem of estimating a cost of funds which could be used as a minimum required rate of return (hurdle rate) for new investment decisions. But, this will work only when interest rates are perfectly steady. Otherwise, using actual average costs to set the hurdle rate for new investments will give the wrong answer.

As an illustration, suppose that the inflation rate increases, and one consequence of this change is a jump in interest rates on most securities. For simplicity, let's say that all rates go up 1 percentage point. The cost of *replacing* all Ninth National's deposits, CDs, and capital funds might now be:

Demand deposits	5%
Time deposits	7%
CDs	7%
Capital notes	9%
Common stock	11% (after taxes).

The weighted average cost of a new pool of funds would be over 8 percent rather than the 7 percent that Ninth National has been paying for its funds. What happens if the bank continues to use that historical cost hurdle rate of 7 percent?

One thing that will happen is that Ninth National might be tempted to take on new loans and investments that yield only 7 1/2 percent. If the bank invests in a $100 bond that yields 7 1/2 percent, it will be earning $7.50 per year. But as long as the composition of the bank's sources of funds doesn't change, the cost of new funds acquired to make that investment is:

Demand deposits	.05 x $30 =	$1.50
Time deposits	.07 x 40 =	2.80
CDs	.07 x 10 =	.70
Capital notes	.09 x 10 =	.90
Common stock	.22 x 10 =	2.20
	$100	$8.10.

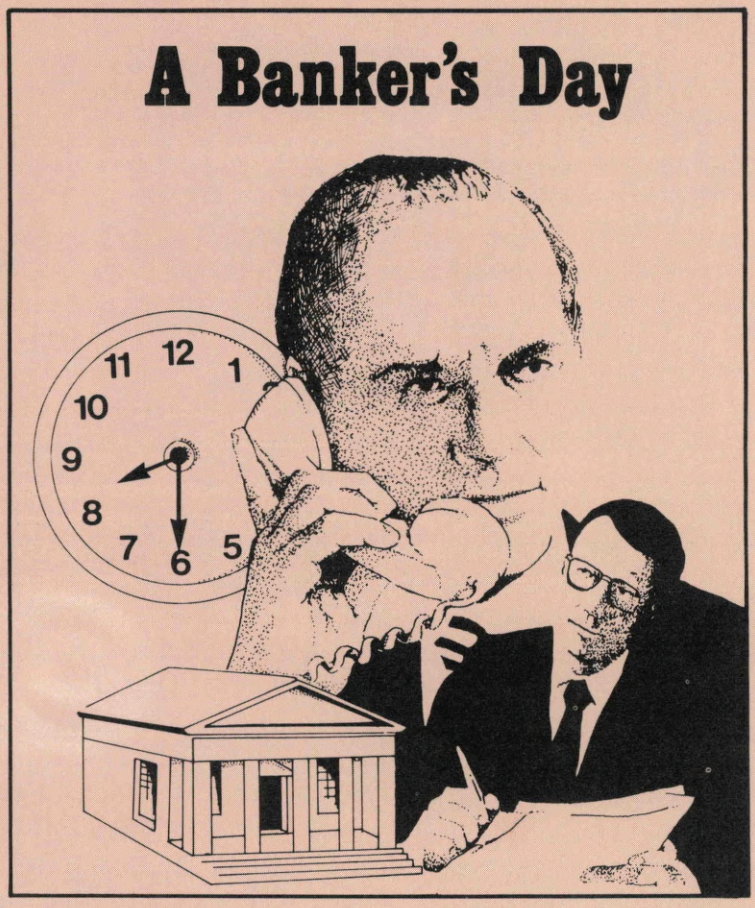
Since shareholders are the last to be paid, this shortfall will come out of their part of the bank's income:

$7.50	income
−5.90	cost of debt sources
1.60	earnings before taxes
−.80	taxes
$.80	earnings after taxes.

$$\text{Return on new shareholder equity} = \frac{\$.80}{\$10.00} = 0.08 = 8 \text{ percent}.$$

This return is not high enough to pay shareholders the return of 11 percent (after taxes) that they expect from their investment in the bank's stock. The ones that are dissatisfied will want to sell their stock and its price will be forced downward. All of the shareholders will be worse off because of the incorrect investment decision.

From the Philadelphia Fed...



This new pamphlet, which describes the range of decisions a modern banker has to make, is available without charge from the Department of Public Services, Federal Reserve Bank of Philadelphia, 100 North Sixth Street, Philadelphia, Pennsylvania 19106.

Uniformity in Assessment: High on the List of Property Tax Reforms

By Nonna A. Noto *

In recent years, dramatic increases in property values and higher costs for local government services, including education, have driven property tax bills sharply upward. As the dollar amounts claimed by taxes have grown, many property owners around the country have come to question whether they are paying more than their fair share.

Most states have laws on the books that require all properties to be assessed for tax purposes at the *same percentage* of their market value, at least within the same taxing jurisdiction. But these laws often are not accompanied by procedures for attaining the legislated goal. And many states have legislated exemptions that offer preferential tax treatment to individuals in certain groups. The consequence of not living up to one of the basic tenets of "good" taxation—uniformity—is a patchwork of uneven tax liabilities. The results are inequity (equals are not treated equally) and inefficiency (property costs do not accurately reflect underlying demand and supply considerations). While a move toward greater uniformity would produce hardship in some cases, many tax experts favor dealing with such cases by direct aid rather than by imposing the costs of nonuniformity of the assessment system on property taxpayers as a whole. But the precise costs and benefits of both direct aid and exemptions remain to be determined.

The mechanisms for achieving greater uniformity are available. Legislatures can use methods other than nonuniform assessments to respond to different groups. And modern computer technology can improve the administration and efficiency of America's property tax system.

ASSESSMENT RATIOS ARE NOT UNIFORM

Uniformity is a long-recognized principle of public finance and is embodied in many

* Nonna A. Noto, who joined the bank staff in 1974, holds a Ph.D. from Stanford University. She specializes in urban economics and public finance.

states' legislation on assessments. Yet almost any sample of properties is likely to reveal a considerable range of assessed-to-market-value ratios rather than uniformity.

Clear Evidence. The factual evidence for nonuniformity is clear both at the local and at the state level.

Most states, for example, have legislated partial exemptions for homeowners, senior citizens, the disabled, and veterans.[1] And many organizations have a long history of total exemption from the property tax. Churches, private schools, and nonprofit hospitals and cultural institutions, along with Federal, state, and local governments, have been declared exempt from property taxes under time-honored legal precedents.

Further, some land use classifications are assessed at lower ratios than others. Vacant or agricultural land, for example, often is assessed at a lower ratio than developed land. And single-family residential property frequently is assessed at a lower rate than multifamily residential, commercial, or industrial property. In a few cases, these preferential assessment policies have been articulated in state laws. But in many instances, they represent local assessment customs.[2]

Even within one land use classification, there may be a systematic bias in assessment ratios corresponding to such features as the age or value of property. Older commercial and industrial properties, for example, may be assessed at a higher ratio than new ones.[3] And lower value houses may be assessed at a larger fraction of market value than higher value ones.

Evidence of identifiable patterns of inequality in assessment ratios has turned up in Philadelphia and other cities, but the patterns vary from city to city.[4] The overall picture of the Philadelphia situation is illustrated by the accompanying map. According to calculations by the Philadelphia City Finance Director's Office, the 1975 citywide average assessment ratio (on all types of property) was 40 percent. Average assessment ratios

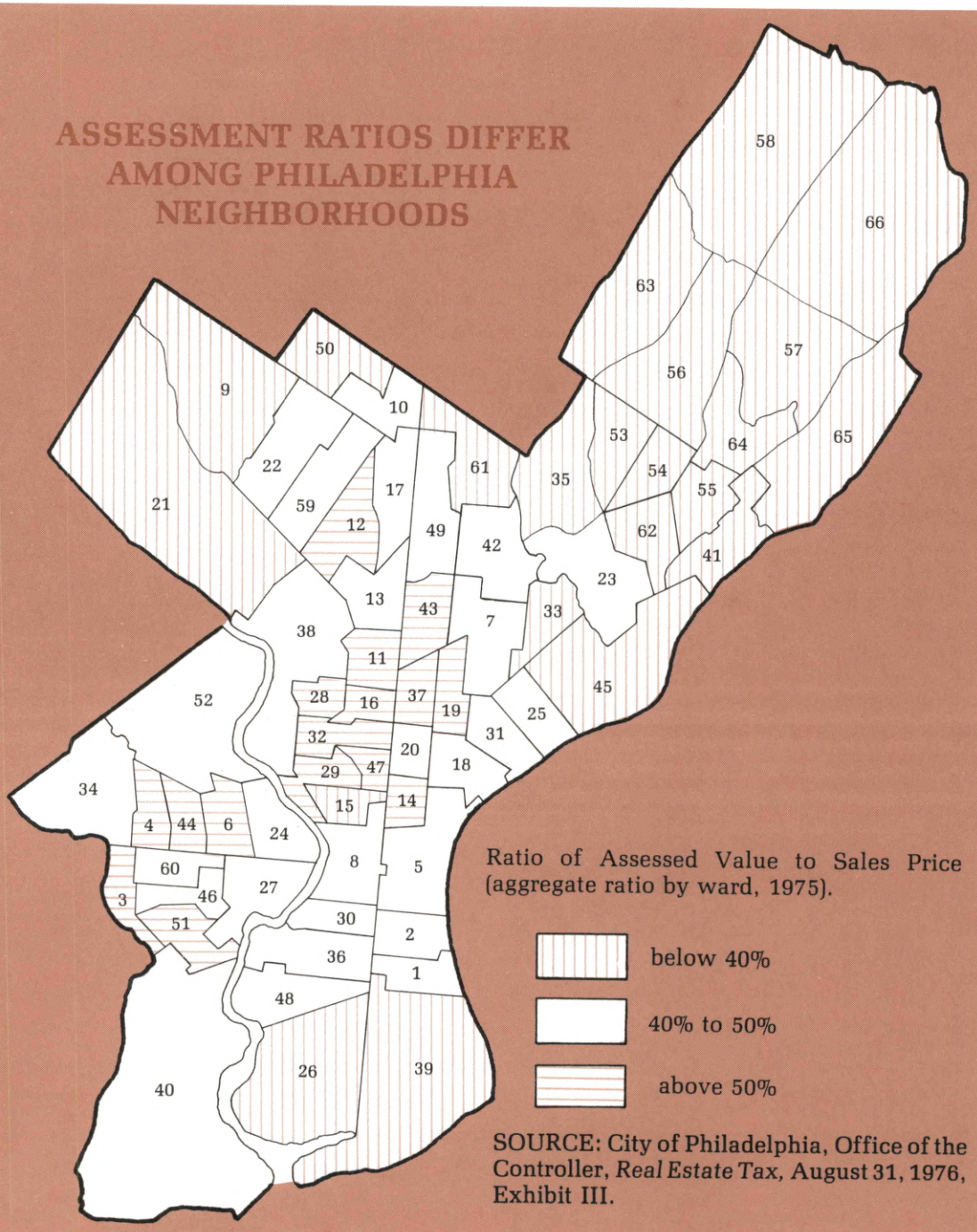
[1] Preferential tax treatment can take the form of a reduction in the assessed value of the residence (an exemption in the traditional sense), a deduction from the tax payment otherwise due, or a tax rebate check. All three approaches accomplish the same result of lowering the effective property tax rate paid by certain property owners.

[2] Apart from the now widespread agricultural and open space exemptions, only eight states have made legal provisions for different land use categories to be assessed or taxed at different rates. Tennessee law, for example, provides that farm and residential property is to be assessed at 25 percent of market value, industrial and commercial property at 40 percent, and public utilities at 55 percent. Both New Jersey and Pennsylvania law require that all types of property be assessed uniformly. Nonetheless, a statewide sample of 1976 property sales in New Jersey found vacant and residential land assessed, on average, at 68 percent of sales price while business property was assessed at 86 percent. A similar calculation of average assessment ratios in Philadelphia based on 1975 property sales found private residential property assessed at 37 percent of sales price compared to 41 percent for industrial property, 42 percent for vacant property, 45 percent for multifamily units, and 52 percent for commercial property. See U. S. Department of Commerce, Bureau of the Census, *Property Values Subject to Local General Property Taxation in the United States:1973*, State and Local Government Special Studies No. 69 (Washington: Government Printing Office, 1974), pp. 4-9; State of New Jersey, Department of the Treasury, Division of Taxation, *Average Assessment/Sales Ratio in New Jersey by Taxing District—by Property Class* (Trenton:1977), p.III; City of Philadelphia, Office of the Controller, *Real Estate Tax*, August 31, 1976, Exhibit IV.

[3] Investigating assessments in Boston in the early 1970s, Andrew Hamer learned from the Boston Assessor's Office that while recently constructed office property was assessed on average at 30 percent of market value, older office structures were assessed at 50 percent; for industrial properties, recently constructed space was assessed at 35 percent, remodeled space at 45 percent, and older space at 50 percent. See his *Industrial Exodus from Central City* (Lexington, Mass.: D.C. Heath and Company, 1973), p. 46.

[4] In some cities, high-value properties appear to be targeted for higher-than-average assessment ratios. But Philadelphia and Baltimore have been singled out by two separate studies as cities which impose noticeably higher assessment ratios on properties of lower value and properties in blighted or declining neighborhoods. See George Peterson, ed., *Property Tax Reform* (Washington: The Urban Institute, 1973), pp. 29-31, 110-111.

ASSESSMENT RATIOS DIFFER AMONG PHILADELPHIA NEIGHBORHOODS



Ratio of Assessed Value to Sales Price (aggregate ratio by ward, 1975).

below 40%

40% to 50%

above 50%

SOURCE: City of Philadelphia, Office of the Controller, *Real Estate Tax*, August 31, 1976, Exhibit III.

for city wards, however, ranged from 29 percent to 66 percent. Based on these figures, it appears that wards with assessment ratios higher than the official target of 50 percent are located mainly in the predominantly black neighborhoods of North and West Philadelphia, which have low and declining property values. Further, the wards with below-average assessments appear to be clustered in the growing Northeast and the stable neighborhoods of Northwest and South Philadelphia. Independent research on assessment inequality in Philadelphia shows similar results.[5]

Not all differences in official assessment ratios impose uneven burdens on taxpayers. The fact, for example, that the Philadelphia assessor aims for a 50-percent assessment ratio while the assessor in neighboring Montgomery County strives for a 17-percent ratio is not necessarily evidence of nonuniformity. As long as all property owners in a taxing jurisdiction are assessed in the same way, they all will be paying taxes in proportion to market value.[6] But when properties within the same taxing jurisdiction are assessed at different fractions of their market value, then they are subject to different effective rates, even though the same millage rate shows up on their tax bills (see MILLAGE VERSUS EFFECTIVE RATE).

MILLAGE VERSUS EFFECTIVE RATE

In comparing property tax burdens, many taxpayers think first of the millage rate—the amount levied per thousand dollars of a property's assessed value. If every property were assessed at its full market value, the millage would tell the whole story. But although most states require full-value assessment, many taxing jurisdictions actually use a certain percentage of full value for computing tax bills. With different assessment ratios, the same millage rates may translate into widely disparate tax bills. Thus if two houses with market values of $50,000 both are situated in districts that tax at 20 mills but one is assessed at full value while the other is assessed at 50 percent, their annual tax bills—at $1,000 and $500 respectively—will differ by $500. So to get a standard for comparison, the right thing to do is to divide the market value into the total tax bill. This gives the *effective tax rate*. In the example, these rates are 2 percent and 1 percent. Looking at official millage rates alone would not have revealed this difference in tax burdens.

Where do differences in assessment ratios come from? Some are traceable to the inadequacy of current assessment systems to

[5] A detailed analysis of assessment inequality in Philadelphia found strong statistical evidence that assessment ratios tend to be larger for lower value houses than for higher value ones and higher for houses located in black and low-income neighborhoods than elsewhere in the city. See Robert H. Edelstein, "The Equity of the Real Estate Property Tax: An Empirical Examination of the City of Philadelphia" (Philadelphia: Rodney L. White Center for Financial Research, The Wharton School, University of Pennsylvania, 1976).

[6] But local variations in assessment ratios would interfere with efforts to levy a uniform countywide or statewide property tax. And discrepancies in assessment ratios across cities and school districts have complicated the task of constructing state revenue-sharing formulas based on local property tax effort or property wealth factors. Pennsylvania and New Jersey, along with many other states outside the Third District, calculate assessment-to-sales ratios for all jurisdictions in the state on the basis of individual property transactions and assessment records. The state estimated assessment ratio is used to convert locally reported assessed value into a standardized measure of taxable property value. Market value per pupil (in Pennsylvania) or equalized assessed value per pupil (in New Jersey) is used in the formula which determines the amount of state aid to local school districts. New Jersey also uses this assessment ratio in the formula which allocates property tax relief to individual property owners from state income tax revenues. In the homestead exemption formula, the assessment or equalization ratio is used to convert the assessed value of an individual residence into an equalized house value (similar to market value) and the millage rate into an equalized (or effective) tax rate. If state aid were distributed on the basis of unadjusted measures, more aid would go to school districts and property owners in places with lower-than-average assessment ratios than would be justified by a standardized comparison.

appraise property accurately and to keep up with changing patterns of market value. And some reflect policy decisions to tax certain kinds of property more heavily than others.

One Cause: Assessment Procedures. While discretionary policies reflect the collective wisdom of the voters, procedural defects result in unwanted distortions of their equity and efficiency preferences. One important weakness is in property appraisal, including the initial appraisal of the parcel and its subsequent reappraisal in light of real estate market trends and physical condition. Poor appraisal and infrequent reassessment are serious impediments to uniformity in assessment (see APPRAISING MARKET VALUE).

APPRAISING MARKET VALUE

Appraising property accurately requires a great deal of informed professional judgment. The local or county assessor frequently calls upon more than one of the following popular appraisal methods for assistance in estimating a property's fair market value.

The simplest method of appraising the market value of a property is to use its most recent *selling price* as a guide. But the assessor must be alert to conditions that may make the selling price an inaccurate indicator of fair market value. For example, the assessor may have to adjust the observed selling price to reflect what price the property would bring in an arm's length transaction rather than an exchange on especially favorable terms such as a sale between relatives or business partners or a forced liquidation. He may have to discount the selling price to allow for the inclusion of personal property such as residential appliances or business equipment in the transaction. Or he may need to increase the selling price to correct for special financing arrangements, such as the assumption of a mortgage.

Estimating the value of a property which has not sold recently is accomplished most easily via *market comparison*. The assessor can take an observed selling price as a standard and estimate the market value of similar properties by adjusting the price upward to reflect, say, the presence of an extra bedroom or bathroom or downward to reflect a deteriorated physical condition or a smaller-than-average lot.

The task of assigning a fair market value is more complicated for unusual properties or those that change hands infrequently. Mansions, apartment houses, industrial plants, and office buildings all are likely to possess the troublesome characteristics of being unique and seldom sold. Appraisers rely on two main techniques for setting a value on such properties. One, known as the *income-multiplier* approach, converts the rental income generated by a property (net of operating expenses) into an estimated market value for the property. The net property income is multiplied by a factor which is based on the capitalization rate. The other approach estimates the *replacement cost* of a property by using tables of building costs plus an estimate of land value.

The income-multiplier and replacement-cost approaches have difficulty accounting for physical depreciation and calculating the impact of changes in demand or supply on the price of property. Further, the capitalization and cost factors used in these methods can become outdated quickly in an inflationary environment. Still, the replacement-cost approach is the basic technique used by the private mass appraisal firms which are hired by small assessment jurisdictions to conduct reappraisals. Evidence of the inadequacy of the estimates made by these firms in the past has focused attention on the need for local assessors to validate the property value estimates made by mass appraisal firms and even for the states to regulate and certify those firms.*

* New Jersey has established procedures whereby the Director of the State Division of Taxation sets standards and qualifications for private appraisal firms and must approve all contracts for reappraisals made with such firms by local assessors. The state also must certify all local assessors.

Pennsylvania's State Tax Equalization Board (STEB) currently is prohibited from monitoring county real estate assessments. Legislation is being considered, however, which would permit STEB to provide technical assistance to local assessors and to set uniformity standards for public assessments and private appraisals.

Two trends have made the already difficult task of achieving accurate appraisals and equal assessment ratios even harder. One is the overall inflation in the real estate market. The other is the tendency of some property values, most notably in certain central city neighborhoods, to rise less rapidly than others—or even to decline.

As inflation in property values during the 1970s has far outrun increases in assessed valuation, average assessment ratios have declined. Even when all property values are rising at the same rate, more recently reassessed properties tend to have higher assessed-to-market-value ratios and higher effective tax rates. This inequality is compounded when some properties increase in value more rapidly than others. With infrequent reassessments (or an unwillingness to reassess downward), average assessment ratios in declining neighborhoods tend to rise in comparison to those in the rest of the jurisdiction.

Nonuniform assessment patterns are found not only in homogeneous jurisdictions but also in counties that cover both urban and suburban districts. Such nonuniformity has been alleged in a class action suit against the Board of Assessment Appeals in Berks County, Pennsylvania. Homeowners in a predominantly nonwhite neighborhood of the old central city of Reading charge that they are being discriminated against because their assessment ratios are higher than those for properties located in the predominantly white areas of the county. The suit claims that, because the Board does not reassess all properties in the county annually, current assessments fail to reflect the decline in property values in the nonwhite areas of the county and the increase in values in the white neighborhoods.[7]

Thus much of the observed difference in assessment ratios stems from inadequacies in the assessment system which keep it from responding to changes in market value. In essence, procedural defects are inadvertently—and unnecessarily—distorting the allocation of the property tax burden.

Another Cause: Preferential Tax Treatment. Some nonuniformity in assessment ratios, however, is a direct reflection of society's preferences. There are many who, though they favor uniformity in principle, would permit some nonuniformity in order to achieve certain outcomes—for example, preserving open space or providing financial relief to senior citizens. But to those who favor strict application of the uniformity principle, it isn't clear that these aims are best achieved by a system of tax preferences.

Cases of preferential tax treatment are common, and they often correspond to patterns of property ownership or property use. One such tax preference is the *exemption for agricultural land and open space.* It has been argued that taxing open space or farm land at the full value of its most productive alternative use would force current owners to sell or develop the land in order to generate sufficient income to pay the tax. This argument has been used successfully in many areas of the country, and now 37 states have established property tax relief provisions for undeveloped land.

Exemptions for elderly and low-income homeowners have been defended by similar arguments. People are likely to have purchased property in the past on the assumption that their property taxes, like their mortgage payments, would remain stable. With rapidly rising real estate values and the growth of public service costs, this expectation has been disappointed. And proponents of exemptions argue that homeowners whose incomes now are low or fixed shouldn't be pressured into selling their property as they might be if it were taxed at its market value.

Both the open space exemption and the homeowner exemption act as tax shelters for capital gains produced by increases in the value of property. The upshot is that the

[7] Garrett v. Bamford 538 F.2d 63 (3rd Cir. 1976).

costs associated with land or housing may not be borne fully by the owners. Thus opponents of exemptions have argued that individuals who can't afford the liabilities on their property may need to admit that they are overhoused or that their property investments aren't paying their keep. If society's aim is to help property owners maintain their holdings, they say, then methods other than tax exemptions may be preferable. Resolving the debate in a rational way requires an appreciation of the costs and benefits of these other methods, such as land use regulation and direct subsidies to the poor and elderly. But more needs to be known about the costs and benefits of these other methods.

Exemptions have been extended to businesses as well as to individuals. Communities that are trying to attract nonresidential property users sometimes offer *assessment exemptions as a form of economic development subsidy*. They may use tax abatements running for as long as ten years to encourage the rehabilitation and redevelopment of deteriorated neighborhoods. The city of Wilmington, Delaware, for example, offers abatements both for new construction and for improvements to existing buildings. These policies apply to residential, industrial, and commercial development anywhere within the city limits. And a 1971 Pennsylvania law permits local jurisdictions to enact exemptions for increases in assessed value which are attributable to improvements made on residential property in deteriorated neighborhoods.[8]

This subsidy technique reflects the belief that the tax revenue forgone in the short run, and the attendant public service costs imposed by the new occupants, will be more than offset in the long run by revenue from higher property values and a broadened income tax base. Some have argued, however, that because of tax capitalization (a more highly taxed property brings a lower price, and a less highly taxed property a higher price), most of the subsidy effect of exemptions may be lost as property values are bid up in response to favorable tax treatment.[9] Also, because the property tax abatement represents only a small part of the total costs of a project, the tax concession may not have much influence at all on private investment decisions. If property tax abatement programs in fact do little to encourage economic development, they may turn out to be a net drain on the public treasury, according to opponents of this approach.

Another variety of preferential treatment —one alternative to direct regulation of land use—is the *graded tax*, which is designed to favor certain forms of land development. Most jurisdictions levy the same property tax rate on the assessed value of both land and improvements. Taxing them at different rates can affect the patterns of development by altering the incentives for investment.

Raising or lowering the tax rate on improvements can influence not only the total price to the buyer, because of tax capitalization, but also the supply of improvements. If the tax on improvements is relatively low, for example, more improvements will be built and higher density construction will be

[8] 72 P. S. § § 4711 to 4716.

[9] Buying a property is buying a tax bill. The prospective buyer who has to look forward to a higher tax bill won't be willing to pay as high a purchase price for a given property. And the savings associated with a lower tax bill will tend to be capitalized into a higher purchase price.

The assumption that tax differences are capitalized has been used to argue against an abrupt change to uniform assessment: the argument goes that such a change is unnecessary on equity grounds, since the combination of tax and purchase price balances out for everybody. It's not clear, however, that full capitalization ever occurs. The evidence suggests that differences in average effective tax rates from one jurisdiction to another are capitalized into property values—for example, in neighboring suburban jurisdictions. But little evidence is available that different assessment ratios within a single jurisdiction produce such capitalization. Thus the tax-capitalization argument against uniform assessment doesn't appear to hold for the city situation.

encouraged. But if the improvements tax is relatively high, owners will be discouraged from developing or redeveloping their land. Changing the tax rate on land can't have any effect on its supply, but, through tax capitalization, it certainly can cause a change in its price. The old Pennsylvania cities of Harrisburg, Pittsburgh, and Scranton have enacted a graded tax in an effort to spur both construction of new buildings and rehabilitation of older structures.[10]

In summary, these preferential tax techniques—exemptions, subsidies, and graded levies—can provide tax relief in certain cases and can encourage voter-favored land uses. Some students of public finance argue, however, that there may be more effective ways to achieve these aims without sacrificing the principle of uniformity.

ACHIEVING MORE UNIFORM ASSESSMENT

Settling on policies to reverse established assessment practices is no simple task. Any attempt to make assessment procedures more accurate and responsive won't be easy or inexpensive. And any attempt to eliminate exemptions and other forms of preferential tax treatment will touch on the economic interests of many concerned groups.

Introducing Computer Aided Assessment Procedures. Where variations in assessment ratios are traceable primarily to inadequacies of the appraisal system, procedural changes are in order. Increased pressure from citizens outraged by their higher-than-average assessments has resulted in the demands of many states to have equalized, if not full-value, assessment for all property. Some states have insisted on annual reassessments, and some state legislatures are endorsing state supervision of assessment practices through personnel training and procedural guidelines.

Computer technology combined with statistical analysis has proven to be a valuable assessor's tool. It offers the property appraiser greater accuracy, standardization, and speed than can be achieved when assessments are done by hand. Automated mass appraisal using advanced statistical techniques has been applied with notable success in several California counties. The greatest breakthroughs in computerized assessments have been made with single-family dwellings, which represent the largest part of most assessors' loads. But recently, progress has been made in applying computer techniques to the appraisal of apartment properties as well. In three Pennsylvania counties—Montgomery, Centre, and Union—the computer helps the assessor appraise a house's current value by comparing it to similar houses that recently have changed hands (see COMPUTER AIDED ASSESSMENT).

The laws of many states require property appraisals and assessments to be updated annually. But this annual reassessment provision has been enforced only rarely because, under traditional assessment procedures, the cost of conducting an annual reassessment would have been prohibitive, especially in large jurisdictions.

Even with computerized mass appraisal techniques, which have increased the feasibility of conducting annual reassessment, assessors' budgets are unlikely to grow enough to support an annual on-site reappraisal of every property in their jurisdictions. An assessor with limited resources thus may wish to consider whether more uniformity

[10] Pennsylvania's third-class cities may set different tax rates for land and buildings as long as the rate is uniform within each classification. Pittsburgh and Scranton limit the city tax on buildings to one-half the rate on land. Thus in 1976, Pittsburgh levied a 49.5-mill tax on land but only a 24.75-mill tax on buildings; in Scranton the rates were 42 mills on land and 21 mills on improvements. Harrisburg taxed land at 23 mills and improvements at 17 mills. The Pennsylvania legislature is considering making the graded tax a local option for all jurisdictions. See Carrie Vang, *Local Tax Manual* (Harrisburg: Pennsylvania League of Cities, 1977), p.5; and Pennsylvania Senate Bills 1014 through 1020 (Session of 1977).

COMPUTER AIDED ASSESSMENT

The application of computers to property assessment has been based on the market comparison approach to appraisal. A property is viewed as possessing a set of characteristics, each of which has a market price. The value of an individual house, for example, is estimated by adjusting the value of the average house in a neighborhood upward or downward according to the presence or absence of certain features. If most houses in the neighborhood have three bedrooms, two baths, a 50 by 100 foot lot, were built in 1955, and on average sell for $35,000, for example, having one less bedroom might reduce the value by $3,000, and having a third bath might raise it by $1,500.

Using a partially computerized approach known as the *sort system*, the assessor in Pennsylvania's Montgomery County describes the basic neighborhood location and structural characteristics of the property in question to the computer. The sort system makes use of the computer's ability to glance rapidly through the computerized records of all parcels in the assessing jurisdiction in order to select a sample of comparable properties which have sold recently. Using observed selling prices as a guideline, the assessor judgmentally estimates the market value of each property by adjusting the average selling price of a house of that type upward to reflect extras in the property in question or downward to reflect the absence of common features.

In the sort system, the value assigned to these optional house features may be estimated on the basis of the assessor's experience. In a more fully computerized system known as *multiple regression analysis*, the computer estimates values for these factors by comparing statistically the recent selling prices and associated features of many similar properties. By pooling information on a large number of transactions, multiple regression analysis is able to make an accurate estimate of the average impact on the price of a house that the presence of a certain feature is expected to have. Then, by adding up these calculated values for a property's characteristics, the computer automatically generates an estimate of the current market value of a house. Later, the assessor can alter the computer-generated appraisal for an individual property if an on-site inspection or additional information so indicates.

Pennsylvania's Centre County and Union County use a simplified multiple regression system in their residential appraisal process. Using information about houses which have sold recently, the computer estimates a market value per square foot of house based on such considerations as age, number of stories, presence of a garage, and neighborhood location. This *square foot multiplier* is used to estimate the current market value of comparable houses which have not changed hands.

for the assessment dollar can be obtained by concentrating efforts on certain neighborhoods or land uses. The results of assessment ratio studies can be used to pinpoint the places that exhibit the greatest divergence from the average assessment ratio (see Appendix).

Some assessment districts may be too small to make economical use of computer technology on their own. These jurisdictions might consider joining together with others to support a modernized system or might tap the technical expertise available at the state tax equalization board or revenue department. Sharing appraisal expertise could prove especially helpful in cases of nonresidential properties, which don't lend themselves easily to standardized mass appraisal techniques.

To the extent that the property tax burden is distributed inequitably and inefficiently as a result of appraisal techniques, procedural improvements can and should be made. Technically induced nonuniformity does not reflect voter preferences; rather it reflects a need for improved assessment methods.

Reconsidering Preferential Tax Treatment. There's a saying that old laws are good laws. The reasoning behind this maxim is that people and institutions adjust over time to the quirks of the law and that any attempt to iron these quirks out may cause more hardship than leaving them alone.

Still, many tax experts believe that the system of tax preferences has grown so complex and burdensome that at last it must be realigned. And they see fundamental efficiency and equity advantages in uniformity. Proponents of Federal income tax reform have argued, for example, that curtailing exemptions would broaden the tax base so that the same amount of revenue could be collected at a lower average tax rate. They see the net outcome of greater uniformity as tax relief all around. The same argument can be made for the property tax—the greater uniformity that would come from reducing exemptions would bring general tax relief.

If enough people decide that they want an end to tax preferences, uniformity will be imposed through legislation and regulation. But just shifting from tax preferences to uniformity—the mere shift itself—could be a costly and dislocating venture; and any such move would have to be accompanied by new programs, on the assumption that society wishes to continue to assist some of the people who would lose the tax benefits afforded by open space exemptions, senior citizen exemptions, and the like. Thus while there are gains to be made through uniformity, there may be costs as well.

SUMMING UP

The local property tax has been attacked on many grounds. Critics have called for fundamental changes in the tax and even for its abolition. But the property tax remains the single largest local revenue source for municipalities and school districts, and it's likely to be around for a long time to come. Thus there may be much to be gained from making this system as fair and efficient as possible.

Technological developments have made regular and frequent assessment a live option for tax reformers right now. The costs and benefits already are well known. But the issue of preferential tax treatment calls for further examination. Eliminating tax preferences would bring uniformity nearer, but whether the benefits would outweigh the cost remains to be determined.

SUGGESTIONS FOR FURTHER READING

For a concise introduction to current issues in property tax analysis see Henry J. Aaron, *Who Pays the Property Tax? A New View* (Washington: Brookings Institution, 1975).

Jerome Dasso's *Computerized Assessment Administration* (Chicago: International Association of Assessing Officers, 1974) is a manager's guide to computer aided assessments. The technical details of computerized assessment systems are treated by Albert M. Church and Robert H. Gustafson in their *Statistics and Computers in the Appraisal Process* (Chicago: International Association of Assessing Officers, 1976).

The *Assessor's Handbook* published by the State of Pennsylvania's Department of Community Affairs (Harrisburg: 1977) lays out the responsibilities of assessors in Pennsylvania as well as the standard methods of appraisal and assessment. For a detailed discussion of uniformity measures see *Analyzing Assessment Equity: Techniques for Measuring and Improving the Quality of Property Tax Administration* (Chicago: International Association of Assessing Officers, 1976).

For a summary of assessment procedures in individual states see The Advisory Commission on Intergovernmental Relations, *The Property Tax in a Changing Environment: An Information Report* (Washington: ACIR, 1974).

APPENDIX
MEASURING ASSESSMENT UNIFORMITY

A statistic commonly used to measure the relative uniformity of assessment ratios is the coefficient of dispersion (coefficient of deviation). This number expresses the average deviation from the median (mean) assessment ratio as a fraction of the median (mean) ratio for that sample of properties. As an illustration, for the five properties listed in the example below, the median assessment ratio is 0.50 and the coefficient of dispersion is 0.24. Thus in this sample, the average deviation from the median assessment ratio is 24 percent.

There is no universal standard for measuring the quality of assessment practices. Some assessors may be faced with conditions, such as dissimilarity in the properties to be assessed and rapidly changing market values, that make their task unusually difficult. As a rule of thumb for manual appraisal systems, however, a coefficient of dispersion of 20 has been considered a mark of acceptable assessment performance, while a coefficient of 10 or below has been viewed as a mark of excellence. With the application of computerized appraisal using multiple regression analysis, coefficients of dispersion of 5 or less have been obtained. Only computerized assessments, then, seem to be approaching the degree of uniformity that would be expected in income tax and sales tax administration, for example.

A 1971 survey by the U. S. Census of Governments indicates that among the three Third District states only New Jersey achieved a degree of assessment uniformity higher than the national average. Eighty percent of the New Jersey areas sampled had coefficients of dispersion less than 20—compared with 49 percent for the U. S. as a whole. Only 21 percent of the Pennsylvania areas and none of those in Delaware had coefficients of dispersion under 20. In fact, a fifth of the areas sampled in Pennsylvania, and a third of those in Delaware, had coefficients of dispersion of 40 percent or more. This compares with none for New Jersey and 9 percent for the U. S. as a whole.

TO CALCULATE THE COEFFICIENT OF DISPERSION IN A SAMPLE OF PROPERTIES . . .

1. **Compute the assessed-to-market-value ratio.**
2. **Find the absolute difference of each ratio from the median.**

Assessed Value (dollars)	÷ Market Value (dollars)	= Assessed-to-Market-Value Ratio (percent)	Absolute Difference of Assessed-to-Market-Value Ratios from Median Ratio (percent)
16,500	22,000	75	25
19,000	27,000	70	20
20,000	40,000	50 (median)	0
29,250	65,000	45	5
28,000	70,000	40	10

3. **Sum the absolute differences (25 + 20 + 0 + 5 + 10 = 60).**
4. **Divide the sum of differences (60) by the number of properties in the sample (5) to get the average difference (12).**
5. **Divide the average difference (12) by the median ratio (50) to get the coefficient of dispersion (24 percent).**

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on Independence Mall
100 North Sixth Street
Philadelphia, Pa. 19106