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Indexation of Social Security Benefits – A Reform in Need of Reform

NEIL A. STEVENS

SOCIAL security benefits for retired workers, their dependents and their survivors are indexed or linked to movements in the consumer price index (CPI).[1] Price indexing, a method of making adjustments to inflation, is the linking of nominal (dollar) magnitudes, such as wages, interest rates, government expenditures or taxes, to movements in a price measure. The purpose of indexing is to ensure that the purchasing power over goods and services is not changed by movements in the general level of prices.[2] Under current law, social security payments are automatically increased in June "whenever the CPI in the first quarter of the calendar year exceeds the CPI in the first quarter of the previous calendar year by at least 3 percent."[3]

For example, effective June 1, 1981, social security payments were increased 11.2 percent, reflecting the increase in the consumer price index from the first quarter of 1980 to the first quarter of 1981.[4]

Social security programs are funded by a tax on wage and salary income.[5] Currently, benefits for retired workers, their dependents and survivors, are rising faster than revenues into the Old Age and Survivors Insurance (OASI) trust fund from which these benefits are paid. According to estimates by the trustees of the social security system[6] and the Congressional Budget Office (CBO), the OASI trust fund will face a financing problem beginning in late 1981 or early 1982 that will continue through the decade.[7] CBO estimates show that outlays from the OASI trust fund in fiscal year 1981 will exceed income into the fund by $4.8 billion. Furthermore, estimates are that the trust fund balance will be depleted by the end of fiscal year 1983, and that the fund will be approximately $64 billion in deficit by the end of 1986 (table 1).

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[1]The price index specified in legislation is the consumer price index for urban wage earners and clerical workers rather than the more recently constructed and more broadly based series for all urban workers.

[2]For background information on indexing, see Thomas M. Humphrey, "The Concept of Indexation in the History of Economic Thought," *Economic Review* (Federal Reserve Bank of Richmond, November/December 1974), pp. 3-16; Herbert Giersch, Milton Friedman, et al., *Essays on Inflation and Indexation* (Washington, D.C.: American Enterprise Institute for Public Policy Research, 1972); and Jai-Hoon Yang, "The Case For and Against Indexation: An Attempt at Perspective," this *Review* (October 1974), pp. 2-11.

[3]*An Analysis of the Effects of Indexing for Inflation on Federal Expenditures*, Report to the Congress of the United States by the Comptroller General (GAO, August 15, 1979), p. 18.

The current provision for the automatic indexing of social security benefits was contained in social security legislation enacted in 1973. Initially, however, automatic indexing of benefits was included in the social security legislation enacted in 1972. The first effective date was to have been January 1, 1975, based on increases in the CPI from the third quarter of 1972 to the second quarter of 1974. In subsequent years, possible benefit increases were to be based on second-quarter-to-second-quarter changes in the CPI and made effective January 1. Legislation enacted in 1973 amended these provisions by providing the first possible automatic increase in benefits to be effective in June 1975, based on the change in CPI from the second quarter of 1974 to the first quarter of 1975.

[4]Increases are effective June 1 and are payable July 1.

[5]Social security benefits are provided under three separate programs. The Old Age and Survivors Insurance program, the largest, with expenditures of $87.6 billion in 1979, pays benefits to retired workers, their dependents and survivors. The Disability Insurance program pays benefits to disabled workers and their dependents, and the Hospital Insurance program pays benefits to workers covered by the previous two programs and the railroad retirement program.

[6]The trustees include the Secretary of the Treasury, the Secretary of Labor, and the Secretary of Health and Human Services.

[7]*1980 Annual Report* of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds, H. Doc. 96-332, 96th Congress, 2nd session (GPO, 1980), p. 50; and *Paying for Social Security: Funding Options for the Near Term*, Congressional Budget Office of the Congress of the United States (February 1981), p. 13.

Table 1

Outlays, Income and Balances for the Old Age and Survivors Insurance Trust Fund (billions of dollars)

	Actual[1]			Projections[2]					
	1970	1975	1980	1981	1982	1983	1984	1985	1986
Outlays	$27.3	$56.7	$103.2	$122.6	$141.4	$158.7	$178.0	$199.3	$222.6
Income	31.7	58.8	100.1	117.8	129.0	143.0	159.1	181.9	203.7
Year-end balance (fiscal year)	32.6	39.9	24.6	19.7	7.4	−8.2	−27.1	−44.5	−63.5

[1]Social Security Bulletin (April 1981), p. 43.

[2]*Paying for Social Security: Funding Options for the Near Term,* (Congressional Budget Office of the Congress of the United States, February 1981).

This short-term financing problem will begin to dissipate in the next decade but only because of sizable increases in payroll taxes scheduled as a result of the 1977 amendments to the Social Security Act. In the next century, however, an imbalance again will emerge between promised social security benefits and projected revenues. The solution to this problem will require either larger increases in taxes than those already scheduled or a reduction in promised benefits.

This article examines the role that the price indexing of benefits has played in creating these financing problems, particularly in the short term. The article shows that the use of the CPI for indexing probably has overstated the benefit increases necessary to keep the purchasing power of benefits constant, and that price indexing is inconsistent with the way benefits are funded. In addition, it discusses modifications of indexing formulas that would help eliminate the current imbalance or avert the development of future financial imbalances.

The Rationale for Price Indexing

Over time, the price level varies as the stock of money changes relative to the available amount of goods and services. Price indexing first came about to rectify the fact that prices or incomes administered by government agencies or fixed by private contractual agreements, such as wage contracts or fixed payment mortgage contracts, do not adjust rapidly to changes in the price level. Market-determined prices of goods and services eventually will adjust to changes in the price level. However, social security benefits and payments under other government programs, which are

Table 2

Increases in Social Security Benefits and the Consumer Price Index

Effective date of increase	Increase in benefit level	Increase in CPI from last effective date of benefit increase[1]
Before automatic indexing		
September 1954	13%	0.5%[2]
January 1954	7	8.0
January 1965	7	7.8
February 1968	13	9.3
January 1970	15	10.8
January 1971	10	5.2
September 1972	20	5.9
June 1974	11[3]	16.4
After automatic indexing		
June 1975	8.0%	
June 1976	6.4	
June 1977	5.9	
June 1978	6.5	
June 1979	9.9	
June 1980	14.3	
June 1981	11.2	

[1]Computed from not seasonally adjusted data for urban wage earners and clerical workers.

[2]Increase in CPI from September 1952, the previous date benefits were increased.

[3]Effective in two steps — a 7 percent increase in March 1974 and a 4 percent increase in June 1974.

Table 3
Alternative Measures of Changes in the Price Level[1]

Period	Consumer price index		Official series minus experimental series	Personal consumption expenditures deflator	Official CPI minus PCE deflator
	Official series[2]	Experimental rental equivalence series			
1947-77	3.4%	n.a.	n.a.	3.3%	0.1%
1977	6.6	6.2%	0.4%	5.9	0.7
1978	9.0	7.8	1.2	7.5	1.5
1979	12.7	10.6	2.1	9.5	3.2
1980	12.5	10.8	1.7	10.1	2.4

[1]Changes are from fourth quarter to fourth quarter, except the 1947-77 period which was computed from yearly average data.

[2]All urban worker series.

not directly determined by market forces, must somehow be adjusted to changes in the price level if Congress desires to offset the impact of these changes on the payments' purchasing power.

On a practical level, an advantage of price indexing is that it is automatic, so it relieves Congress from having to devote considerable attention to frequent increases in benefits in an inflationary environment. Also, given the tendency of Congress in the late 1960s and early 1970s to increase benefits faster than the price level (table 2), indexing may have acted to put a cap on benefit increases, and thus may have averted an even larger financing crisis. Nevertheless, there are problems with the price indexing of benefits that should be discussed.

The Vexing Problem of Measuring Changes in the Price Level

Price indexation requires a statistical measure of the price level, which in practice, is measured by price indexes. Typically, a price index is designed to answer the question, "How much does the cost of a basket of goods and services change over time?" Unfortunately, there are numerous technical problems in providing an answer.[8]

[8]For a more thorough discussion of the problems in measuring the price level, see William H. Wallace and William E. Cullison, *Measuring Price Changes: A Study of the Price Indexes,* 4th ed. (Federal Reserve Bank of Richmond, 1979); and R.G.D. Allen, "Index Numbers in Theory and Practice" (Chicago: Aldine Publishing Co., 1975).

Two widely used price indexes — the consumer price index and the personal consumption expenditures (PCE) deflator — demonstrate the differences that can arise between price measures. Though these indexes have followed similar patterns in the past, their movements diverged substantially in 1979 and 1980 (see table 3). For example, the CPI increased 3.2 percentage points more than the PCE deflator in 1979 and 1.7 percentage points more in 1980. While there are several differences in the way these two price indexes are computed, two of the more significant differences are the choice of period in which to define the market basket — either current or past — and the methods used to measure housing costs.

Fixed Versus Variable Weights — The CPI-W, which is used to index social security benefits, is a "fixed-weight" index. The procedure for calculating this index is to regularly survey prices of a large number of items consumers typically purchase (the so-called market basket) and compare the aggregate cost of these items with the cost of the same market basket in a selected base period. The weights given to various expenditure categories in the market basket are kept constant or fixed from period to period. Currently, the CPI market basket is based on a survey taken in the 1972-73 period. In the past these weights have revised approximately every 10 years. The PCE deflator, on the other hand, is essentially a variable or current-weight index. This index, unlike the CPI, takes into account the prices of personal consumption items in the current period and, in effect, weighs them by the quantities currently pur-

chased. Since expenditure patterns can change, the weights can vary from period to period.

Economists have recognized that both fixed- and variable-weight indexes present problems. One problem is that consumption patterns change over time as people alter their preferences or respond to changes in relative prices. For example, in the 1970s the price of oil rose sharply relative to other prices. As a result, consumers curtailed their consumption of gasoline and other oil-based products and purchased substitutes for these products. Yet, in calculating the CPI, the 1972-73 consumption pattern for oil-based products continues to be used. As a result, the CPI overstates changes in the price level. On the other hand, the PCE deflator, which uses the current expenditures for oil-based products in its calculation, understates the price level, since substitutions and curtailed energy consumption lowered the living standard of consumers.

While over past periods changing expenditure patterns have been a rather insignificant problem, as evidenced by the small difference between the CPI and PCE deflator from 1947 to 1977, the problem has been somewhat more pronounced in recent years. For example, in 1979 it is estimated that about half of the 2.9 percentage-point difference between the CPI and the PCE deflator can be attributed to changing weights or differences in weights on gasoline purchases.[9] Also important was the approximately 1.8 percentage-point difference caused by the different treatment of homeownership costs in the two indexes.

Homeownership Costs — Much recent criticism of the CPI has focused on the measurement of housing costs. Durable goods, such as houses, are consumed over an extended period of time. Thus, the purchase of a durable good represents an act of saving (future consumption) with relatively minor effects on current consumption.

The cost of owner-occupied housing, like other items in the CPI, are calculated by using weights derived by surveys in the early 1970s. In this period, about 6 percent of households purchased homes. As currently measured, the CPI assumes that 6 percent of households will purchase and consume the total value of the house and one-half of the mortgage that usually goes along with it in the current period, while those living in previously purchased houses will spend nothing for housing services except for mainte-

nance, taxes and insurance. Aside from numerous technical problems, this view of housing costs gives a misleading estimate of the cost to the "average" consumer.[10] A sharp rise in mortgage interest rates, for example, raises the cost of housing, though few homeowners may actually bear the cost.

While there is no "right" way to measure housing costs, economists generally accept a procedure called the "rental equivalence" approach. This method involves the sampling of rents from rented houses. If homeowners charge rents that cover all the costs of maintaining a home, then the price of a house, the cost of credit, etc., are included in the rent charged by the owner to the renter.

The Bureau of Labor Statistics, which computes the CPI, has experimented with several methods to calculate homeownership costs, including rental equivalence.[11] A comparison of the experimental rental equivalence series and the official CPI measure shows considerable differences in recent years (table 3). In 1980, for example, the official CPI measure grew at a 12.5 percent annual rate compared with only a 10.8 percent increase in the experimental series.

Price Indexing and Real Wage Declines — The Financial Implications

In essence, the price indexing of social security payments is a promise by the government to keep benefits unchanged in terms of their purchasing power. As just seen, this may be hard to attain because of problems in measuring the price level. In addition, the promise of fixed real benefits is sometimes inconsistent with the methods used to finance social security benefits.

If Congress wants to maintain the purchasing power of benefits received by current social security recipients, it must levy an appropriate level of taxes to pay for these benefits. Social security benefits are currently funded on a pay-as-you-go basis; that is, benefits for currently retired workers are funded by payroll taxes on the wages and salaries of those currently working.[12] A problem crops up whenever wages

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[9]Alan S. Blinder, "The Consumer Price Index and The Measurement of Recent Inflation," *Brookings Papers on Economic Activity* (2:1980), pp. 539-65.

[10]Ibid, p. 546.

[11]As a proxy for rents on rented houses, this experimental series uses the CPI rent index, which includes rents on apartments as well as rented houses.

[12]One-half of the payroll tax is levied directly on an employee's earnings and the other half is paid by employers. Studies, however, indicate that the portion of the tax paid by employers is, for the most part, borne by employees. For a discussion of this point, see John A. Brittain, *The Payroll Tax for Social Security* (Washington, D.C.: The Brookings Institution, 1975), Chapters I and II.

and salaries rise more slowly than the price level. When this occurs, the benefits of current social security recipients, which rise with increases in the price level, increase more rapidly than revenues, which rise with increases in wages and salaries.

Historically, wages have generally advanced more rapidly than prices; that is, real wages have generally risen (table 4). These increases reflect advances in labor productivity (output per manhour worked). In recent years, however, real wages have declined with the decline in labor productivity.[13] The adjusted hourly earnings of workers,[14] after allowances for increases in the CPI, have declined or remained unchanged in five of the past eight years and, on average, have declined at about a 1 percent annual rate since 1972.[15]

The decline in real wages has contributed substantially to the financing problem the social security system now faces. Moreover, if this financing problem is resolved by increasing payroll taxes rather than reducing benefits, the price indexing of benefits will further redistribute the ability to consume the nation's output from those working to those receiving social security benefits. When nominal wages rise more slowly than the price level, a tax increase imposes a further decline in real wages. In effect, this decline imposes an additional reduction in living standards for workers in order to leave the purchasing power of social security benefits unchanged.

The CPI's overstatement of the cost-of-living increase in recent years magnifies the income transfer. This overstatement results in benefit increases above those necessary to maintain the same level of real benefits, and implies an even greater increase in taxes and a further reduction in the real after-tax wages of

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[13]Several explanations have been offered by economists for the recent decline in productivity and, hence, the decline in real wages. One explanation points to the sharp rises in the relative price of energy in 1973-74, and again in 1979-80. According to some studies, these sharp increases in the relative price of energy made part of the capital stock economically obsolete, thereby reducing workers' productivity. For details of this and other explanations, see John A. Tatom, "The Productivity Problem," this *Review* (September 1979), pp. 3-16.

[14]Average hourly earnings are reported before deductions for taxes, social insurance, fringe benefits, etc. The adjusted hourly earnings index takes into account such factors as variation in the amounts of overtime pay or shifts of workers into higher or lower paying industries.

[15]As discussed earlier in this paper, to the extent the CPI has overstated the rate of price increases in recent years, this decline in real wages is also overstated.

Table 4

Changes in Consumer Price Index and Hourly Earnings (year-over-year changes)

Year	Consumer price index[1]	Adjusted hourly earnings[2]	
		Current dollars	1967 dollars[3]
1952-72[4]	2.2%	4.5%	2.2%
1972	3.3	6.4	3.0
1973	6.2	6.2	0.0
1974	11.0	7.9	−2.7
1975	9.1	8.3	−0.7
1976	5.7	7.3	−1.3
1977	6.5	7.5	1.0
1978	7.6	8.2	0.6
1979	11.3	7.9	−3.1
1980	13.3	9.3	−3.6
1972-80[4]	8.8	7.8	−0.9
1952-80[4]	4.1	5.5	1.3

[1]Data are for all urban consumers.

[2]Total private nonagricultural earnings for production or nonsupervisory workers adjusted for overtime and for industry employment shifts.

[3]Current dollar index divided by consumer price index.

[4]Annualized rates of change.

workers than would otherwise have been necessary.[16]

Alternative Indexing Rules

Modifying the indexing rules to tie benefits to nominal wage movements rather than price index movements appears to be a way to alleviate some of these problems. With benefits linked to nominal wage rates, real benefits would change commensurately with real wages; that is, when nominal wages rise faster than the price level, indicating rising productivity and a rising standard of living for workers, real social security benefits would also increase. Conversely, when wages increase more slowly than the price level, indi-

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[16]Another potential problem is the difference in expenditure patterns of social security beneficiaries, and urban wage earners and clerical workers. To the extent there are differences in expenditure patterns, relative price changes would affect the purchasing power of social security benefits differently than earnings of urban wage earners. A study by the Bureau of Labor Statistics, however, indicated that a consumer price index based on purchasing patterns of retired workers would not be substantially different from the official CPI measure. See Janet L. Norwood, "Cost-of-Living Escalation of Pensions," *Monthly Labor Review* (June 1972), pp. 21-24.

Table 5

Outlays, Income and Balances for the Old Age and Survivors Insurance Fund, Assuming the Minimum Rule in Effect (billions of dollars)[1]

	1979	1980	1981	1982	1983	1984	1985	1986
Outlays	$ 89.8	$100.3	$114.7	$131.6	$149.0	$168.3	$189.6	$212.9
Income	86.9	100.1	117.8	129.0	143.0	159.1	181.9	203.7
Year-end balance	28.1	27.9	31.0	28.4	22.4	13.2	5.5	−3.7

[1]Estimates are based on actual OASI trust fund data for 1979-80 and Congressional Budget Office projections of outlays and income under current indexing procedures for 1981-86, as shown in table 1. Modifications of these outlay data were computed by assuming that the minimum rule had been in effect in 1979, 1980, 1981, all years in which average hourly earnings rose less rapidly than the CPI. For subsequent years, it is assumed that the hourly earnings rose more rapidly than the CPI.

cating lower productivity and a declining standard of living for workers, real benefits would decline.

Had social security benefits been indexed to average hourly earnings during the recent period of real wage declines, much of the current short-term financial problem would have been averted. Benefits indexed to adjusted average hourly earnings during 1979, 1980, and 1981 would have resulted in social security benefit increases of 8.2 percent in June 1979, 8.4 percent in June 1980 and 9.8 percent in June 1981, instead of the respective 9.9, 14.3 and 11.2 percent increases actually granted. In total, during these three years, benefits of retired workers rose 35 percent as average hourly earnings of current workers rose only 26 percent.

To initiate the indexing of social security benefits to nominal wages at this point, however, would probably still increase future deficits in the OASI trust fund. Since, historically, nominal wages have risen faster than the price level, the continuation of this trend would result in greater increases in benefits than under a price-indexed scheme and hence greater deficits in the OASI trust fund than those currently projected.

A variant of a wage indexing scheme is the "minimum-rule" scheme, which indexes benefits to the *lower* increase of the wage or price index. This rule implies that real social security benefits will decline when real wages decline, but remain unchanged when real wages rise.[17] This rule would largely remove the fi-

nancial problem that occurs when real wages decline. For example, if the minimum rule had been in effect in the past three years so that benefits would have increased with hourly earnings rather than the CPI, the estimated year-end balance in fiscal year 1986 would be $3.7 billion in deficit rather than the CBO estimates of $63.5 billion (see tables 1 and 5). Unfortunately, to introduce the minimum rule at this point would not solve the financing problem of the OASI trust fund, since this rule would not reduce benefits from their present level.[18] Thus, the minimum rule will not cure the present budget problems, but will prevent larger deficits in a future period of declining real wages.

New measures will have to be taken to solve the current short-term financing problem. The CBO for example, has investigated a number of possible options, including a "partial" indexing to the CPI. It estimated that if benefits were increased by only two-thirds of the actual increase in the CPI over the next several years, the financing problem over this decade would be eliminated.[19] Several other proposals have also been suggested to eliminate the short-term financing problem. These include the reapportionment of

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[17]One objection to this rule is that real wages often decline and rise in business cycles. For instance, if real wages fell in year one but recovered that loss in year two, under the minimum rule real social security benefits would be reduced in the first year but kept at that same lower real level in the second year. However, Congress could easily monitor this kind of problem and remedy it by ad hoc increases in benefits.

[18]The CBO has considered the effect of this rule on the impending deficit of the OASI trust fund. According to their estimates, the minimum rule would reduce outlays of the trust fund over the next five years by $26 billion, or cut about 40 percent of the projected deficit over the next five years. Their estimate, however, is based on the assumption that the indexing rule goes into effect in 1981 when the CBO projects the nominal wages to rise about 3 percent slower than the official CPI measure. In fact, if this rule were instigated at a later date when the CBO projects wage increases to again exceed price increases, the minimum rule would do nothing to eliminate the short-run financing problem of the OASI trust fund. See *Paying for Social Security: Funding Options for the Near Term,* (Congressional Budget Office of the Congress of the United States, February 1981).

[19]Ibid, pp. 29-31.

funds in other social security trust funds into the OASI trust fund, the taxation of social security benefits and the reduction or elimination of certain benefits. The administration recently has proposed a plan that would cut back the benefits of future early retiring workers, while only marginally reducing the benefits of current recipients. While these various proposals would eliminate, to varying degrees, the estimated deficit over the next several years, they would not remove the basic inconsistency between price indexing and the pay-as-you-go financing of the social security benefits. In other words, none of these proposals would preclude additional deficits from developing in the OASI trust fund should future declines in real wages occur.

INDEXING AND THE LONG-TERM FINANCIAL IMBALANCE

Analysts also project a long-term financial imbalance in the social security trust funds for the next century, when outlays again are projected to exceed inflows into the social security system. One of the major factors underlying this imbalance is the increasing ratio of retirees to workers.

Since benefits are now funded on a pay-as-you-go basis, the benefits of current workers will be funded by payroll taxes paid by the next generation of workers. This funding scheme is subject to changes in demographic patterns. Past increases in benefits were granted on the assumption that birth rates would be higher than current projections now indicate. With declining birth rates, there will be fewer workers to pay into the social security trust funds when the post-World War II baby-boom generation begins to retire. In addition, the increased life expectancy has increased the ratio of retirees to workers.

This problem is potentially quite serious, despite the substantial increases in social security taxes that have already been scheduled as a result of the 1977 amendments to the Social Security Act (see table 6). If the current law is left intact until 2025, taxes on payrolls would have to rise, according to estimates of the chief actuary of the social security system, by at least 8 percentage points in order to fund benefits at that point, implying nearly a 24 percent tax on taxable payrolls.[20] To compensate for these scheduled in-

Table 6

Social Security Taxes on Payrolls Before and After the 1977 Amendments

	Tax rates (percent)[1]		Taxable base[2]	
	Before	After	Before	After
1977	5.85%	5.85%	$16,500	$16,500
1978	6.05	6.05	17,700	17,700
1979	6.05	6.13	18,900	22,900
1980	6.05	6.13	20,400	25,900
1981	6.30	6.65	21,900	29,700
1982-84	6.30	6.70		
1985	6.30	7.05		
1986-89	6.45	7.15		
1990-2010	6.45	7.65		
2011 and after	7.45	7.65		

[1]Includes taxes for old age, survivors, disability insurance and hospital insurance.

[2]Beginning in 1982, the amounts will be determined automatically under the new law on the basis of the annual increase in average earnings on covered employment.

creases in social security taxes, alternatives to reduce benefits have been suggested. One proposal is to increase the retirement age from 65 to 68, thereby reducing the average period that benefits are paid out; another is to tax social security benefits, which would generate additional general revenues that could then be used to fund social security benefits.[21]

The modification of current indexing procedures is another alternative. Under current law, the benefits of retired workers increase with the price level, but the benefits of future retirees are tied to average wage movements.[22] Wage indexing is essentially a promise

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[20]A. Haeworth Robertson, "Financial Status of Social Security Program After the Social Security Amendments of 1977," *Social Security Bulletin* (March 1978), pp. 21-30. The 24 percent rate includes the tax on both the employer and the employee.

[21]An argument for the taxation of social security benefits can also be made on the basis of equity considerations. Taxation of social benefits, or some portion of benefits, would treat such income more equally with that of other pension incomes. Also, it would tax social security income according to the ability-to-pay criteria applied to other income.

[22]Benefits of future retirees are indexed in two ways. First, the wage history of retiring workers is indexed to the average wages of U.S. workers so that earnings in past years are brought up to current average wage levels. For example, if the average earnings doubled from 1970 to 1980, the wage that a retiring worker actually earned in 1970, say, $10,000, would be doubled to $20,000. After a certain number of years are dropped out, the worker's indexed earning history is averaged to obtain the average indexed monthly earnings (AIME). A formula to compute benefits, prescribed by Congress, is then applied which in 1979 was 90 percent of the first $180 plus 32 percent of the next $905 plus 15 percent of the excess over $1,085. This formula is indexed to average U.S. wage movements. The "breakpoints," namely $180 and $1,085, are adjusted automatically each year to reflect changes in average U.S. wages.

to keep the benefits of retiring workers at a certain proportion of their real income during their lifetime. Thus, as discussed earlier, when wages rise faster than prices, the initial benefits of future retiring workers will increase in real terms in step with increases in wages over their working years.

This procedure itself is consistent with the current financing scheme that taxes payroll income, in the sense that future benefits and taxes will rise or fall together. However, large benefit increases were granted in the late 1960s and early 1970s based on what now appears to have been incorrect assumptions about birth and death rates. As a result, a long-term financing problem is expected to emerge if current demographic trends persist.

An indexing procedure that would insure that benefits grow at a lower rate than revenue is a "partially-indexed" wage rule. This rule would specify that benefits be indexed to wage movements, but by a smaller percentage than the wage increase. When real wages are growing, benefits would rise over time, but not as rapidly as wages or revenues. While the purchasing power of promised benefits to future retirees would be reduced from where they are now, they would normally be at a substantially higher level than those of current retirees.

CONCLUSION

Congress has indexed social security benefits to movements in the consumer price index, a reform intended to protect the purchasing power of these benefits. Recent U.S. experience, however, has shown that there are problems with this procedure. One problem is that the CPI has seriously overstated the rise in prices in recent years; thus, it has contributed to

higher benefits than were necessary to keep the purchasing power of benefits unchanged. The Bureau of Labor Statistics is currently contemplating certain technical changes in the official CPI calculations, such as the measurement of home ownership costs by the rental equivalence method. These changes, if implemented, may result in a better measure of changes in the price level.

In addition, price indexing of benefits can be inconsistent with the method currently used to finance the social security system. The system is essentially financed on a pay-as-you-go basis by taxes on wages and salaries, so when prices rise faster than wages, benefits rise faster than revenues into the OASI trust fund. To remedy such a situation, once the small trust fund balances are depleted, requires that the government either levy additional taxes on workers or reduce the growth of benefits.

One reform of the indexing procedure that would greatly diminish the likelihood of such financial imbalances in the OASI trust fund in a future period of declining real wages is the so-called minimum rule. This rule would limit benefit increases to either average wage movements or the price level, whichever is smaller, and implies that benefits would decline in real terms when real wages of workers decline and remain constant when real wages rise, as the current law provides. Such a rule does not reduce benefits from those promised under current law except when real wages of workers are declining. Thus, at this point, it would neither solve the short-term financing problem faced in the 1980s nor the long-term problem that is expected to develop in the next century. It would, however, preclude them from becoming worse should prices rise faster than wages in the future. To solve these financing problems, other measures must be taken to either increase taxes or reduce benefits.

Why the Median-Priced Home Costs So Much

SCOTT E. HEIN and JAMES C. LAMB, JR.

INFLATION has caused many distortions that affect the affordability of housing, especially for first-time buyers. Since 1965, the price of the median-priced house in the United States has more than tripled.[1] More important, however, the annual mortgage payment for a standard financing arrangement is almost seven times as large as before for the median-priced house. As a result, the median-income family is unlikely to qualify for and presumably would be reluctant to obtain conventional financing to buy the median-priced house today.

In 1965, the median before-tax family income was $7,610, the new home mortgage rate averaged 5.81 percent, and the median sale price of a new one-family house was $20,150. With a 20 percent down payment and a 30-year mortgage to secure the balance, a homeowner would owe $1,136 in annual interest and principal payment on the debt, approximately 14.9 percent of his income.

In 1980, by comparison, median before-tax income was approximately $21,500, the new home mortgage rate for the year averaged 13.73 percent, and the median sale price of a new one-family house vaulted to $64,900. The annual interest and principal charges on a 30-year mortgage for this home, again assuming a 20 percent down payment, would be $7,249, or 33.7 percent of the median income (see table 1).

As evidenced by these numbers, the change in the cost of homeownership has been drastic. This article explains why this cost has risen so sharply: why the 1965 median-income family had to pay less than 15 percent of its annual income in mortgage payments on a median-priced house, while the 1980 median-income family must pay more than 33 per-

Table 1
Comparison of Income and Mortgage Payments for 1965 and 1980 (current dollars)

	1965	1980
Median before-tax income	$ 7,610	$21,500
Median sale price of a new home	$20,150	$64,900
Average mortgage rate	5.81%	13.73%
Annual interest and principal[1]	$ 1,136	$ 7,249
Payment as a percentage of income	14.9%	33.7%

[1]Assuming 20 percent down payment.

cent. Two separate issues are considered: the increase in housing prices and the increase in the cost of financing a home purchase.

THE RISE IN HOUSING PRICES

From 1965 to 1980, the prices of personal consumption goods more than doubled, rising 131.8 percent. Since inflation is a sustained increase in the general level of prices, one would expect similar increases in housing prices. However, the prices of new housing for the same period rose an even higher 223.2 percent.[2] Table 2 shows the annual rate of increase in new housing prices and personal consumption goods.

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[1]The median of a set of data is the number below and above which there are an equal number of observations.

[2]This indicates that individuals who owned homes over this period have experienced sizable capital gains. On this matter, see Patric H. Hendershott and Sheng Cheng Hu, "Inflation and the Benefits from Owner-Occupied Housing" (National Bureau of Economic Research, Working Paper No. 383, August 1979) for a discussion of the capital gains experienced by households. The present paper does not analyze the ramifications of these capital gains on the demand for housing.

Table 2

Annual Change in Housing Prices and the Personal Consumption Deflator[1]

Year	Change in housing prices	Change in personal consumption deflator
1965	2.9%	1.7%
1966	3.5	2.9
1967	3.6	2.4
1968	5.6	4.1
1969	8.0	4.5
1970	3.0	4.7
1971	5.2	4.2
1972	6.4	3.7
1973	9.5	5.6
1974	9.3	10.1
1975	9.5	7.6
1976	8.6	5.2
1977	12.8	6.0
1978	13.7	6.8
1979	14.2	8.9
1980	10.1	10.2

[1]Data on housing prices are for new sales only.

Only in 1970, 1974 and 1980 was the annual rate of increase in housing prices less than that of personal consumption goods. Thus, while general inflation explains most of the increase in housing prices, it leaves unanswered the question why housing prices have risen faster than the general price level.

Quality Changes

One possible explanation for this phenomenon is that the quality of housing has risen over the past 15 years; thus, we are comparing the price of two dissimilar goods. Though this problem plagues all price index measures, it appears to be particularly important in the case of housing. The average new home is larger and has more amenities, such as central air conditioning and insulation. Still, economists generally believe that these quality increases are not substantial enough to fully explain the rapid relative price rise.[3]

[3]For example, Randall J. Pozdena, "Inflation Expectations and the Housing Market," Federal Reserve Bank of San Francisco *Economic Review* (Fall 1980), pp. 29-47, estimates that 15 percent of the increase in the average home sales price between 1970 and 1979 is explained by quality considerations.

Demographic and Lifestyle Factors

Additional factors that help explain the relative increase in housing prices are demographic changes since 1965. First, the adult population — the purchasers of homes — has grown rapidly in recent years.[4] There appear to be two sources of this growth. One, individuals born in the post-World War II baby boom have moved into the homebuying age group. Two, the U.S. population now enjoys an increased longevity.

In addition, lifestyle changes apparently have increased the demand for shelter, at least partially affecting the demand for owner-occupied housing. For example, the proportion of unmarried adults has increased with the rise in the divorce rate and the postponement of marriage. These lifestyle changes have resulted in more and more single-person households. Today there often are two people demanding housing, where before there was one.

Inflation and the Favorable Tax Treatment of Homeownership

A third factor causing the relative rise of housing prices is the favorable treatment of homeownership by the U.S. tax structure. As inflation has accelerated, this treatment has become even more favorable.[5] For example, an individual can deduct mortgage interest expenses from taxable income in determining his income tax. Thus, as nominal interest rates and mortgage rates rise with inflation, borrowers can deduct larger interest expenses, even if the real (inflation adjusted) cost of borrowing remains unchanged. In other words, the higher the anticipated future inflation, the cheaper it is to borrow under our tax system.[6] Since most people borrow to purchase a

[4]For a more detailed discussion, see Dan M. Bechter, "How Much For a New House in the Years Ahead? Some Insights From 1975-80" (Federal Reserve Bank of Kansas City, Research Working Paper 81-104).

[5]Anthony Downs, "The Low (Real) Cost of Housing," *Across the Board* (February 1981), pp. 51-55; James M. Poterba, "Inflation, Income Taxes and Owner-Occupied Housing" (National Bureau of Economic Research, Working Paper No. 553, September 1980).

[6]There is an important distinction between nominal and real interest rates. Nominal interest rates are market interest rates which state how many dollars the borrower will pay and the lender will receive on a loan. Since inflation depreciates the value of a dollar in terms of its command over resources, nominal rates are bid up by anticipated inflation. Real interest rates are rates that have been adjusted for inflation. The expected real interest rate can be measured by subtracting the expected annual rate of inflation from the nominal interest rate.

The favorable treatment given to borrowers comes from the fact that individuals can deduct nominal interest expenses

house, this increasingly favorable treatment has increased the demand for the single-family dwelling.

This benefit becomes even more important as inflation pushes individuals into higher marginal income tax brackets (bracket creep). Bracket creep has increased the marginal tax rate for the median-income family from 17 percent in 1965 to 24 percent in 1980. As individuals are pushed into higher marginal tax brackets, the value of deducting interest expenses increases. Thus, even if the interest expense on a loan or mortgage were unaffected by inflation, individuals would pay less after-tax dollars to borrow in 1980 than they did in 1965. Since we have a progressive income tax structure, the increase in marginal tax rates has been even larger for family incomes greater than the median. In 1965, a family whose income was in the 80th percentile (who earned more dollars than 80 percent of all other families) was in the 19 percent marginal tax bracket. In comparison, by 1980 this family was in the 37 percent marginal tax bracket. Thus, high-income families have experienced even greater reductions in the after-tax cost of borrowing as inflation has moved them into higher marginal tax brackets.[7]

In another benefit of our tax structure, capital gains realized from the sale of a home are not taxed if they are reinvested in another home. In addition, people over the age of 55 can now realize a tax-free, one-time capital gain of $100,000 or less from the sale of their home. Consequently, some homeowners effectively pay no tax on capital gains from home ownership, substantially less than they would pay in taxes on capital gains from stocks or bonds.

An additional favorable tax consideration concerns housing as a form of investment. Consider an investor who is contemplating two alternative purchases: a purchase either of $70,000 in securities or a $70,000 house. In the first case, the investor earns taxable interest income from the investment. In the latter, he receives no *direct* monetary remuneration, but he does obtain certain housing services referred to as "imputed rent"—the value of these services if the investor were renting the house.[8] If the expected annual interest income equals the imputed rent (and if neither investment is appreciating in value), tax considerations would induce the investor to purchase the house rather than the securities, because the income earned from the house is untaxed.

Furthermore, inflation drives nominal interest rates up so that the interest income from securities increases (relative to interest income in noninflationary situations). This raises the tax burden on securities, making the investor worse off. Thus, a rise in the inflation rate increases the relative attractiveness of imputed income versus income from securities.

Finally, the U.S. tax structure is such that, during periods of high inflation, corporations are penalized with higher tax bills, while no such effect occurs on housing investments. Thus, individuals become wary of investing in corporate stocks. Corporations are affected because the depreciation of their assets is based on historic cost, and their inventories are valued by first-in-first-out (FIFO) inventory accounting. With respect to depreciation, present tax accounting practices do not write off capital expenses rapidly enough. In an inflationary environment, the dollar value of depreciation for a machine should represent both the physical deterioration of the machine, and the fact that it will take more dollars in the future to replace the machine or any of its parts. Present depreciation practices fail to recognize this latter element of depreciation and, as such, overstate corporate profits. With corporations paying more in taxes, the return to equity holders is reduced accordingly. A similar overstatement of profits results when corporations use FIFO inventory accounting. A number of studies have suggested that these factors have induced investors to divert money from the stock market into the housing market, where as noted above, more favorable tax treatment is available.[9]

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from their incomes in determining taxable income. Compare two individuals — one in an inflationary environment with 10 percent inflation and the other in an environment with no inflation. Suppose the interest rates are 13 percent and 3 percent, respectively, so that the real rate is 3 percent in both cases. Although the real cost of borrowing is the same for each individual, the after-tax real cost is lower for the person in the inflationary environment since that individual's nominal interest expense is much larger.

The point that the present tax structure favors borrowing has also been made in Lawrence H. Summers, "Inflation, the Stock Market and Owner Occupied Housing" (National Bureau of Economic Research, Working Paper No. 606, December 1980).

[7]See Patric H. Hendershott, "Estimates of Investment Functions and Some Implications for Productivity Growth," in Laurence H. Meyer, ed., *The Supply-Side Effects of Economic Policy* (St. Louis: Center for the Study of American Business and Federal Reserve Bank of St. Louis), pp. 149-65.

[8]See Anthony M. Rufolo, "What's Ahead for Housing Prices?" Federal Reserve Bank of Philadelphia *Business Review* (July/August 1980), pp. 9-15.

[9]Patric H. Hendershott, "The Decline in Aggregate Share Values: Inflation and Taxation of the Returns From Equities and Owner-Occupied Housing" (National Bureau of Economic Research, Working Paper No. 370, July 1979) and Summers, "Inflation, the Stock Market and Owner Occupied Housing."

Many factors have increased the demand for residential housing over the last 15 years.[10] It is important to recognize that part of this stimulus to demand comes from the favorable tax treatment of housing which has worked to increase the *after-tax* affordability of housing from an economic perspective; that is, the relative after-tax price of housing is being reduced by the interaction of inflation and the present tax structure.[11] Looking at the ratio of mortgage payments to before-tax income, as many homebuyers and lending institutions do, fails to recognize this point.

THE COST OF BORROWING

As we have seen, housing prices have risen faster than other prices over the last 15 years. However, family incomes have also risen faster than inflation over this same period. In fact, family incomes nearly have kept up with housing prices. In 1965, the ratio of the median-priced house to the median family income was 2.6; in 1980 the ratio had risen only to 3.0. Thus, ignoring tax considerations, the 1980 house would *not* appear to be substantially more expensive relative to income than it was in 1965.

To make this point another way, consider what would result if the 1980 median-income family could purchase the 1980 median-priced house, *at the 1965 mortgage rate*. If this family bought a 1980 median-priced home, but borrowed 80 percent of the purchase price at a mortgage rate equal to the 1965 average of 5.81 percent, its principal and interest payments would have been only *17.0* percent of the median family income. Thus, the 1980 median-income family could well afford the 1980 median-priced house, if only they could obtain a 5.81 percent mortgage rate. This hypothetical case is clearly unrealistic, but it does suggest that a major culprit in the 1980 affordability problem is today's high level of mortgage rates. At a mortgage rate of 13.73 percent, today's homebuyer would be paying more than 33 percent of his current income in terms of interest and principal alone.

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[10]In addition, other factors have retarded the supply of housing. Bechter, "How Much For a New House?" p. 13, sees government regulations "as being directly or indirectly responsible for holding back the rate of increase in the pace of homebuilding during the rising portion of the last housing cycle." In this light government policies have also increased the relative price of housing by imposing stringent zoning codes and subdivision regulations.

[11]This point has led Downs, "The Low (Real) Cost of Housing," to suggest that the United States is overinvesting in housing. Also, see Hendershott, "Estimates of Investment Functions."

But today's high level of mortgage rates, in and of itself, is not the problem. Though the mortgage rate was quite high in 1980, it is unlikely that this rate has substantially reduced the long-run economic incentive to own a home. Quoted mortgage rates are nominal rates. Nominal rates alone, however, have little influence on an individual's purchasing or investment decisions. Both tax considerations and anticipated future inflation influence these decisions.

When the anticipated inflation rate and the favorable tax treatment given to housing are taken into account, homebuying is not nearly as adversely affected by high nominal mortgage rates as might first be thought. As we have seen, the ability to write off interest expenses reduces the true interest costs associated with purchasing a home. Last year, for example, a median-income family of four was in the 24 percent marginal tax bracket for U.S. income tax purposes. After deducting interest expenses from the purchase of a new home, the family's after-tax mortgage rate was reduced (at the margin) from the market rate of 13.73 percent to the *net* rate of 10.43 percent [13.73 $\times$ (1 - 0.24)]. The 1965 median-income family, on the other hand, paid a 4.71 percent [5.81 $\times$ (1 - 0.19)] marginal after-tax mortgage rate.

Further, when inflation expectations are considered, this after-tax rate of 10.43 percent in 1980 may not be all that high. Nominal interest rates are high today, when compared to those in 1965, because investors anticipate a higher future inflation rate than they anticipated in 1965. As such, they recognize that the dollars which will be paid back in the future will buy fewer goods, and they demand compensation accordingly. Borrowers, also anticipating inflation, recognize they will be paying back the loan with a depreciated currency and thus do not find high nominal interest rates prohibitive.

For example, take the 1965 median-income family who must pay 4.71 percent after taxes to borrow at the 1965 mortgage rate. Suppose this family anticipates that future inflation will be 2 percent per year. If this family borrows $100 for a year, they would pay back, after tax deductibility is allowed, $104.71 at the end of one year. Since they expect 2 percent inflation, however, they see the foregone $104.71 as equivalent to giving up $102.66 ($104.71/1.02) in present dollars. Thus, the *real* after-tax interest rate is only 2.66 percent — this 1965 homebuyer expects to give up only $2.66 worth of goods and services to borrow $100.

How much inflation must today's homebuyer antici-

pate to make them indifferent between the present arrangement and that of 1965? The after-tax mortgage rate for the 1980 median-income family is 10.43 percent. Thus, after tax deductions, the family will pay $110.43 to borrow $100 for one year at the 1980 mortgage rate. If the family anticipates inflation at 8 percent over the next year, they see the $110.43 given up at the end of one year as equivalent to $102.25 ($110.43/1.08) in 1980 dollars. The real after-tax rate is 2.25 percent. Thus, the 1980 median-income family expecting the future inflation rate to be 8 percent or more anticipates *lower* after-tax real borrowing costs than the 1965 median-income family that expected a future inflation rate of 2 percent.

If individuals expect inflation to continue at recent levels, the 10.43 percent after-tax rate the median-income family must pay for a 13.73 percent mortgage represents a relatively small cost in terms of the real goods and services that must be given up. It is unlikely then that the recent high nominal mortgage rates alone have significantly discouraged home purchases. Thus, when both taxes and anticipated future inflation are taken into account, the after-tax real cost of the mortgage is apparently not unduly prohibitive.

THE CONVENTIONAL MORTGAGE

If, as has been argued, neither 1980 housing prices nor 1980 mortgage rates are too great a burden for prospective homeowners, what has caused the significant increase in the ratio of mortgage payments to income? The answer lies in restrictions resulting from conventional mortgage agreements.

Conventionally, mortgage debt is amortized over the repayment period, usually 25 to 30 years, so that the periodic payment is fixed, and both the principal and interest are paid off by the end of the loan. One of the main features of the conventional mortgage is that it fixes the periodic payments in dollar terms for the duration of the loan. This feature was useful in a noninflationary environment, but is it when future inflation is expected?

Consider two hypothetical cases in which a family with the median income in 1980 borrows $51,920 to purchase the median-priced house.[12] In the first case, suppose the family (and the rest of the public) anticipates no inflation in the future, expecting the prices of goods and services to remain essentially unchanged. The family realistically expects its income to rise, but this expectation is based on anticipated productivity gains, not inflation. As such, the increase in expected

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[12]We will ignore all tax considerations in the following analysis.

future income implies an increased future command over goods and services. Assume the family expects their income to rise at an annual rate of 3 percent. Similarly, assume the family can borrow at a 3 percent rate.

In the second case, suppose the family (and the rest of the public) anticipates a steady 8 percent rate of inflation for 30 years. We assume that in every other way this family is similar to the first. Specifically, we assume that the family expects its income to grow in real (inflation-adjusted) terms at a 3 percent rate. This implies that the family expects their dollar income to increase at about an 11 percent rate — 8 percent due to inflation, 3 percent due to real productivity gains. Table 3 lists the two respective dollar income streams that are anticipated in these two situations. While the expected income streams are quite different, each family expects its command over goods and services to be the same under each scenario. In addition, we will assume in this second case that the family expecting 8 percent inflation can borrow at an 11 percent rate, so that in real terms the cost of borrowing is 3 percent as it was in case one.

Thus, we are comparing a family in two different situations that are essentially identical when inflation is accounted for. Each family starts with the same dollar income and buys the same dollar-priced house. With the passing of every year, each family can buy 3 percent more goods and services than it could the previous year. In addition, the real cost of borrowing is the same in each case: to borrow a dollar today, each family promises to pay back enough money in one year to buy what $1.03 buys today.

The two families should be equally happy. In real terms their situations are identical. But let us consider what would happen if each family were to obtain a conventional mortgage. In the first case, with the family expecting zero inflation and borrowing at a 3 percent rate, the annual mortgage payment turns out to be $2,627. In the second case, the family expecting 8 percent inflation and borrowing at an 11 percent rate faces a $5,933 annual mortgage payment. Over the full term of the mortgage, the two situations are identical. The significantly higher nominal payment in the second case is due to expected inflation. If, as we assume, inflation turns out to equal the 8 percent rate expected, the interest paid on the second debt over the full 30-year period will buy exactly the same amount of goods and services as in the no inflation case. Thus, in such a case the family is simply compensating the lender for the eroding value of money and is no worse off in a real sense.

Table 3
Percent of Principal and Interest to Income With and Without Inflation

	No Inflation			8% Inflation			
Year	Payment	Median income	Payment as a percent of median income	Payment	Payment adjusted for inflation	Median income	Payment as a percent of median income
1980	$2,627	$21,500	12.2%	$5,933	$5,933	$ 21,500	27.6%
1981	2,627	22,145	11.9	5,933	5,494	23,917	24.8
1982	2,627	22,809	11.5	5,933	5,087	26,604	22.3
1983	2,627	23,494	11.2	5,933	4,710	29,596	20.0
1984	2,627	24,198	10.9	5,933	4,361	32,921	18.0
1985	2,627	24,924	10.5	5,933	4,038	36,622	16.2
1986	2,627	25,672	10.2	5,933	3,739	40,738	14.6
1987	2,627	26,442	9.9	5,933	3,462	45,317	13.1
1988	2,627	27,235	9.6	5,933	3,205	50,410	11.8
1989	2,627	28,052	9.4	5,933	2,968	56,076	10.6
1990	2,627	28,894	9.1	5,933	2,748	62,380	9.5
1991	2,627	29,761	8.8	5,933	2,545	69,392	8.5
1992	2,627	30,654	8.6	5,933	2,356	77,192	7.7
1993	2,627	31,573	8.3	5,933	2,182	85,867	6.9
1994	2,267	32,520	8.1	5,933	2,020	95,518	6.2
1995	2,627	33,496	7.8	5,933	1,870	106,255	5.6
1996	2,627	34,501	7.6	5,933	1,732	118,198	5.0
1997	2,627	35,536	7.4	5,933	1,604	131,484	4.5
1998	2,627	36,602	7.1	5,933	1,485	142,262	4.1
1999	2,627	37,700	7.0	5,933	1,375	162,702	3.7
2000	2,627	38,831	6.8	5,933	1,273	180,990	3.3
2001	2,627	39,996	6.6	5,933	1,179	201,333	3.0
2002	2,627	41,196	6.4	5,933	1,091	223,969	2.7
2003	2,627	42,431	6.2	5,933	1,010	249,132	2.4
2004	2,627	43,704	6.0	5,933	936	277,135	2.1
2005	2,627	45,015	5.8	5,933	866	308,289	1.9
2006	2,627	46,366	5.7	5,933	802	342,939	1.7
2007	2,627	47,757	5.5	5,933	743	381,486	1.6
2008	2,627	49,189	5.3	5,933	688	424,359	1.4
2009	2,627	50,665	5.2	5,933	637	472,060	1.3

This, however, is a long-run perspective. In the short run (less than the full term of the mortgage), as table 3 indicates, the two families are treated very differently. Specifically, the proportion of income spent on the mortgage when inflation is expected to be 8 percent is much larger in the early years of the mortgage. For example, in the first year the mortgage payment is 27.6 percent of the family income with 8 percent expected inflation, as opposed to 12.2 percent of the family income in the zero anticipated inflation case.

The explanation for this is simple enough. When everyone anticipates inflation, the borrower must not only repay the principal and interest, but must also compensate the lender for the eroding value of money.

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Since, under the conventional mortgage, the periodic payment is fixed in nominal terms, the borrower must compensate the lender early in the repayment period for inflation expected to occur many years down the road. However, the ratio of mortgage payment to family income falls quite rapidly as the second family's income increases because of productivity gains and inflation, so that the very high ratio early in the mortgage is counter-balanced by a lower ratio later on.

The conventional mortgage thus treats the home-buyer very differently depending on anticipated inflation. In a noninflationary environment, the family income is expected to be relatively stable in dollar terms, and the mortgage payment plan is in complete agreement with such an expectation. However, in an inflationary environment the family expects its income to rise with inflation; the fixed dollar mortgage payment fails to take such an expectation into account. Thus, while nominal interest rates clearly reflect expectations of future inflation and require compensation accordingly, the payment schedule for a conventional mortgage does not reflect such expectations.

THE MORTGAGE PAYMENT-INCOME RATIO: LOAN CRITERION

This example indicates quite pointedly how allowing for a maximum ratio on the mortgage payment to family income is a dubious rule for the lender to follow in determining whether or not to make a loan under conventional arrangements. The two families are in exactly the same situation in real terms. The current house prices are the same. The expected real income streams are the same. And the expected real interest rates are the same. Therefore, if the family in the noninflationary environment can buy the house, then the family in the inflationary environment should also be able to buy the same house.

Solely considering the ratio of the nominal mortgage payment to income in the first year of the mortgage would suggest that the family expecting 8 percent inflation is less able to afford the house than the family expecting no inflation. However, this problem is a function of the interaction of anticipated inflation and the conventional mortgage; it is unrelated to whether or not the family can ultimately pay off the loan. Surely if the family could "afford" the home in the case of zero inflation, they could "afford" it in the case of 8 percent inflation. In this light, recent increases in the acceptable mortgage payment to family income ratio are not seen as a major problem for the long-run solvency of mortgage lenders, and in fact

is a natural response to the interaction of inflation and the conventional mortgage.

The Real Mortgage Expenses

Table 3 further shows that the family in the inflationary situation pays a substantially larger inflation-adjusted mortgage payment in the early years of the mortgage than the family in the non-inflationary case. In our example, the real payments (in terms of actual command over goods and services) are higher for the family in the inflationary environment for the first 11 years and lower thereafter. Thus, the early payments are high, not only relative to the family income, but in real terms also.

In real terms, the family in the inflationary environment is saving more in the early part of the mortgage than the family expecting no inflation. Relative to the family expecting no inflation, the family anticipating 8 percent inflation is postponing consumption in the early years of the mortgage so it can make the high nominal payments. This postponed consumption early in the life of the mortgage is, of course, offset by lower real payments later on.

It is important to recognize that this savings decision was dictated by the interaction of inflation and the conventional mortgage. It may not be a choice that the family would prefer. For example, our family expecting 8 percent inflation may not like the idea of spending 27.6 percent of their 1980 income on mortgage payments. But, to the extent that only fixed nominal payment plans are being offered, their choice becomes either to accept this savings schedule or to forego buying the home. In this light, it is entirely likely that we could see a reduced demand for housing in periods of high anticipated inflation, as a result of the pattern of real costs imposed by the conventional mortgage. Families and individuals may forego buying homes in inflationary periods, not because housing is no longer a worthwhile long-term investment, but because of the disproportionate real mortgage payments forced on them in early years by the conventional fixed-payment mortgage.

THE CONVENTIONAL MORTGAGE AND EXPECTED INFLATION

Our example has shown that in the face of expected inflation the conventional mortgage acts to front-end load the mortgage payments both in real terms and relative to a family's current income. Moreover, as expected inflation accelerates, the front-end loading problem becomes more severe. The larger the

Table 4

Percent of Principal and Interest to Income Under Different Rates of Inflation

	8% Inflation				13% Inflation			
Year	Payment	Payment adjusted for inflation	Median income	Payment as a percent of median income	Payment	Payment adjusted for inflation	Median income	Payment as a percent of median income
1980	$5,933	$5,933	$ 21,500	27.6%	$6,892	$6,892	$ 21,500	32.1%
1981	5,933	5,494	23,917	24.8	6,892	6,099	25,024	27.5
1982	5,933	5,087	26,604	22.3	6,892	5,397	29,125	23.7
1983	5,933	4,710	29,596	20.0	6,892	4,777	33,899	20.3
1984	5,933	4,361	32,921	18.0	6,892	4,227	39,454	17.5
1985	5,933	4,038	36,622	16.2	6,892	3,741	45,921	15.0
1986	5,933	3,739	40,738	14.6	6,892	3,310	53,448	12.9
1987	5,933	3,462	45,317	13.1	6,892	2,930	62,208	11.1
1988	5,933	3,205	50,410	11.8	6,892	2,592	72,403	9.5
1989	5,933	2,968	56,076	10.6	6,892	2,294	84,269	8.2
1990	5,933	2,748	62,380	9.5	6,892	2,030	98,082	7.0
1991	5,933	2,545	69,392	8.5	6,892	1,797	114,159	6.0
1992	5,933	2,356	77,192	7.7	6,892	1,590	131,570	5.2
1993	5,933	2,182	85,867	6.9	6,892	1,407	154,645	4.5
1994	5,933	2,020	95,518	6.2	6,892	1,245	179,990	3.8
1995	5,933	1,870	106,255	5.6	6,892	1,102	209,493	3.3
1996	5,933	1,732	118,198	5.0	6,892	975	243,830	2.8
1997	5,933	1,604	131,484	4.5	6,892	863	283,793	2.4
1998	5,933	1,485	142,262	4.1	6,892	764	330,306	2.1
1999	5,933	1,375	162,702	3.7	6,892	676	384,443	1.8
2000	5,933	1,273	180,990	3.3	6,892	598	447,453	1.5
2001	5,933	1,179	201,333	3.0	6,892	529	520,791	1.3
2002	5,933	1,091	223,969	2.7	6,892	468	606,151	1.1
2003	5,933	1,010	249,132	2.4	6,892	415	705,484	1.0
2004	5,933	936	277,135	2.1	6,892	367	821,115	0.8
2005	5,933	866	308,289	1.9	6,892	325	955,693	0.7
2006	5,933	802	342,939	1.7	6,892	287	1,112,344	0.6
2007	5,933	743	381,486	1.6	6,892	254	1,294,657	0.5
2008	5,933	688	424,359	1.4	6,892	225	1,506,831	0.5
2009	5,933	637	472,060	1.3	6,892	199	1,753,812	0.4

expected rate of inflation, the higher the nominal mortgage rate and the higher the first-year conventional mortgage payment — both in real terms and relative to family income. Table 4 shows this for a case in which inflation accelerates from 8 percent to 13 percent.[13]

This feature explains in large part why we had no "affordability" problem from 1976 through 1978.[14]

[13]At 13 percent inflation, the family's mortgage payment in 1980 is 32.1 percent of their 1980 income. If inflation was expected to be 40 percent or more, the family's mortgage payment would have exceeded their income.

[14]There is cursory evidence that the front-end loading problem was evident in 1974. That year saw a sharp acceleration in both inflation and nominal interest rates. The FHA mortgage rate averaged 9.55 percent that year. As such, conditions were conducive for the imposition of significant real mortgage payments early in the loan. Along these lines it is appropriate to note that 1974 was one of only two years from 1965 to 1980 in which housing prices did not rise as rapidly as consumption goods.

Over this period, both inflation and nominal interest rates were fairly low — suggesting relatively low expected inflation. For example, the FHA mortgage rate was below 10 percent from 1976 through 1978. Beginning in 1979, however, inflation and nominal interest rates rose sharply. Since the early part of 1979, the front-end loading problem has likely become an important one for homebuyers, especially first-time buyers.[15] For previous homeowners, this problem is not as severe since they have realized significant capital gains from homeownership which can offset the front-end loading problem.

SUMMARY AND CONCLUSION

A family with the 1980 median income must pay over 33 percent of their income to buy the 1980 median-priced house. In comparison, the 1965 median-income family paid less than 15 percent of their income to buy the 1965 median-priced house. To some

[15]There is an alternative mortgage arrangement that can be implemented to avoid this problem. For a discussion of such a mortgage, see Donald Lessard and Franco Modigliani, "Inflation and the Housing Market: Problems and Potential Solutions," in Donald Lessard and Franco Modigliani, eds., *New Mortgage Designs for Stable Housing in an Inflationary Environment* (Proceedings of a Conference Sponsored by the Federal Reserve Bank of Boston), pp. 13-45; and Henry J. Cassidy, "Price-Level Adjusted Mortgages (PLAMs): A Comparison with other Home Mortgage Instruments" (Federal Home Loan Bank Board, Working Paper No. 90, January 1981).

Note, however, that the variable or renegotiable mortgage rate arrangements will not resolve the current cash-flow problems for first-time buyers.

extent, this drastic change is due to the fact that housing prices have risen faster than inflation, spurred on by demographic factors and the preferential tax treatment of housing which has accelerated with inflation. Family incomes, however, have to a large extent kept up with housing prices, so this phenomenon is not as crucial as may first appear.

The main culprit in causing the significant increase in the proportion of income a new buyer must pay to purchase a house is the combination of the expectation of higher future inflation and the conventional mortgage. Expected inflation requires that lenders be compensated for the expected deterioration in the purchasing power of money. Moreover, the conventional mortgage requires that payments, including those due to future inflationary effects on the value of money, be spread evenly over the duration of the mortgage so that dollar payments are constant. As such, today's conventional mortgage imposes a significant cash-flow problem for the homebuyer, especially the first-time buyer.

It is thus likely that many prospective new homebuyers recently have postponed home purchases or have bought a lower-priced home than they originally desired, either because of the significant real costs of the mortgage in the early years, or because of the limitation on mortgage debt to income imposed by credit institutions. In this regard, any actions taken to reduce inflation will benefit the long-term future of the housing industry.

Inflation: The Cost-Push Myth

DALLAS S. BATTEN

INFLATION continues to be our greatest economic problem. This is not a particularly new revelation — policymakers have called it "public enemy No. 1" at least four times in the past decade. What is puzzling is that inflation has persisted (and worsened) even though its reduction has been a primary goal of both Federal Reserve and administration policy for over 10 years.

The explanations for persistent inflation are many: uncontrollably rising wages; OPEC oil-price increases; droughts or poor harvests; large government budget deficits. The list of "causes" of inflation changes with the circumstances. If we were to take them seriously, we would conclude that inflation may be caused by nearly everything. None of these causes, however, can explain inflation consistently over time or across countries.[1]

This article analyzes a frequently given cause of inflation — cost-push — within a monetary framework. The cost-push view of inflation is based on the notion that prices are set by the costs of production and that prices rise *only* when costs rise, regardless of demand. Inflation, in this framework, is the result of the sellers of productive inputs (including labor) persistently and unilaterally raising their selling prices, causing producers' costs, and subsequently prices, to rise.

WHAT IS INFLATION?

Inflation is a persistent rise in the overall (or average) level of prices of all goods and services. This definition must be distinguished from an increase in relative prices (e.g., a rise in the price of wheat or oil) which, as argued below, is not inflation. Some advocates of the cost-push view confuse relative price changes with changes in the overall price level. Consequently, they view the increase in a particular price as a contributor to inflation when in reality it is not.[2] For example, in a study of CBS Evening News broadcasts, 61.5 percent of the reports that dealt with the topic of inflation either explicitly or implicitly identified the rising prices of individual goods as the cause of inflation. A typical report: "Inflation continued to steam along at a double-digit annual rate. . . . The major factor in the surge continues to be food."[3] In other words, food price increases *cause* the overall price level to rise. Changes in the prices of individual goods do *not* cause inflation, although they do affect its measurement.[4] Individual price increases accompany increases in the measure of inflation, but tell us little about the cause of inflation.

There are an infinite number of individual prices consistent with any given overall price level. At any time, some prices are increasing, some are decreasing, while others remain unchanged. Inflation — a persist-

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[1]See, for example, Scott E. Hein, "Deficits and Inflation," this *Review* (March 1981), pp. 3-10; and Michael Parkin, "Oil Push Inflation?" Banca Nazionale del Lavoro *Quarterly Review* (June 1980), pp. 163-86.

[2]For a more thorough discussion of this point, see Hans H. Helbling and James E. Turley, "A Primer on Inflation: Its Conception, Its Costs, Its Consequences," this *Review* (January 1975), pp. 2-8.

[3]Tom Bethell, "TV, Inflation and Government Handouts," *The Wall Street Journal*, July 8, 1980.

[4]Since there are many prices in an economy and since these prices do not necessarily move together, some type of price index must be constructed in order to capture changes in the general level of prices (the overall price level). Two of the most popular price indices are the consumer price index and the implicit GNP deflator. For a discussion of the problems associated with measuring the overall price level, see Denis S. Karnosky, "A Primer on the Consumer Price Index," this *Review* (July 1974), pp. 2-7.
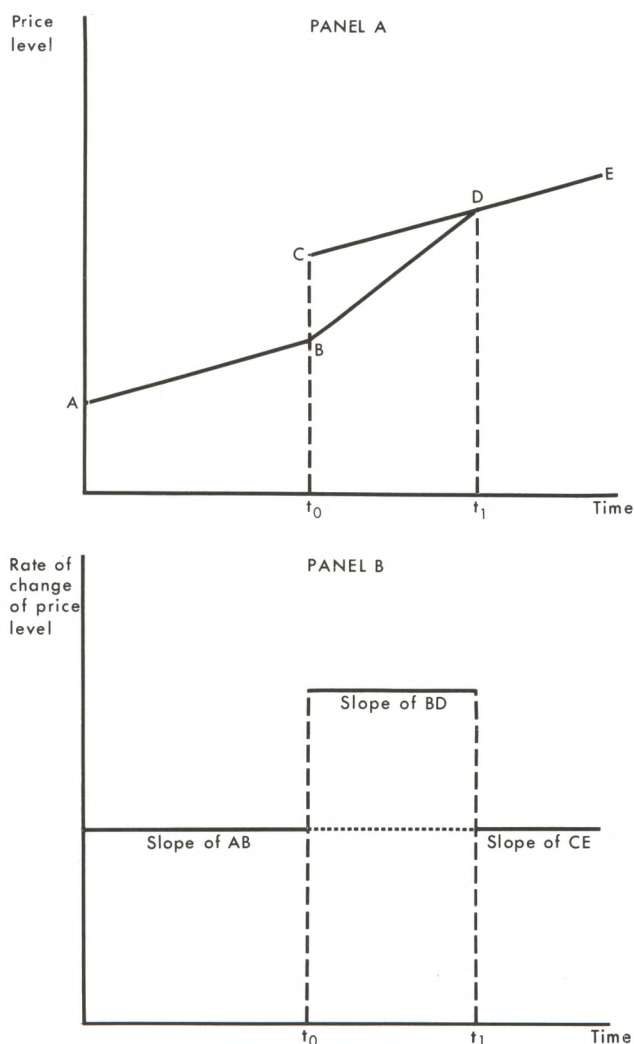
ent rise in the overall price level—can be detected only by observing changes in an aggregate measure of prices, not by changes in individual prices.

Since inflation is a continuous rise in the average price level, a one-time increase caused by some random shock (e.g., a drought or a reduction in the quantity of oil supplied by OPEC) is not considered inflation. Of course, this one-time increase will result in a higher overall price level, but the *rate of increase* of the overall price level (i.e., the rate of inflation) will be unaffected if the economy adjusts to this shock immediately. Consider the example in figure 1. Over time, the overall price level is rising at a rate equal to the slope of line AB. (This rate of price increase is usually called the trend or underlying rate of inflation.) At point t_0, the trend is interrupted by the occurrence of a random shock (e.g., OPEC nations reduce their rate of supplying oil). It the economy adjusted to this shock instantaneously, the overall price level would increase (from B to C), but the trend rate of inflation would be unaffected. (The slopes of AB and CE are identical.) However, such adjustments are not instantaneous. During the adjustment period (t_0 to t_1), the overall price level will rise at a rate (the slope of BD) that is greater than the trend rate, giving the appearance that the shock has actually increased the rate of inflation. This higher rate of price change during the adjustment period is *not* a continuing phenomenon, however, but simply a transitory deviation of the rate of inflation from its trend. Since these deviations do not persist, they are not considered inflation.[5]

WHAT CAUSES INFLATION?

As noted above, considerable confusion exists about the relationships among changes in individual prices, random shocks and the cause of inflation. Political leaders attempt to persuade us that inflation is caused primarily by either random shocks or greedy businesses and labor unions raising their prices and wages unilaterally. As we have seen, the random shock argument is fallacious. Placing the blame for inflation on business and labor is the central tenet of the cost-push

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[5]Of course, these random shocks do cause the prices of some commodities and consequently the overall price level to rise. Other things equal, individuals will experience a decline in their purchasing power. However, these shocks are typically a temporary phenomenon and, by definition, uncontrollable. To place the blame for persistent price level increases (i.e., inflation) on continually occurring random shocks is, in essence, contending that inflation is uncontrollable. This is an undesirable approach, for if inflation is ever to be eliminated, it must be considered a result of controllable events.

Figure 1
Effect of Transitory Nonmonetary Shock on the Trend Rate of Inflation

argument. This argument typically holds that businesses continually raise their prices in an effort to earn higher profits. Presumably, their ability to do this successfully stems from monopoly power.

A similar argument can be made for labor unions. Specifically, unions are alleged to exercise some monopoly power in labor markets to procure wage increases for their members greater than those dictated by market conditions. Then, the firms that employ these workers must raise their prices in order to cover these labor costs. Once this occurs, union members realize that their increased wages do not buy as many goods and services as they did before. As a result, they ask for another raise. This continuing scenario is the familiar "wage-price spiral."

These explanations of inflation conveniently absolve government from having any role in creating inflation. The "culprits" are identified by observing which components of the overall price level rise the most at any particular time. Needless to say, the list of those contributing to inflation quickly becomes quite large: farmers (rising food prices), participants in financial markets (rising interest rates), foreigners (rising oil prices), etc. The public then believes that almost everyone is responsible for inflation, and a myriad of government agencies are formed to regulate prices in various markets, protecting some people from the presumed excesses of others. The Council on Wage and Price Stability is one such example.

Money and Inflation

To understand the fallacy of the cost-push argument, the actual cause of inflation must be identified. The ultimate source of inflation is persistent excessive growth in aggregate demand resulting from persistent excessive growth in the supply of money. This isn't a particularly novel idea — eighteenth century economists aptly described inflation as the result of "too much money chasing too few goods;" that is, the overall price level in any economy is determined by the relationship between the demand for and the supply of money. In particular, it depends on the supply of money relative to the amount that individuals desire to hold.

The quantity of money supplied is essentially a policy variable controlled by the monetary authority, the Federal Reserve System in the United States. The Fed can affect the stock of money either by changing the fraction of commercial bank and thrift institution deposits that must be held in reserve accounts with the Fed or by directly changing the level of reserves in these accounts. The Fed most frequently employs the latter method, participating in the government securities markets. Specifically, when it wants to inject reserves, it buys government securities; when it wants to drain reserves, it sells government securities.

The demand for money is the individual's desire to hold a portion of his wealth in the form of money. In the aggregate, it is determined by permanent income (the expected flow of income over one's lifetime), interest rates, prices and price expectations. An increase in permanent income motivates individuals to demand a larger stock of money. An increase

in permanent income results in an increase in wealth, other things equal. Since individuals want to hold a certain percentage of their wealth in the form of money, they will add to their money balances (i.e., demand more money) as their permanent income rises in order to maintain the desired relationship between money and wealth. The interest rate is the opportunity cost of holding money, the income foregone by holding money instead of an interest-earning asset. As interest rates rise, holding money becomes relatively more costly; consequently individuals hold smaller money balances. The demand for money is positively and proportionately related to the overall price level. For example, if prices double, individuals will hold twice as much money since it will take twice as many dollars to conduct any real transaction. Finally, rising prices erode the purchasing power of the money held by individuals. If expectations of future inflation rise, individuals will attempt to hold less of their wealth in the form of money and more in some asset that will maintain its value in terms of other goods as prices rise (e.g., land or gold).

The equilibrium overall price level is the one (given the level of permanent income, interest rates and price expectations) that induces individuals to hold the exact quantity of money that the monetary authority supplies. Any other price level will motivate individuals to demand more or less money than is being supplied. If individuals are satisfied with the amount of money that they are holding, they will have no desire to increase or decrease their spending on goods and services; in other words, they are in equilibrium and the existing price level is the equilibrium one. If the money supply changes, other things equal, individuals will alter their spending in order to reach equilibrium again and, consequently, the price level will change. For example, if the amount of money supplied is greater than the amount that individuals desire to hold, an *excess supply* of money exists. Individuals will attempt to rid themselves of the excess money by increasing their purchases of goods and services. Thus, the existence of an excess supply of money necessarily implies a corresponding excess demand for goods and services. As individuals increase their spending, they bid up the prices of goods and services. This rise in the price level continues until individuals are motivated to hold the existing stock of money supplied by the monetary authority, that is, until equilibrium is regained. If the monetary authority continues to supply more money than is demanded, excess aggregate demand will persist and prices will continue to rise. Thus, inflation is the result of a persistent excess supply of money.

The link between money and inflation is not confined to the United States. In fact, it is the "tie that binds" the inflationary experience of the industrialized world during the past decade.[6] Table 1 provides a cross-country comparison of the rate of money growth and inflation over the 20-quarter period from IV/1975 to IV/1980 for the major industrial nations.[7] The countries are ranked in descending order according to the rate of money growth experienced during the period. If the demand for money is relatively stable across countries, the analysis above predicts a positive relationship between money growth and inflation. This relationship can be clearly identified in the table. In particular, Italy had the highest rate of money growth and the highest rate of inflation; the United Kingdom experienced the second highest growth rates of money and prices, and so forth.[8] In fact, if this comparison is continued, only West Germany violates the ordering of inflation with the rate of money growth. These results are extremely robust when one considers the heterogeneity of this group of countries.

The Cost-Push Myth

Though the cost-push argument is appealing on the surface, neither economic theory nor empirical evidence indicates that businesses and labor can cause continually rising prices. All firms, regardless of the degree of competition in their industry, produce a quantity and charge a price that they expect will yield the highest profit. This price is higher in a more monopolistic market than in a more competitive one. If a firm with some monopoly power chooses to raise its price arbitrarily, the quantity that it can sell will decrease — since a monopolist faces a downward-sloping demand curve — and its profits will fall. Consequently, since profits would actually fall as prices are arbitrarily increased, a monopolist has no incentive to raise its price continually.[9] A monopolist may charge

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[6]For additional support, see "Inflation and money — the tie that binds," Citibank *Monthly Economic Letter* (December 1980), pp. 8-11.

[7]The choice of a 20-quarter period is supported by evidence presented by Denis S. Karnosky, "The Link Between Money and Prices — 1971-76," this *Review* (June 1976), pp. 17-23; and Albert E. Burger, "Is Inflation All Due to Money?" this *Review* (December 1978), pp. 8-12.

[8]The Spearman rank correlation coefficient with Germany included is .829; the calculated value when Germany is excluded is .997. The critical values are .700 and .738, respectively; that is, the hypothesis that money growth and inflation are unrelated is rejected for both cases.

[9]In fact, one study has demonstrated that prices in highly concentrated industries increased less rapidly during the period 1954-73 than did other prices. See Steven Lustgarten, *Indus-*

Table 1

Money Growth and Inflation in the Major Industrial Nations (IV/1975-IV/1980)

Country	Annual rates of money growth[1]	Annual rates of inflation[2]
Italy	20.5%	17.1%
United Kingdom	12.3	13.7
France	10.0	10.7
West Germany	7.8	4.1
United States	7.5	9.1
Canada	7.5	9.0
Japan	7.2	6.3
Netherlands	6.8	5.8
Switzerland	5.3	2.5

[1]M1 for all countries except the United States for which M1B is used.

[2]Consumer price index used as a measure of inflation.

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higher prices than a competitive firm, but this does not imply constantly *rising* prices.

Unfortunately, realizing that monopolies (which wish to maximize their profits) cannot unilaterally contribute to inflation is insufficient to lay this argument to rest. A similar argument has been developed based on changes in the degree of competition within markets. Since monopolies do charge higher prices than competitive firms, prices will continue to rise if the economy becomes less and less competitive. In other words, it is often argued that inflation is the result of the acquisition of additional market power by the firms within the economy. If the economy is becoming less and less competitive, then the continually declining rate of growth of real output that results will cause prices to rise; that is, inflation caused by the acquisition of more and more monopoly power must be accompanied by *less and less* output being produced and sold. Chart 1 contains a comparison of a trend rate of inflation (as measured by the consumer price index) with a trend rate of growth of real output (real gross national product). Since the trend rate of growth of real output does not show a continuously decreasing pattern, the hypothesis that increased monopolization has caused the rising inflation during the past decade can be rejected.

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trial Concentration and Inflation (American Enterprise Institute for Public Policy Research, 1975), pp. 25-29.

Chart 1
Trend Rates of Inflation and Output Growth [1]
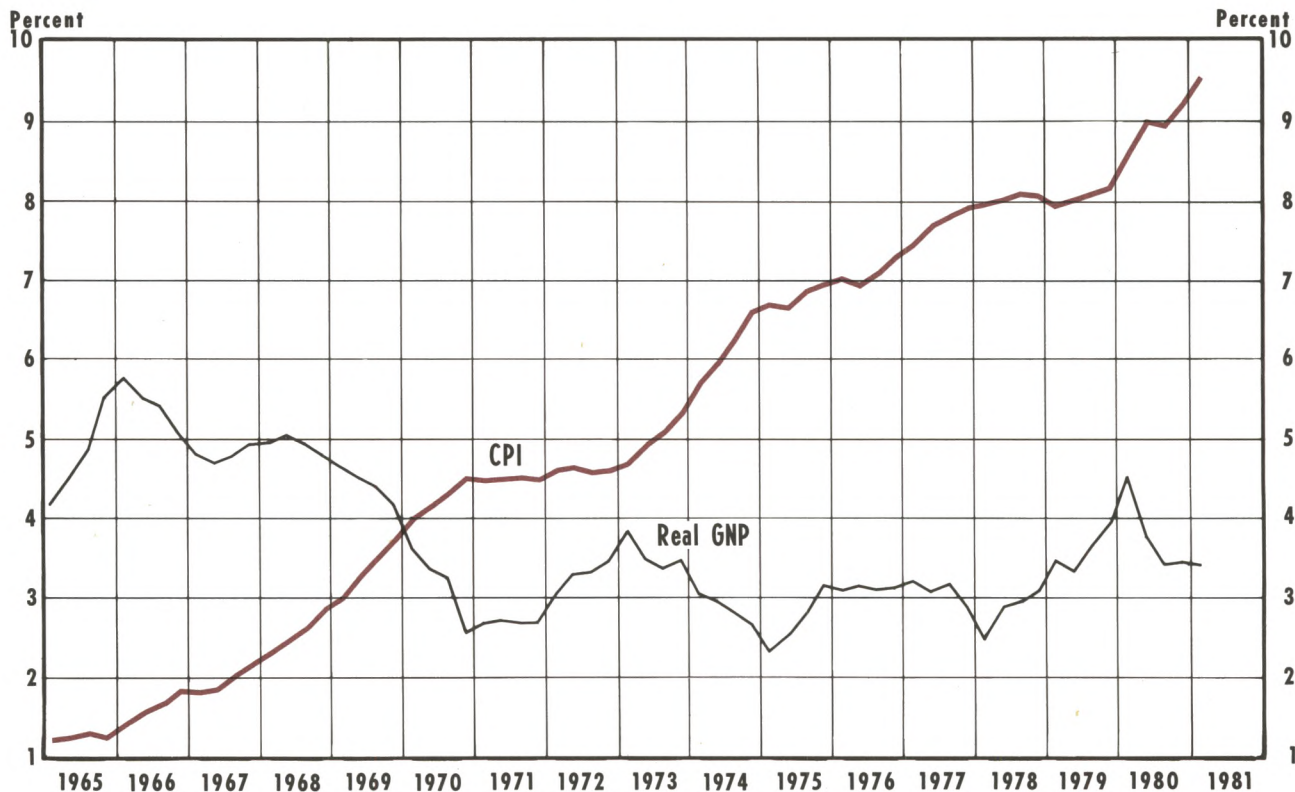
Sources: U.S. Department of Labor and U.S. Department of Commerce

[1] Trends are 20-quarter moving averages. Inflation is measured by the Consumer Price Index.

The cost-push argument is even less credible when analyzed in a macroeconomic framework. In particular, other non-monopolized sectors of the economy adapt to the exercising of monopoly power in one sector. As a result, they tend to neutralize the monopoly's impact on the entire economy. To understand this more clearly, assume that the union in industry A succeeds in obtaining a wage increase for its members that is higher than that dictated by market conditions (i.e., the demand for A's product and the productivity of the workers in A). As a result, the firms in A raise their prices in an attempt to cover the increased labor costs.[10] Other things equal, these higher prices cause the overall price level to rise. Because of this price increase, individuals in the aggregate demand larger money balances. If the money supply remains unchanged, however, there is no ad-

ditional money for them to hold. Consequently, in order to increase their balances to the new desired level, they must decrease their spending on goods and services.

This decreased aggregate demand will ultimately cause prices in other industries to fall until the overall price level returns to what it was prior to the wage increase. The price level must return to its original value because, other things equal (especially the money supply), it is the only price level at which the quantity of money supplied equals the quantity demanded. The wage increase in A has induced higher prices in A, but lower prices in other industries. The union's action has caused relative prices to change, but has not affected the overall price level.[11]

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[10]It should be noted that an increase in wages need not be the motivation for higher prices; higher prices could have resulted from the firms in A exercising their monopoly power. The crucial point is that prices in A have risen unilaterally, independent of market conditions.

[11]The inability of a labor union (that doesn't represent the entire labor force) to affect the overall price level can be seen through the quantity equation:

$$MV = PQ,$$

where M is the money stock; V is the velocity of money (i.e., the average number of times that the money stock

Critics of the above scenario state that "nowadays, . . . compensatory price declines tend not to occur."[12] As a result, they conclude that "the rules of economics don't seem to be working any more."[13] The rules of economics, however, always work despite attempts to frustrate them. The point missed by these critics is that the monetary accommodation of a price shock prevents the occurrence of a compensatory price decrease. In the scenario above, prices in other industries fell because the money stock was held constant.

This price adjustment does not occur immediately. During the adjustment period, the cost of adjusting is reflected by reduced output. If the monetary authority confuses this loss of output (and the corresponding decline in employment) with a permanent decline in aggregate demand, he may increase the money supply. This then precludes the compensatory price declines that one expects to observe in other industries. The price level does not return to its original level and the success of the labor union in industry A in obtaining a higher than warranted wage increase for its members is termed a cause of infla-

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circulates within the economy during a year); P is the overall price level; and Q is real gross national product (GNP). Using the quantity equation, the overall price level can be determined as follows:

$$P = \frac{MV}{Q}.$$

Suppose that there are only two industries (A and B) in this economy. Labor in A is unionized; labor in B is not. In this simple world, the overall price level and real GNP can be rewritten as:

$$P = w_A P_A + w_B P_B$$
$$Q = Q_A + Q_B,$$

where P_A and P_B are the prices in industries A and B, respectively; w_A and w_B are the percentages of the average consumer's consumption bundle composed of A's output and B's output, respectively; and Q_A and Q_B are the output of A and B, respectively. If the action of the union in A causes wages and prices in A to rise, then the overall price level must also rise, other things equal. Since nothing has occurred that causes M or V to change, the new, higher P is consistent with the quantity equation only if Q declines. Total output (Q) must decline because Q_A decreases as consumers react to the higher P_A by moving up their demand curves for A. This new situation, however, cannot be one of equilibrium because there are unemployed workers that are willing to work at the current market wage. The union's action has precluded their employment in A; consequently, these workers must search for work in B. As they search for employment in B, wages in B decline, causing P_B to fall and Q_B to rise until there are no unemployed workers at the current wage. Since none of these occurrences change the equilibrium number of employed workers (economy-wide) or the relationship between the number of workers and the quantity of output produced economy-wide, this equilibrating process must continue until P_B has decreased (and Q_B has increased) sufficiently for the overall price level (P) and real output (Q) to return to their original levels.

[12]"Needed: A New Perspective on Inflation," *The Morgan Guaranty Survey* (November 1980), p. 2.

[13]*Ibid.*

tion. In fact, the actual cause of inflation has been the accommodation on the part of the monetary authority, not the monopolist, labor union, or an inherent price rigidity built into the economy.

It is difficult to support the cost-push hypothesis. Gordon, in a study of inflation in the United States, Canada, France, West Germany, Italy, Japan, Sweden and the United Kingdom for the period 1958-76, could find no support for the wage-push hypothesis: "The wage-push hypothesis appears to be alive and well as an explanation of wage rates, but not as a theory of inflation or of monetary growth."[14] In an analysis of post-World War II inflation in the United States, Barth and Bennett concluded that "there is evidence of unidirectional causality that runs from consumer prices to wages."[15] In other words, higher wages do *not* lead to higher prices as the cost-push hypothesis predicts; instead, higher prices lead to higher wages.

The Cost-Push Illusion

If cost-push inflation is really a myth, why do consumers hear businessmen rationalize their price increases with: "I have to raise my price because my costs have risen." Are businessmen simply trying to pass the buck? No, most businessmen (especially those operating relatively small businesses) believe that higher costs of production are the motivation for their raising prices. They seldom identify the real cause — increased aggregate demand resulting from increased money growth. The translation of increased aggregate demand into higher prices is frequently concealed in the marketplace by the existence of inventories. As a result, a "cost-push illusion" is created.[16]

No merchant sells his product at a constant rate; sales in some time periods are larger than normal, while sales in other time periods are smaller. In order to hedge against running out of their product during periods of larger than normal sales, merchants

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[14]Robert J. Gordon, "World Inflation and Monetary Accommodation in Eight Countries," *Brookings Papers on Economic Activity* (2: 1977), p. 433. Since changes in wages are the predominant causes of changes in costs of production, testing the wage-push hypothesis is tantamount to testing the cost-push hypothesis.

[15]James R. Barth and James T. Bennett, "Cost-push versus Demand-pull Inflation: Some Empirical Evidence," *Journal of Money, Credit and Banking* (August 1975), p. 397.

[16]This phrase was coined by Armen A. Alchian and William R. Allen in *University Economics*, 3rd. ed. (Wadsworth Publishing Company, Inc., 1972), p. 95. This discussion follows theirs.

typically hold inventories (or buffer stocks). If aggregate demand increases, merchants cannot immediately distinguish this phenomenon from a period in which sales are temporarily above normal; that is, they do not realize immediately that they could raise their price and still make the normal amount of sales. Consequently, they will not raise their price immediately, but instead, will draw down their inventories held for such an occasion as this. If these higher than normal sales persist, merchants will increase their purchase rate from suppliers in order to maintain their inventories at the desired level. The firms that supply these merchants thus will experience higher than normal rates of sales, and their inventories will be depleted more rapidly than desired, motivating them to increase the rates at which they purchase from their suppliers.

This process continues filtering down the network of markets until it finally reaches the market of raw materials (the primary inputs used to produce this commodity). In the raw materials markets, the amount available is insufficient to meet the increased amount demanded at the *old* price.[17] Since aggregate demand has increased (not just the demand of one or a few manufacturers), all manufacturers want additional raw materials. As a result, all offer higher prices to suppliers until the price of raw materials is bid up enough to clear the market. Because the higher price for raw materials increases their cost of production, manufacturers will charge wholesalers a higher price for their product, citing increased raw material costs as the reason. Wholesalers will say that the increased manufacturers' price makes it necessary to charge retailers a higher price. And finally, the retailer (merchant), being completely truthful, will tell the consumer that he must charge a higher price because his costs have risen.

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[17]That is, existing inventories of raw materials are insufficient to meet the increased demand.

Though it appears that increased raw material costs have caused a higher final product price, the actual cause of the higher prices at every level of the manufacturing and distribution network is the initial increase in aggregate demand for the final product. The price increase is delayed until the impact of the increased demand reaches the raw materials market by the existence of inventories at each level that are sufficient to buffer transitory, but not permanent, changes in demand at each level.

SUMMARY AND CONCLUSION

The focus of this paper has been to separate the cost-push myth from the reality of inflation. The cost-push argument views inflation as the result of continually rising costs of production — costs that rise unilaterally, independent of market forces. Such an hypothesis (1) confuses changes in relative prices with inflation, a continuously rising overall level of prices, and (2) neglects the role that the money supply plays in the determination of the overall price level. The idea that greedy businesses and/or labor unions can cause a continual rise in prices cannot be supported by either the conceptual development or the empirical evidence provided. Alternatively, the hypothesis that inflation is caused by excessive money growth is well supported. In the major industrial countries, those with the highest rates of inflation have the highest rates of money growth, and vice versa. Consequently, inflation cannot be eliminated by attacking those sectors of the economy that have experienced the most rapid increase in prices, by imposing wage and price controls, or even by employing some type of tax-based incomes policy. Inflation will be eliminated only when the long-term rate of money growth is approximately the same as the long-term rate of real output growth.

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