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Pensions, Economics and
Public Policy

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1986

Published for the
Pension Research Council
Wharton School
University of Pennsylvania
by

Dow Jones-Irwin

Homewood, Illinois 60430

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ISBN 0-87094-760-5

Library of Congress Catalog Card No. 85-73289

Printed in the United States of America

1 2 3 4 5 6 7 8 9 0 K 3 2 1 0 9 8 7 6

Pension Assets in the Year 2000

In this chapter, the findings for the defined contribution plan asset share presented in Chapter 6 are combined with the asset projections made for defined benefit plans in Chapter 5. Together, these findings provide the basis for total private plan asset projections for the year 2000. In addition, public plan assets will be briefly considered, so that a private-plus-public asset projection can also be made.

PUTTING THE PIECES TOGETHER: PROJECTING TOTAL ASSETS TO THE YEAR 2000

Private Pension Plan Assets

The DC-plan asset share findings in Chapter 6 can be used directly to calculate absolute asset holdings in defined contribution plans. First, the absolute asset estimates for defined benefit plans are taken from Table 5-2 and reproduced in column 2 of Table 7-1. The DC-plan asset base relative to DB-plan assets is taken from column 2 of Table 6-9 and reproduced in column 3 of Table 7-1. Multiplying the share numbers in column 3 times the DB-plan asset numbers in column 2 yields absolute DC-plan asset estimates; these are shown in column 4. In 1981, DC-plan assets amount to \$221 billion, this in comparison to \$574 billion in DB-plan assets. Asset projections for future years are also presented.

In the year 2000 defined benefit plan assets have been projected to be \$1.4 trillion (1984 dollars). Assets in defined contribution plans are estimated to be 53.6 percent of this amount, or \$779 billion (1984

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TABLE 7-1 Assets in Private Pension Plans, 1950-2000

(1)	(2)	(3)	(4)	(5)
Year	Assets in Defined Benefit Plans* (\$ Billion, 1984)	DC Assets + DB Assets* (Percent × 100)	Assets in Defined Contribution Plans [Column 2 × Column 3]/100 (\$ Billion, 1984)	Total Private Pension Assets [Column 2 + Column 4] (\$ Billion, 1984)
1950	\$ 45	13.2	\$ 6	\$ 51
1955	92	17.3	16	108
1960	153	21.9	33	186
1965	270	26.3	71	341
1970	323	30.6	99	422
1975	360	34.7	125	485
1981	574	38.6	221	795
1990	902*	47.0*	424*	1,326*
2000	1,453*	53.6*	779*	2,232*

*Denotes projected target value.

*Numbers in this column through 1981 are taken from column 7 in Table 5-2; numbers for 1990 and 2000 are taken from column 6 of the same table.

*Numbers in this column are taken from column 2 in Table 6-9.

dollars). Combining these estimates, total private plan assets in the year 2000 are projected to amount to \$2.23 trillion (1984 dollars).

Public Plan Assets

To properly project state and local public plan assets, it is necessary to separately study underlying growth characteristics of public plans, much in the same way that private plan characteristics were studied. Participation trends, maturity factors, secondary plan coverage, and funding policies are all issues that warrant separate study in the public sector. But such an exercise would take us far beyond the scope of this study. Hence, a shortcut of sorts is used to provide a reasonable idea of the role that public plans are expected to play in the pension asset base in the near future.

In particular, using Federal Reserve Board Flow of Funds data, it is easy to determine public plans' share of total pension assets over time. These numbers are shown through 1981 in column 3 of Table 7-2. What is remarkable is that over a 30-year period, public plans' asset share of pension assets has been quite steady: they held a 22.5 percent share in 1950 and 25.1 percent in 1981. In between these years, the share fell to as low as 20.4 in 1960 to a high of 26.4 in 1975. Even this variation could be attributable to different portfolio characteristics in the face of fluctuating securities values.

Given these numbers, it appears reasonable as a first order magnitude to assume that public plan share will remain in the 22.5 percent

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TABLE 7-2 Public and Private Plan Assets, 1950-2000

(1)	(2)	(3)	(4)	(5)
Year	Private Plan Assets* (\$ Billion, 1984)	Public Plan Share of Total Pension Assets* (Percent \times 100)	Public Plan Assets (\$ Billion, 1984) [Col. 3 \times Col. 5]/100	Public Plus Private Plan Assets* (\$ Billion, 1984)
1950	\$ 51	22.5	\$ 15	\$ 66
1955	108	21.6	30	137
1960	186	20.8	38	185
1965	341	20.4	86	427
1970	422	23.0	126	548
1975	485	26.4	173	658
1981	795	25.1	267	1,062
1990	1,326*	22.5*	384*	1,710*
2000	2,232*	22.5*	647*	2,879*

*Denotes projected value.

*Figures in this column are taken from column 5 of Table 7-1.

²Let s denote the share of total (nonfederal) pension assets; then $sT + P = T$, where T denotes total pension assets and P denotes private pension assets. Values of P are reported in column 2; values of s are reported in column 3. Substituting these values into the expression yields T . The value of sT is capsuled in column 4; the value of T is reported in column 5.

SOURCE: through 1981: Federal Reserve System, *Flow of Funds, Accounts, Assets and Liabilities Outstanding, 1961-84*, Washington, D. C., 1985. Projections to 1990 and 2000 are derived from projections of P .

range until the year 2000. Making this assumption and using these shares together with the private plan numbers shown in column 2 of the table (taken directly from column 5, Table 7-1), public plan asset estimates are derived; these numbers are shown in column 4. In 1981, public plans held approximately \$267 billion in pension plan assets, in comparison to an estimated \$795 billion held by private plans.

Total Pension Assets

To arrive at total pension assets, we can simply add private pension assets in column 2 of Table 7-2 to public plan assets in column 4 in the same table. The grand totals are presented in column 5. The projections show that in the year 2000, pension plans in the United States (excluding plans in the federal government) will hold approximately \$2.9 trillion (in 1984 dollars).

These numbers rather abruptly summarize the work done in Chapters 4-7. The foundations that lay behind the calculations and the projections of all of the component parts of the pension universe come together in the form of a single number. The data neatly summarize one of the truly impressive post-World War II growth industries: pension plan trusts. The numbers in the table reflect real (1984) dollars; hence the growth exhibited is real. In 1950, \$66 billion in assets were

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TABLE 7-3 Pension Assets in Relation to Employment and Wages, 1950-2000

(1) Year	(2) <i>Pension Assets Per Worker*</i>		(5) <i>Pension Assets as a Fraction of Total Wages^a</i>	
	1984 Dollars	Indexed to 1981	Ratio	Indexed to 1981
1950	\$ 1,523	.14	.13	.18
1955	2,831	.26	.22	.29
1960	4,327	.40	.31	.41
1965	6,383	.56	.41	.54
1970	6,981	.64	.44	.58
1975	8,651	.79	.55	.74
1981	10,907	1.00	.75	1.00
1990	14,699*	1.35*	.87*	1.16*
2000	21,429*	1.96*	1.14*	1.51*

*Denotes projected value.

^aPension assets are taken from Table 7-2, column 5. The work force is comprised of the nonagricultural private and public work force; it is assumed to grow at a 1.7 percent rate after 1981 (see chapter 5, note 18).

^aThe real wage rate is the nonagricultural private sector weekly wage times 52 adjusted to 1984 dollars; it is assumed to grow at the rate of 1.1 percent after 1981 (see chapter 5, note 18).

held by public and private pension plans; only 20 years later real pension assets were 8.3 times this amount; by 1981, 16.1 times. By the year 2000, pensions will hold over 43 times the \$66 billion of holdings in 1950.

IMPLICATIONS OF PENSION GROWTH

If pensions were interesting only because they are big, or because they got big fast, there would be few if any reasons to study pensions, except perhaps to document the power of tax policy to influence the shape of economic institutions. But pensions may indeed have many more implications than this: they have become dominant forces in labor and capital markets. It is unlikely that their presence has exerted little or no impact on national productivity and growth, on the work patterns and financial well-being of workers, or on the way in which capital is allocated in America. These subjects will be addressed in the ensuing two chapters. But first, it is useful to describe the importance of pensions in terms of workers and corporations.

Pensions and Workers

Some additional pension calculations are presented in Table 7-3. These numbers express pension assets per worker (including all covered and uncovered workers in the private and public sectors) and as a fraction

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of annual national wages. These data show that in the year 2000, pension assets per worker will be 14 times greater than they were in the year 1950 (see columns 2 and 3). Most of this growth has already taken place, increasing by a factor of seven over the 30-year period 1950-1981. But it will double again by the year 2000.

As a percentage of national wages, pension assets will grow by a factor of eight over the period 1950-2000 (see columns 4 and 5). They grew by a factor of 5.5 from 1950 until 1981, but they will increase by an additional 50 percent by the year 2000. Put another way, over the 50-year period, real pension assets will have grown at a rate approximately two-and-one-half times the rate of expansion of the economy as a whole, measured by employment income (7.5 percent per year versus 3.0 percent).

Regardless of the measure used, it is apparent that the spread of pensions throughout the work force and the economy has been dramatic after World War II and will continue to be impressive until at least the turn of the century. Because of its growth, its absolute size, and its widespread impact on a broad segment of the work force, pensions have attracted much attention by labor economists.

Over a period of 30 years, labor markets have moved from a situation where a small portion of the work force retired with a pension to one where two thirds of workers will receive a pension, including virtually all middle- and upper-bracket wage earners. Moreover, these pensions have become more generous and are being supplemented more often by secondary plans (see Chapters 5 and 6). The improvements in coverage and benefit amounts are succinctly summarized in column 4 of Table 7-3. In 1981, pension assets were 75 percent of wages paid in the United States in that year; in 1950, they were 13 percent of wages; by the year 2000, pension assets will be 114 percent of wages. All of this means that to the extent that pensions affect labor mobility, retirement, labor productivity, and retirement incomes, dramatic underlying economic effects may be occurring in labor markets as a result of pension growth.

Pensions and Corporate Ownership

The impact of pensions on corporate ownership is every bit as impressive and important as their impact on workers. The numbers in columns 2 and 3 in Table 7-4 tell the tale. In 1950, pensions held less than 1 percent of all corporate equity; in 1984 they held 22.8 percent. In 1950, pensions held 13.1 percent of all corporate bonds; in 1984, they held 49.9 percent. The growth in these ownership characteristics reflects two trends. The first relates directly to the relative growth of pensions, summarized in column 4 of the table in terms of financial

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TABLE 7-4 Pension Ownership of Corporate Equity and Bonds, 1950-2000

(1)	(2) <i>Share of Corporate Securities</i>		(4)	(5)
Year	<i>Equities</i>	<i>Bonds</i>	<i>Pension Assets + Financial Assets^b</i>	<i>Corporate Equity/Bond Ratio in Pension Plans (Index^a)</i>
1950	.9%	13.1%	3.0%	.07
1955	2.2	24.5	4.4	.09
1960	4.1	33.1	6.3	.12
1965	6.3	41.0	7.5	.14
1970	9.6	38.7	8.9	.24
1975	17.8	41.5	12.2	.42
1980	19.3	49.2	14.9	.39
1981	19.4	50.7	15.3	.38
1984	22.8	49.9	16.7	.46
1990	30.1*	48.4*	18.1*	.63*
2000	47.1*	44.1*	21.7*	1.08*

*Denotes projected value.

^aNumbers in this column are divided by the corporate equity/bond ratio for the economy as a whole. That is, the ratio equals column 2 divided by column 3.

^bProjections past 1984 assume that financial assets will grow at the same rate as GNP (see note 4 in text); pension asset growth is taken from Table 7-2.

SOURCE: Federal Reserve Board, *Flow of Funds Accounts, Year-end Assets and Liabilities Outstanding (1949-78)*; also 1960-1983 edition. The data include insured and noninsured trust pensions for private and public (state and local) plans. Equity and bond holdings in pooled funds are excluded from the data; thus, an adjustment was made to incorporate pooled fund holdings using data from the Federal Financial Examination Council, *Trust Assets by Banks and Trust Companies*, Washington, D. C., 1982.

assets in the economy. Pension assets have been growing rapidly compared to the economy as a whole: in 1950, pensions held 3 percent of all financial assets; in 1984, they held 16.7 percent.

The second relates to pensions' inclinations to hold corporate equity in their portfolio. The data in the last column of the table show that in comparison to equity/bond corporate financing overall, pension plans have steadily favored more equity to debt in their portfolios: this is why the pension equity ownership share has increased so rapidly compared to the pension bond ownership share.

These trends can be extrapolated to future years to gauge their implications for potential pension securities ownership. Recognizing all the usual caveats about such projections, it appears that the full ownership impact of pension growth is far from over.

Equity projection. The equity ownership share can be defined as follows:

$$E^p/E = (PA/E) (E^p/PA). \quad (7-1)$$

This expression says that the value of equity securities held by pension plans E^p as a percentage of all outstanding corporate equity E is a

The copyright for "Pensions, Economics & Public Policy" by R. Ippolito is held by The McGraw-Hill Companies, Inc. product of two ratios: the importance of pension assets to outstanding equity in the United States (PA/E) times the share of pension portfolios held in the form of equities (E^p/PA). The first ratio PA/E is a measure of pension size in relation to the economy; the second is a behavioral ratio defining pension plans' preference to hold equity. Three trends combine to suggest that pension ownership of equity shares will dramatically increase over the next 15 to 20 years. Once again, because 1981 was a year representative of long term funding ratios, it will be used as the base year for projections.

First, as shown above, pension assets are accumulating at a rate much faster than the economy itself. Second, because of a growing preference to finance corporations by debt,¹ equity shares are expanding at a rate much slower than the economy as a whole; in fact, for each 1 percent expansion of real GNP, equity shares have been expanding only .5 percent.² Third, as shown in Table 7-4, the share of pension portfolios held in the form of equity has been increasing constantly; in fact, it has been increasing at a rate in the vicinity of one-half percentage point per year.³ The last result suggests that the term (E^p/PA) in equation (7-1) will grow by a factor of 1.24 by the year 2000 (see note 3); since its value in 1981 was 32.7 percent (see note 3), this means that if the pension preference for more equity persists, pensions will hold 40.5 percent of their assets in equity in the year 2000.

The first term in equation (7-1), PA/E , will also grow rapidly. Pension assets PA have already been projected (see Table 7-2). Assuming

¹This trend may in part be attributable to the deductibility of interest payments at the corporate level and the nondeductibility of dividends.

²That is, consider the results of the following regression run for the period 1950-1983 using Federal Reserve Board data:

$$\ln(\text{Equity}) = -2.69 + .48 \ln(\text{Real GNP}) + .95 \ln(\text{NYSE}), R^2 = .94,$$

(13.2) (8.7) (16.2)

where numbers in parenthesis are t-statistics, Equity is the market value of corporate equity outstanding, Real GNP is gross national product deflated by the GNP deflator, and NYSE is the value of the New York Stock Exchange composite index deflated by the GNP deflator. The results show that corporate equity has been expanding less rapidly than GNP itself.

³Using data from the Federal Reserve Board, the following regression was run for the period 1950-1983:

$$\ln(\text{StockPort}) = -4.35 + .496 \ln(\text{NYSE}) + .069 (E/GNP) + .45 \ln(\text{time}), R^2 = .91,$$

(6.4) (2.5) (.42) (11.7)

where StockPort is the portion of pension assets held in the form of equity shares, E/GNP is the ratio of outstanding corporate equity to GNP, and time is a time counter. Clearly, pensions have been showing a strong preference over time in the direction of holding more equity. In percentage terms, differentiating the estimated relation with respect to time, it turns out that the stock share in the pension portfolio has been growing by approximately 1.4 percent per year (.005 percentage points). The equity share in pension portfolios in 1981 was 32.7 percent. Using the above equation, this share is projected to be 1.24 times this amount by the year 2000.

The copyright for "Pensions, Economics & Public Policy" by R. Ippolito is held by The McGraw-Hill Companies, Inc. that GNP continues to grow at the 3.4 percent rate that has characterized its movement over the past 33 years,⁴ and if corporate equity shares expand in the same relation to GNP that has characterized the last 33 years experience—that is, at a rate about half as fast as the GNP⁵—then by the year 2000, equity issues will grow by a factor of 1.38 [= exp (.034 × 1/2 × 19 years)] compared to 1981. This is to be compared to a growth factor for pensions of 2.71 over the same period (see Table 7-2). Thus, in comparison to 1981, the pension share of outstanding equity is expected to increase by a factor of 2.43 by the year 2000:

$$\begin{aligned} (E^*/E) \cdot (E^*/E) &= [(PA^*/PA) / (E^*/E)] \cdot [(E^*/PA) \cdot (E^*/PA)] \\ &= (2.71/1.38)(1.24) = 2.43, \end{aligned}$$

where variables marked by an asterisk denote projected values in the year 2000 and other variables denote 1981 values. Since the pension share of outstanding equity in 1981 was 19.4 percent, then

$$E^*/E = 19.4 \times 2.43 = 47.1\%.$$

That is, if current trends continue, pensions will own 47 percent of all outstanding corporate equity by the year 2000. This number and the intermediate 1990 projection are shown in Table 7-4.

Bond projection. In contrast to projections for stock ownership, it is likely—if current trends continue—that pension ownership of corporate bonds will actually fall over the next 15–20 years. There are two reasons for this. First, in contrast to equities, overall corporate bond issues have been expanding at a rate faster than the GNP—about 1.27 times faster.⁶ Thus, in the companion formula to equation (7-1),

$$B^*/B = (PA/B) (B^*/PA), \quad (7-2)$$

the first term, denoting the relative importance of pensions to corporate bonds outstanding, will not grow as rapidly as in the case of stocks. In particular, recalling that real GNP has expanded at the rate of 3.4 percent per year, and since corporate bond issues have expanded at a rate 1.27 times faster than GNP, the value of *B* in equation (7-2) in the year 2000

⁴That is, for the period 1950–1983, the following regression was run:

$$\ln(\text{Real GNP}) = 1.66 + .0337 \text{ time}, R^2 = .99,$$

(146.3) (59.3)

where numbers in parenthesis are t-statistics.

⁵The relationship between equity issues and GNP is shown in note 2.

⁶Using Federal Reserve Board data, the following regression was run:

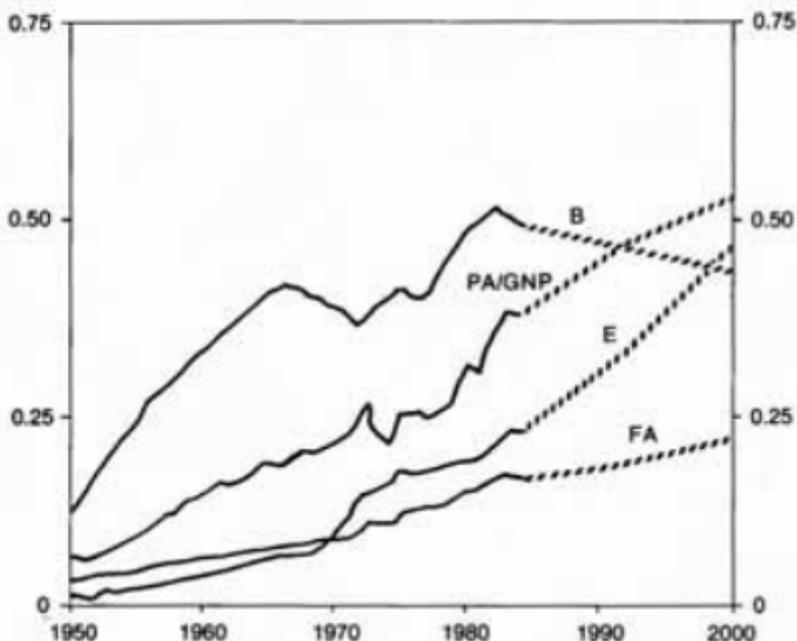
$$\ln(\text{Bonds}) = -2.34 + 1.27 \ln(\text{Real GNP}) - .092 (\text{Inflation Rate}), R^2 = .97,$$

(24.8) (31.3) (1.11)

where numbers in parenthesis are t-statistics and Bonds are the market value of outstanding corporate bonds in the United States.

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FIGURE 7-1 Pension Ownership of Corporate Securities: 1950-2000



Legend: PA/GNP-Actual pension assets as a share of GNP
 B-Pension share of corporate bonds
 E-Pension share of corporate equity
 FA-Pension share of total financial assets

benefit plans for the year 1978. The results are shown in the first two columns of Table 7-5. The results show that plans shed bonds and accumulate equity as they age and grow, results consistent with the time series results. The bond share is also influenced by the insurance status of the plan: partially or wholly insured plans hold more bonds in their portfolio. Since pension assets held by insurance plans are falling over time in a comparative sense,⁸ this result is consistent with the time series results.

⁸In 1960, 20.6 percent of pension plans' assets were held by insurance firms; in 1983, 17.8 percent were held. This data is available from the Federal Reserve Boards' *Flow of Funds* data.

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TABLE 7-5 Factors Affecting Pension Portfolio Choice

(1)	(2)	(3)	(4)	(5)
	Dependent Variable			
	Share of Pension Assets in Corporate:			
Independent Variable	Bonds	Equity	Bonds	Equity
Intercept	1.93 (2.08)	-.96 (1.04)	.32 (9.64)	.65 (19.30)
Plan age	-.002 (3.78)	.002 (3.73)	-.0005 (1.05)	.0004 (.88)
Plan size (number of vested participants, 000)	-.015 (4.13)	.015 (4.03)	-.47 (.81)	.33 (.56)
Partially insured	.068 (3.53)	-.072 (3.74)	—	—
Fully insured	.096 (2.09)	-.100 (2.20)	—	—
Defined contribution plan	—	—	-.057 (3.76)	.055 (3.57)
Other variables	*	*	*	*
R-squared	.139	.145	.059	.058
Observations	1,002	1,002	1,258	1,258

Corporate bonds and equity account for 86 percent of plan assets on average; omitted assets include government bonds, real estate, cash, and miscellaneous holdings.

*Thirty-five additional independent variables were incorporated into the regression, including industry dummy variables, occupational and demographic characteristics of industry, growth rate of industry, union and funding status of plan, and multiemployer and flat-benefit indexes. None of the coefficients on these variables was significant at the .05 level.

*Other independent variables included nine industry dummy variables and union status. Six and five of these variables in the bond and stock equations are significant at the .05 level.

SOURCE: Results reported in columns 2 and 3 are based on data from 5500 annual reports for the year 1978. Results in columns 4 and 5 are based on data from the 5500 annual reports for the year 1981.

A similar regression was run for 1,258 plans that included defined contribution plans in the sample for the year 1981 (comparable data were not available in 1978). These results are shown in the last two columns of the table. In contrast to the defined benefit results, plan age and size do not significantly affect bond or equity portfolio shares, though the regressions include far fewer explanatory variables. What is most important, however, is that defined contribution plans evince a strong tendency to hold more equity shares and fewer corporate bonds. Given the rapid escalation of defined contribution assets in the overall pension universe (see Chapter 6), the results are consistent with the time series results which show a drift toward more equity holdings, fewer bonds.

The results do not provide an understanding of why some plans tend to hold more equity, but they do help verify the trends evinced in the aggregate data. Clearly, much remains to be done to understand

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CONCLUSION

By any measure, conventional¹⁰ pension assets in the United States have been accumulating at a very rapid rate since World War II, and there is every indication, barring major changes in the tax code, that substantial growth will continue through the turn of the century. In 1984, real private and public plan assets were \$1.3 trillion, approximately 16 times their 1950 value, and they will reach \$2.9 trillion (1984 dollars) by the year 2000. On a per-worker basis (including covered and uncovered workers in the nonagricultural work force), real pension assets have grown from approximately \$1,500 in 1950 to \$11,000 in 1981, and they will reach almost \$21,000 (1984 dollars) by the year 2000. Over the 50-year period 1950–2000, pension assets will have grown two-and-one-half times faster than the gross national product. By the year 2000, unless patterns of securities issues or pension portfolio preferences change, pension plans will own almost half the value of all corporate bonds and equity.

The measurement and projection of pension growth is comparatively straightforward to calculate; the sources of this growth are also easy to identify. What is much more difficult, and what we know much less about, are the economic consequences of this growth. In 1950, pensions as institutions were barely perceptible; by the year 2000, they will be dominant factors in workers' compensation schemes, and majority owners of corporate America.

Drastic changes in tax structure led to an amazing proliferation of pensions in the economy. But what are the ultimate economic effects of this change? Do pensions merely represent different ways of paying workers with no essential effects on labor markets? Are pension investors perfect substitutes for nonpension investors? Would the same level of national savings exist without pensions? These are questions that will be addressed—but surely not answered—in the ensuing two chapters. Following these and other discussions, and after recognizing the shortcomings posed by our ignorance, an attempt will be made later in the study to outline policy recommendations that would lead to a more efficient private pension system. It is hoped that various areas of fruitful research will also become apparent.

¹⁰The data do not include assets accumulated in IRAs, Keoghs, or 401(k)s.