

Analysis of U.S. Pension Plans and Participants' Behavior

MiKyeong Bae*, Seung Sin Lee**

Associate Professor, Dept. of Consumer Information Science, KeiMyung University, Korea *

Professor, Dept. of Consumer Science & Housing, Konkuk University, Korea **

Abstract : This paper first introduces the U. S. pension system and its current trends. Then the following two sections discuss the research on worker behavior of defined contribution plans, a popular pension plan available for American workers in recent years, and the adequacy of retirement income among American people. The last section is a summary.

This paper reviews the trend of the U. S. pension system, research on worker's behavior of defined contribution retirement plans, and studies on retirement income adequacy. These themes may have common or different features in other countries, such as Korea. This paper provides helpful information for private and public policy makers and researchers of these topics in Korea to advance their understanding of pension and retirement behavior and facilitate effective policy making of pensions and retirement.

Key Words : retirement pension, retirement behavior, U.S. pension system, retirement pension plan

I. Introduction

This paper first introduces the U. S. pension system and its current trends. Then the following sections discuss the research on workers' behavior of defined contribution plans, a popular pension plan available for American workers in recent years, and the adequacy of retirement income among American people. The last section is a summary.

We discuss and illustrate the important aspects of U.S. pension system and retirement behavior. The paper's coverage is broad. It examines the trend of U.S. pension system, worker behavior of defined contribution plans with special

reference to 401(k) participation and contribution as well as asset allocation in defined contribution plans, and the adequacy of retirement income. The reviews of this paper provides very useful information for policy makers and researchers in understanding the structure of U.S. pension system and retirement behavior.

II. Overview of U.S. Pension System and Trends(1978-1998)

Pensions are part of fringe benefits offered to workers by American companies. In the early

Corresponding Author: Seung Sin Lee, Department of Consumer Science & Housing, Konkuk University, Hyawang-dong, Kwangin-gu, Seoul, Korea, Tel: 82-2-450-3778 Fax: 82-2-444-1058 E-mail: Lchung@konkuk.ac.kr

1930s, compensation of the nation's workers was made up almost entirely of wages or salaries for time worked or pay for units of output. Benefits as we know them today were virtually non-existent except for workers' compensation programs in several states. The Second World War brought inflationary pressures and restrained demand for very limited supplies of domestic goods. To deal with these pressures, the War Labor Board

controlled increases in cash wages, while employers were encouraged to offer forms of compensation that were considered "non-inflationary." Thus, compensation practices began to shift from direct pay to "fringe" benefits such as paid holidays and vacations, insurance, and pensions (Stelluto & Kiein, 1990).

There are two types of retirement benefits offered by employers in the U.S., the defined

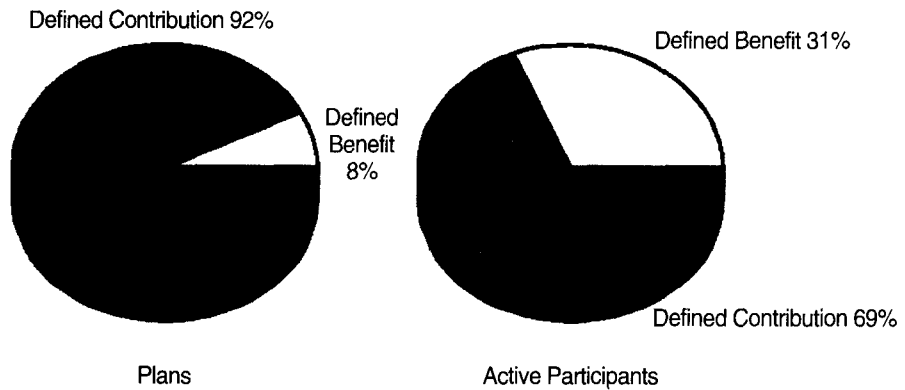
<Table 1> Number of Pension Plans by type of plan, 1979-1998

Year	Total Plans			Single Employer Plans 1/			Multiemployer Plans 2/		
	Total	Defined Benefit	Defined Contribution	Total	Defined Benefit	Defined Contribution	Total	Defined Benefit	Defined Contribution
1979	470,921	139,489	331,432	468,265	137,243	331,022	2,656	2,246	410
1980	488,901	148,096	340,805	486,142	145,764	340,378	2,759	2,332	427
1981	545,611	167,293	378,318	542,789	165,042	377,747	2,822	2,252	570
1982	594,456	174,998	419,458	591,417	172,662	418,755	3,039	2,336	703
1983	602,848	175,143	427,705	599,822	172,843	426,979	3,026	2,300	726
1984	604,434	168,015	436,419	601,413	165,732	435,681	3,021	2,283	738
1985	632,135	170,172	461,963	629,069	167,911	461,158	3,066	2,261	805
1986	717,627	172,642	544,985	714,563	170,431	544,132	3,063	2,210	853
1987	733,029	163,065	569,964	729,909	160,904	569,005	3,112	2,157	955
1988	729,922	145,952	583,971	726,648	143,833	582,815	3,275	2,119	1,156
1989	731,356	132,467	598,889	728,276	130,472	597,804	3,080	1,995	1,085
1990	712,308	113,062	599,245	709,404	111,251	598,153	2,904	1,812	1,092
1991	699,294	101,752	597,542	696,300	99,931	596,369	2,994	1,821	1,173
1992	708,335	88,621	619,714	705,226	86,797	618,429	3,109	1,824	1,285
1993	702,097	83,596	618,501	698,918	81,737	617,180	3,179	1,859	1,320
1994	690,344	74,422	615,922	687,158	72,555	614,603	3,186	1,867	1,319
1995	693,404	69,492	623,912	690,265	67,682	622,584	3,139	1,810	1,328
1996	696,224	63,657	632,566	692,957	61,790	631,167	3,267	1,867	1,399
1997	720,041	59,499	660,542	716,912	57,720	659,192	3,130	1,779	1,351
1998	730,031	56,405	673,626	726,997	54,699	672,297	3,035	1,706	1,329

1/ Includes single employer plans, plans of controlled groups of corporations, and multiple-employer noncollectively bargained plans.

2/ Includes multiemployer plans and multiple-employer collectively bargained plans.

SOURCE: Form 5500 series reports reports filed with the internal Revenue Service for 1979-1998 plan years.



<Figure 1> Distribution of Pension Plans and Participants by type of plan, 1998

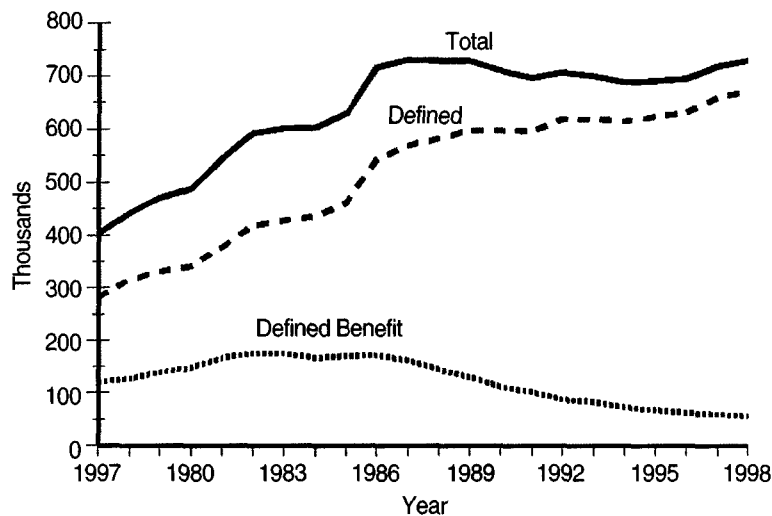
Source: Form 5500 series reports filed with the Internal Revenue Service for plan years beginning in 1998.

benefits (DB) plans and defined contribution (DC) plans<Table 1>. In defined benefit plans, the benefit at retirement is specified through a formula. Worker's wage level and tenure are usually factored into the formula to determine the level of retirement benefits when one retires. In this type of plan the employer bears the investment risk over the years to fund the benefit. In defined contribution plans, the employee is allowed to contribute certain percentage to her/his retirement account and the employer usually matches the employee's contribution. In the defined contribution plans, employees take financial risks in their retirement savings plans and the amount of future value of their plans is unknown.

Based on the 1993 Current Population Survey, 18.9 million workers are covered by DC plans, 10.6 million covered by DB plans, and 4.5 million covered by both DC and DB plans<Figure 1>. However, 50.8 million workers do not earn a pension (Hinz & Turner, 1998). Firm size has a significant effect on pension coverage. In 1997, half

of all full-time employees in medium and large private establishments were enrolled in defined benefit plans, while 57% were enrolled in defined contribution plans (U. S. Bureau of Labor Statistics, 1999)<Figure 2>. Workers in smaller companies are less likely to receive retirement benefits. Fifteen percent of all full-time workers in small private establishments were enrolled in defined benefit plans in 1996, while 38 percent of all full -time workers were enrolled in defined contribution plans (U.S. Bureau of Labor Statistics, 1998).

After the passage of the Employee Retirement Income Security Act (ERISA) in 1974, the number of DB plans with fewer than 100 participants grew until the early 1980s, then leveled off for a few years, and declined steadily after 1987. The number of DB plans sponsored by larger employers, on the other hand, remained relatively constant over this same period. The DC plans in larger firms grew significantly over the period, from slightly under 9,000 plans in 1975 to over 39,000 plans almost twenty years later. The growth



<Figure 2> Number of Pension Plans, 1977-1998

Source: Form 5500 series reports filed with the Internal Revenue Service for 1977-1998 plan years.

of DC plans in smaller employers is more dramatic by adding 400,000 new plans over the period. The number of participants of DC and DB plans showed the same pattern (U. S. Department of Labor, 1996). The reasons for the recent popularity of defined contribution plans are several (Mitchell & Schieber, 1998). One is the flexibility of this type of plan. Employees can choose to participate or not and have some control of their retirement savings, compared to retirement savings in defined benefit plans. Another attractive aspect of DC plans to workers is employer matching. Many DC plans will provide employer matches if employees start to contribute to the plans. The third reason is the relative low costs of DC plans, compared to DB plans, which is an advantage for employers.

Mitchell and Schieber (1998) raised several concerns about the popularity of DC plans. Two concerns are relevant to employers, the possible liability of employer in case the DC funds lose

money in the financial markets and the burden of managing the DC plans. The other three concerns are about worker's behavior. If workers have more control of their retirement savings, are they well informed to make wise investment decisions, are they going to overreact on the short-term market falls, are they going to contribute less in private savings because of their contributions to DC plans? The following section will review studies that examine worker behavior of DC plans.

III. Workers Participation for Defined Pension Plans

Many of the defined contribution plans in the U. S. are 401(k) type plans. 401(k) is a section of the U. S. tax code. The section allows workers in private companies to contribute a certain amount of their salaries and wages to defined contribution

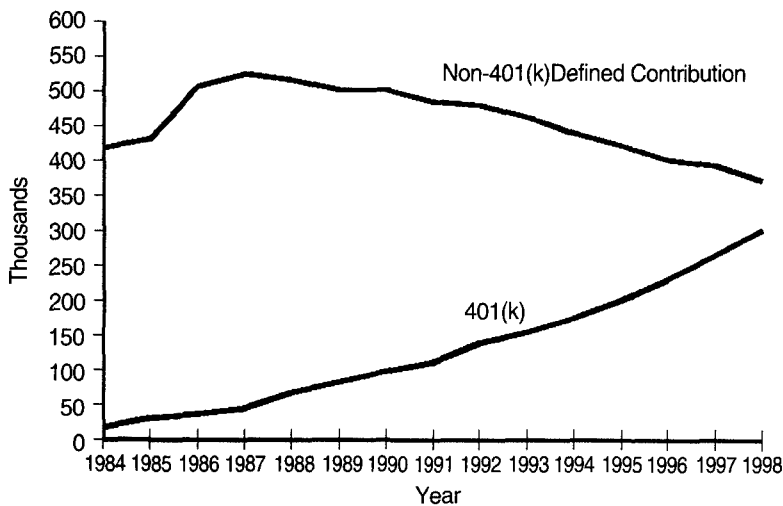
retirement plans annually and the contributions are tax deferred until workers withdraw funds from these plans at retirement. The contributions are automatically deducted from the payroll by employers. The plans are usually sponsored and administrated by employers and many employers provide matching dollars for worker's contributions<Figure 3>. Workers in government or nonprofit organizations have retirement plans with similar tax deferring advantages, which are specified in other sections of the tax code. For convenience, all of these defined contribution retirement plans are called 401(k) plans in this paper.

Obviously, there are several advantages for workers to participate in and contribute to 401(k) plans, such as employer matching, tax-deferring, and convenience. However, a significant number of workers who are eligible to participate but choose not to. For example, 4.1% of the worker

population are eligible to a pension plan but do not participate. Among workers with shorter tenure (4 years or shorter), 73% of them are eligible but do not participate in a pension plan (Hinz & Turner, 1998). In addition, there is a concern about workers' ability to wisely manage their own retirement plans. Empirical studies examined the worker behavior in relation to the participation in, contribution to, and allocate funds to 401(k) plans, which are summarized as follows<Table 2>.

1. 401(k) Participation and Contribution<Table 3>

Researchers usually examine the 401(k) participation and contribution behavior together. Using data from the May 1988 Current Population Survey Benefits Supplement, Andrews (1992) examined the factors associated with the coverage,



<Figure 3> Number of Defined Contribution Plans, 1984-1998

Source: Form 5500 series reports filed with the Internal Revenue Service for 1984-1998 plan years.

<Table 2> Distribution of Participants by amount of assets, 1998(numbers in thousands)

Amount of Assets	Total Plans			Single Employer Plans 1/			Multiemployer Plans 2/		
	Total	Defined Benefit	Defined Contribution	Total	Defined Benefit	Defined Contribution	Total	Defined Benefit	Defined Contribution
Total	99,455	41,552	57,903	87,930	32,634	55,296	11,525	8,918	2,607
None or not reported	1,585	474	1,111	1,581	471	1,110	4	3	1
\$1-24K	290	8	282	290	8	282	0	0	0
25-49K	353	6	347	352	6	346	1	0	1
50-99K	702	23	679	395	22	673	7	1	6
100-249K	1,847	667	1,779	1,840	66	1,773	7	1	6
250-499K	2,269	116	2,154	2,245	112	2,132	25	3	21
500-999K	3,252	241	3,011	3,216	233	2,983	36	8	28
1-2.4M	5,236	560	4,675	5,143	547	4,596	93	14	79
2.5-4.9M	4,463	728	3,735	4,322	699	3,623	141	29	112
5-9.9M	5,029	1,168	3,860	4,714	1,085	3,629	315	83	232
10-24.9M	7,457	2,407	5,050	6,909	2,162	4,748	548	246	302
25-49.9M	6,179	2,387	3,793	5,425	2,013	3,413	754	374	380
50-74.9M	4,175	1,732	244	3,656	1,449	2,208	519	283	236
75-99.9M	2,804	1,283	1,521	2,457	1,017	1,440	347	266	81
100-149.9M	4,424	1,951	2,473	3,901	1,625	2,276	523	326	197
150-199.9M	3,339	1,433	1,906	2,721	1,054	1,667	618	379	239
200-249.9M	2,679	1,323	1,356	2,146	1,009	1,137	533	314	219
250-499.9M	7,738	4,188	3,550	6,446	3,072	3,374	1,292	1,116	176
500-999.9M	8,330	4,341	3,989	7,286	3,536	3,749	1,044	804	240
1-2.49B	10,878	6,337	4,541	8,935	4,444	4,491	1,943	1,893	50
2.5B or more	16,425	10,779	5,646	13,651	8,005	5,646	2,773	2,773	-

1/ Includes single employer plans, plans of controlled groups of corporations, and multiple-employer noncollectively bargained plans.

2/ Includes multiemployer plans and multiple-employer collectively bargained plans.

NOTES: Excludes plans covering only one participant. The letters K, M, and B denote thousands, millions, and billions, respectively.

SOURCE: Form 5500 series reports filed with the internal Revenue Service for plan years beginning in 1998.

participation, and percentage contribution to 401(k) plans. Age, earnings, family income, and tenure were positively related to the probability to participate in 401(k) plans in her study. She also found that older workers, workers with IRAs, and those with higher family income contributed a higher percentage to the 401(k) plans. However,

participants in plans where employer contributions were provided tended to contribute at lower rates than those in plans without employer contributions. Andrews (1992, p.158) concluded that participants may target their desired rate of saving and trade off increases in their own contribution with that of their employers.

<Table 3> Number of Active Participants in Pension Plans by type of plan, 1979~1998

Year	Total Plans			Single Employer Plans 1/			Multiemployer Plans 2/		
	Total	Defined Benefit	Defined Contribution	Total	Defined Benefit	Defined Contribution	Total	Defined Benefit	Defined Contribution
1979	46,929	29,440	17,489	39,799	22,757	17,041	7,130	6,683	447
1980	49,026	30,133	18,893	42,079	23,705	18,374	6,947	6,428	519
1981	50,826	30,082	20,743	43,821	23,701	20,120	7,005	6,381	623
1982	53,024	29,756	23,448	46,344	23,630	22,714	6,860	6,126	734
1983	57,808	29,964	27,844	50,911	23,877	27,034	6,897	6,087	810
1984	60,775	30,172	30,603	54,044	24,315	29,729	6,732	5,857	875
1985	62,268	29,024	33,244	55,778	23,465	32,313	6,491	5,559	931
1986	63,290	28,670	34,620	56,723	23,270	33,453	6,566	5,400	1,167
1987	63,392	28,432	34,959	56,846	23,170	33,676	6,546	5,262	1,284
1988	62,142	28,081	34,062	55,464	22,867	32,596	6,678	5,213	1,465
1989	61,294	27,304	33,990	54,300	21,892	32,408	6,994	5,412	1,582
1990	61,831	26,344	35,488	55,409	21,386	34,022	6,422	4,957	1,465
1991	61,517	25,747	35,771	55,048	20,833	34,215	6,469	4,914	1,555
1992	64,231	25,362	38,868	57,940	20,771	37,170	6,290	4,592	1,699
1993	64,746	25,127	39,619	58,596	20,670	37,926	6,150	4,458	1,692
1994	64,972	24,615	40,357	58,889	20,215	38,674	6,083	4,400	1,682
1995	66,193	23,531	42,662	59,894	19,005	40,889	6,299	4,525	1,773
1996	67,888	23,262	44,625	61,417	18,681	42,736	6,470	4,581	1,889
1997	70,724	22,745	47,979	64,088	18,118	45,970	6,637	4,628	2,009
1998	73,328	22,994	50,335	66,390	18,283	48,107	6,938	4,710	2,228

1/ Includes single employer plans, plans of controlled and multiple-employer noncollectively bargained plans.

2/ Includes multiemployer plans and multiple-employer collectively bargained plans.

NOTE: The number of participants includes double counting of workers in more than one plan.

SOURCE: Form 5500 series reports reports filed with the internal Revenue Service for 1979-1998 plan years.

Kusko, Poterba and Wilcox (1994) studied a medium-size manufacturing firm. They found that workers were more likely to contribute at certain percentages of their salaries, such as 6% (the maximum company match rate), 10% (the maximum rate of worker contributions allowed), or the highest amount allowed by IRS. This implied that contribution constraints may have important impacts on workers' saving decisions.

Through conditional tabulation analyses, they found income and age were positively related to the contribution percentage. Their results also implied that contribution decisions of eligible workers are relatively insensitive to the rate of employer matching on worker contributions. Most workers maintained the same participation status and contribution rate year after year, despite substantial changes in the employer's match rate.

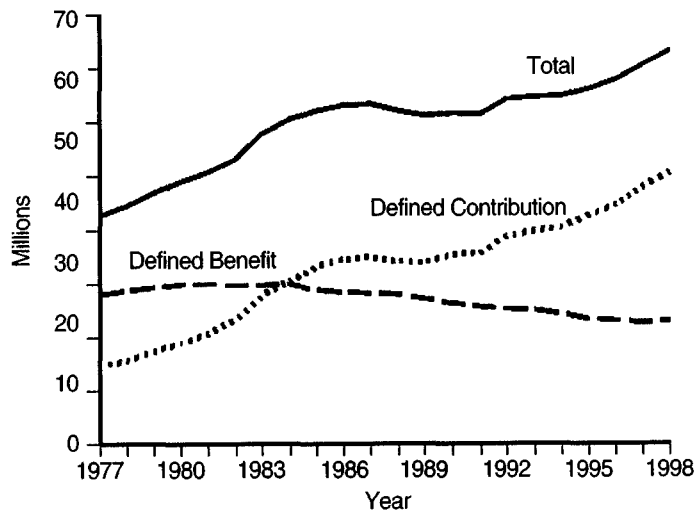
Papke's (1995) study used plan level data from Form 5500s, which are filed annually with the Internal Revenue Service. She focused on the effects of employer match on the participation in and contribution to 401(k) plans. She found that the effect of employer match on worker's participation was significant but small. In addition, substantial increases in worker contributions occurred when a plan moved from a zero to a small or moderately sized match rate. When the employer provided at least ten cents on the dollar, the marginal effect of an increased match rate was small.

Using data from the 1992 Survey of Consumer Finances and the first wave of the Health and Retirement Survey, the U. S. General Accounting Office (1996) reported that a worker's income, education, coverage by a defined benefit plan, and having a spouse with pension coverage were positively related to the 401(k) contribution rate.

These conclusions were based on cross tabulation analyses and no other variables were controlled when the contribution rate and one of the demographic variables were cross tabulated <Figure 4>.

Even and Macpherson (1997) used data from the 1988 and 1993 Pension Supplements to the Current Population Survey to investigate factors associated with 401(k) participation and contributions. After control for endogenous matching and correction for selectivity bias generated by non-response to questions on the availability of matching, the effects of matching on participation were substantially increased, but the effects of matching on contribution rate were mixed. They also found that year of work for the current employer was positively related to the contribution rate.

Yuh and DeVaney (1996) investigated



<Figure 4> Pension Plan Active Participants, 1977-1998

Source: Form 5500 series reports filed with the Internal Revenue Service for 1977-1998 plan years.

determinants of family accumulations in defined contribution pension plans (including 401(k) plans) with data from the 1992 Survey of Consumer Finances. Husband's education, race, coverage of a defined benefit plan, income, years of work, and risk taking attitude had significant effects on the amounts accumulated.

Xiao (1997, 1998) used data from the 1995 Survey of Consumer Finances (SCF) to examine factors associated with 401(k) contributions. The SCF data has unique features to study worker's pension behavior. It has a larger sample size for workers who have pension plans compared to other similar data set such as the Health and Retirement Survey. More important, it provides detailed information of pension features and non-pension assets that are limited in other data sets used by many previous studies. He found that

several plan features (employer matching and the ability to withdraw) and worker characteristics (risk tolerance, labor income, and year of work) affected the 401(k) plan contributions.

Clark and Schieber (1998) used administrative data from 19 firms of various sizes to explore factors associated with 401(k) participation and contribution. They included four moments for age and earning variables in their multivariate analyses. Their study confirmed findings of previous studies. Simulations based on the estimated parameters indicated that the age effect has an inverse-U shape on participation but an upward shape on contribution. The earning effect has an inverse-U shape on both participation and contribution. Employer match has positive effects on both participation and contribution. The unique finding of this study is that communications had

<Table 4> Number of 401(k) Type Plans, Participants, Assets, Contributions, and Benefit Payments, 1984-1998

Year	Number of Plans	Active Participants (thousands)	Assets (millions)	Contributions (millions)	Benefits (millions)
1984	17,303	7,540	\$91,754	\$16,291	\$10,617
1985	29,869	10,339	143,939	24,322	16,399
1986	37,420	11,559	182,784	29,226	22,098
1987	45,054	13,131	215,477	33,185	22,215
1988	68,121	15,203	276,995	39,412	25,235
1989	83,301	17,337	357,015	46,081	30,875
1990	97,614	19,548	384,854	48,998	32,028
1991	111,394	19,126	440,259	51,533	32,734
1992	139,704	22,404	552,959	64,345	43,166
1993	154,527	23,138	616,316	69,322	44,206
1994	174,945	25,206	674,681	75,878	50,659
1995	200,813	28,061	863,918	87,416	62,163
1996	230,808	30,843	1,061,493	103,973	78,481
1997	265,251	33,865	1,264,168	115,673	93,070
1998	300,593	37,114	1,540,975	134,659	120,693

SOURCE: Form 5500 series reports filed with the Internal Revenue Service for 1984-1998 plan years.

significant effects on both participation and contribution. The two communication variables used are employer provided generic newsletters related to participation in 401(k) plans and employer provided communication materials specifically tailored to the individual company's 401(k) plans.

2. Asset Allocation in Defined Contribution Plans

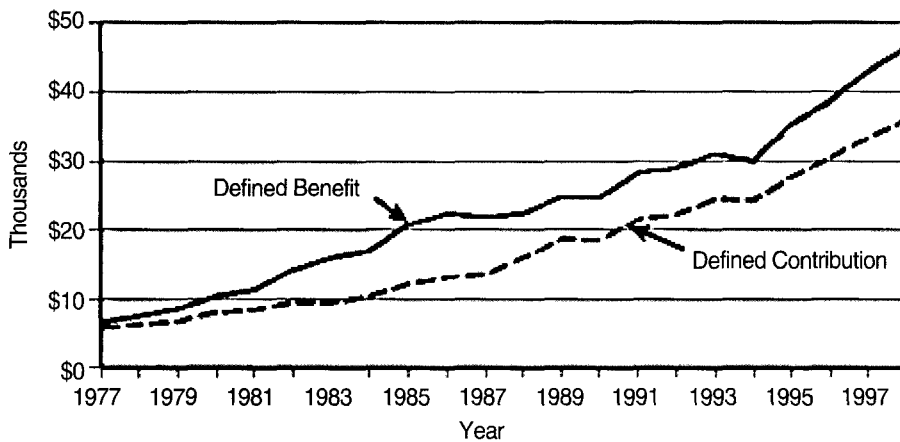
Different asset allocation decisions in defined contribution pension plans will have significant implications on retirement income in a long run <Table 5>. Estimated using data from the Health and Retirement Survey and the Current Population Survey, if all 401(k) assets were invested in equities in 1997, the projected average for 401(k) assets for a 65 years old in 2025 would exceed the average value of Social Security benefit by nearly

80%. If all the 401(k) assets were invested in bonds, the 401(k) assets would grow slower, about half of the average value of Social Security benefit during the 28-year period (Poterba, Venti, & Wise, 1998). A number of studies have focused on asset allocation behavior in defined contribution pension plans. Bajtelsmit and VanDerhei (1997) used a sample of 20,000 management employees of a large U.S. employer and explored the gender difference of asset allocation in defined contribution pension plans<Figure 5>. Three dependent variables were used in their tobit analyses: fixed-income, equity, and employer stock. They found women are more likely to invest in the fixed-income alternative and less likely to invest in the employer stock. Age showed a U-shape effect on fixed-income alternative and an inverse-U-shape effect on employer stock. The effects of tenure on the equity and fixed income are a U-shape and an inverse-U-shape, respectively.

<Table 5> Number of Pension Plans, Total Participants, Active Participants, Assets, Contributions, and Benefits by type of plan, 1998

Type of Plan	Number of Plans 1/	Total Participants (thousands) 2/	Active Participants (thousands) 3/	Total Assets (millions) 4/	Total Contributions (millions) 5/	Total Benefits (millions) 6/
TOTAL	730,031	99,455	73,328	\$4,021,849	\$201,886	\$273,115
Defined benefit	56,405	41,552	22,994	1,936,600	34,985	111,249
Defined contribution	673,626	57,903	50,335	2,085,250	166,900	161,866
Profit sharing and thrift-savings	542,869	48,488	42,402	1,764,380	147,465	137,145
Stock bonus	4,700	3,416	2,858	145,097	7,233	10,969
Target benefit	5,378	139	127	6,009	310	532
Money purchase	99,163	5,143	4,381	150,036	10,924	11,639
Annuity-403(b)(1)	15,185	91	87	677	98	53
Custodial account-403(b)(7)	1,599	6	5	99	7	6
IRAs or annuities(Code 408)	750	23	15	958	39	65
Other defined contribution	3,981	597	459	17,994	825	1,457

SOURCE: Form 5500 series reports filed with the Internal Revenue Service for plan years beginning in 1998.



<Figure 5> Assets per Participant, by type of plan, 1977-1998

Source: Form 5500 series reports filed with the Internal Revenue Service for 1977-1998 plan years.

Wealth and income also showed effects on the investment alternatives.

Goodfellow and Schieber (1997) pooled administrative records on slightly more than 36,000 participants drawn from 24 defined contribution plans. They found that younger workers are generally more aggressive in their investment behavior than older workers and higher wage workers are somewhat more aggressive in their investment behavior than lower wage workers. However, they used bivariate analyses and the pattern they reported with clear exceptions.

Hinz, McCarthy, and Turner (1997) focused on the gender difference on asset allocation decisions using data from a 1990 survey of participants in the federal government's Thrift Savings Plan (TSP). They concluded that women appear to invest their pension assets more conservatively than men.

Sundn and Surette (1998) also focused on the gender difference of asset allocation in defined

contribution pension plans using the data from the 1992 and 1995 Survey of Consumer Finances. They concluded that gender and marital status significantly affect how individuals choose to allocate assets in defined contribution plans. However, they interpret the findings with caution and view them as descriptive, rather than causal.

Papke (1998) explored the effect of investment choice on the asset allocation behavior in defined contribution pension plans using data from the 1992 National Longitudinal Survey of Measure Women. Evidence from her study indicated that plan participants choose to invest more in stocks when given the choice.

Benartzi and Thaler (1998) assumed that workers use a naive diversification strategy, or the 1/n heuristic (split money evenly to all possible funds available), to allocate their funds in defined contribution plans. They explored this issue with three data sets, a sample of University of California employees, a sample of 170 retirement saving

plans from a private market research company, and a sample of TWA pilots. Some evidence is found to support the assumption. They concluded that the array of funds being offered affects the resulting asset allocation.

The Employee Benefit Research Institute (EBRI) and the Investment Company Institute (ICI) have conducted a collaborative project on 401(k) plan asset allocation, account balances, and loan activity (VanDerhei, Galer, Quick, & Rea, 1999). The data are the records on active participants in 401(k) plans provided by the plan administrators that are either EBRI sponsors or ICI members. Their major findings include that over two-thirds of plan balances are invested directly or indirectly in equity securities. Younger workers tended to invest more in equities and older workers tended to invest more in fixed-income investments. The addition of company stock substantially reduced the allocation to equity funds and the addition of Guaranteed Investment contracts (GIC) lowered allocations to bond and money funds.

Xiao (1999) used data from the 1995 Survey of Consumer Finances to examine asset allocation in defined contribution plans and private savings. The data set he used is similar to one used by Sundn and Surette (1998), but the sample chosen is more restricted, including only workers who had a choice for investment options in only the 1995 data set since there is not a choice variable in the 1992 data set. He found some consistence between asset allocation in defined contribution plans and private savings. Workers who reported allocating most funds to stocks in defined contribution plans had 39% of their private savings in stocks (including stock IRAs and mutual funds). By contrast,

workers who reported allocating most funds to bonds in defined contribution plans had only 21% of their private savings in stocks.

The above reviewed studies are empirical in nature since the theoretical framework has yet to be developed in this emerging area. The traditional life cycle model could be used to study pension behavior because pensions can be viewed as one component of retirement savings. However, the life cycle model is disconfirmed by many empirical studies and researchers are looking for a new framework that incorporating the advance of psychology into the economic model (Thaler, 1994, Shefrin & Thaler, 1988).

IV. Adequacy of Retirement Income

The adequacy of retirement savings is an important current issue because of four reasons. First, the Social Security system, the major retirement resource for most American workers and their families, is predicted to be under-funded in the near future. Year 2034 will be the first year that Social Security trust fund assets will not allow full payment of benefits (Social Security Administration, 1999). Second, the format of pensions provided by employers is moving from defined benefit pension plans to defined contribution plans (Mithell & Schieber, 1998). In this process, workers are assuming more responsibilities on their future retirement income and taking market risks in their defined contribution retirement plans, which are borne by employers in defined benefit pension plans. Third,

the uncertain Social Security benefits in the future and the trend towards defined contribution pension plans require workers to take more responsibility on their retirement financial security and to increase private savings. However, evidence shows that Americans save too little for retirement (Bernheim, 1996). Fourth, the fact that workers take more control of their retirement finances may result in an issue of social fairness in a long run because of diverse saving attitudes, values, behaviors, and strategies. In a study examining the retirement income inequality among retired families, Xiao, Yuh, and Malroux (1998) found that Social Security income was more evenly distributed than other income sources among retired families. However, investment income contributed mostly to income inequality among retired couples and singles.

One study investigated the perceived retirement income adequacy among Americans. Using data from the 1989 Survey of Consumer Finance, Malroux and Xiao (1995) studied determinants of perceived adequacy of retirement income. They found that age, race, income, self-employment, and planning horizon affected the perception of the retirement adequacy. Another study (Xiao & Anderson, 1997) examined income sources before and after retirement using data from the 1995 Survey of Consumer Finances. They found that 19 percent of retirees reported they had income from wages and salaries and the income from this source accounted for, on average, 7 percent in their total income, which implies the inadequacy of their retirement savings.

Several recent studies investigated the adequacy of retirement savings among American people in

more directly way. Bernheim (1992, 1993, 1996) has based on the life cycle model to estimate the retirement wealth adequacy and limited his population to baby boomers. Using computer simulations, he calculated the target saving levels by marital status, income level, and pension ownership and also estimated the actual saving levels of people using data collected by a consulting company. He concluded that the typical Baby Boom household ought to triple its rate of saving. One limitation of Bernheim's study is that he used the traditional economic life cycle model to estimate the desirable saving levels for families. This traditional model is imperfect to describe people's actual behavior (see a discussion by Poterba, 1996). In a recent study, Bernheim, Skinner, and Weiberg (1997) used data from the Panel Study of Income Dynamics and the Consumer Expenditure Survey and concluded that they find very little support for the life cycle model. The data are, however, consistent with "rule of thumb" or "mental accounting" theories of wealth accumulation.

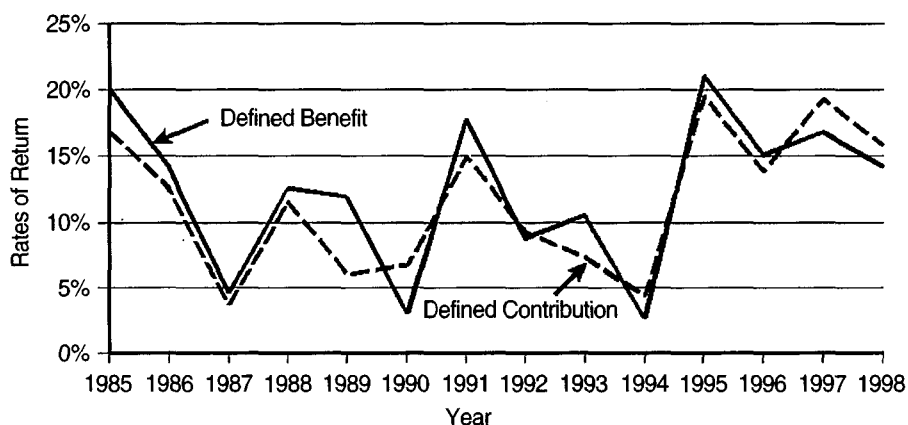
The other studies used a more straightforward accounting approach, a procedure similar to one described in Anderson, Xiao, and Garman (1999), to examine the retirement income adequacy. Three related studies, Mitchell, Moore, and Phillips (1998), Moore and Mitchell (1998), and Mitchell and Moor (1997) examined the adequacy of asset holdings among older Americans using data from the Health and Retirement Study. The data from the Health and Retirement Study only covered older American people who were 51 to 61 years old in the first wave of data collection in 1992 (Juster & Suzman, 1995). They found that for

retirement at age 65, assets were expected to be about \$42,000 and additional savings of 7% of earnings per year were required. Americans on the verge of retirement have accumulated too little wealth to support a comfortable retirement. Factors related to retirement shortfalls include respondents' and spouses' educational attainment, earnings, marital and children status, and ethnicity. Moderate alcohol consumption is associated with improved proximity to the saving target, while smokers are farther from this goal. Attitudes toward risk and people's planning horizon also helped understand who undersave and why. The unique aspect of this study is that they used the Earning and Benefits File, a restricted data set available under controlled access conditions. This file provides detailed information on the earning histories and other wealth information of the respondents that allow researchers to estimate these respondents' Social Security benefits more accurately.

Another group of researchers (Yuh, Montalto, &

Hanna,1998; Yuh, Hanna, Montalto, forthcoming) used the data from the 1995 Survey of Consumer Finance to investigate if Americans save enough for retirement. Retirement wealth is projected using planned retirement age and portfolio allocation. Retirement needs are estimated from expenditure functions using data from the Consumer Expenditure Survey. They concluded that 52% of the households are adequately prepared. This study used sample data that covered all age groups, or more specifically, household heads at age 35 to 70. One unique aspect of this study is that they estimated the retirement income need based on data from the Consumer Expenditure Survey.

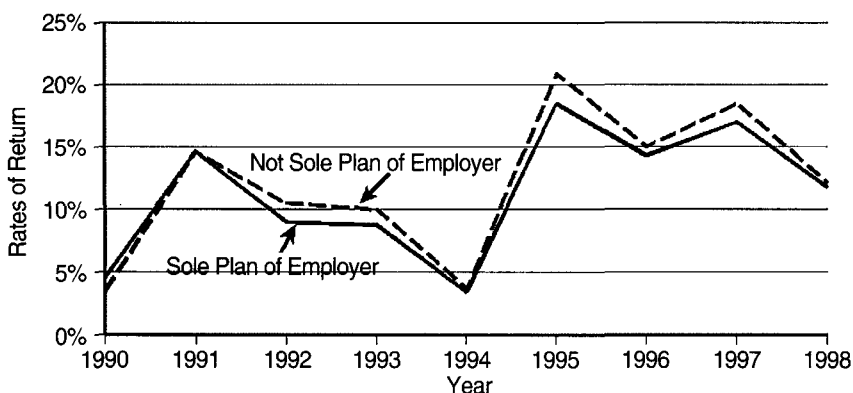
The retirement income adequacy issue will be concerned by all American people and research in this area is expected to continue. Many questions should be answered more specifically: do people choose to lower their living standards after retirement, or are they forced to live at a lower level



<Figure 6> Rates of Return by type of plan, 1985-1998

Note: Plans with 100 or more participants only.

Source: Form 5500 series reports filed with the Internal Revenue Service for 1985-1998 plan years.



<Figure 7> Rates of Return for 401(k) Type plans, 1990-1998

Note: Plans with 100 or more participants only.

Source: Form 5500 series reports filed with the Internal Revenue Service for 1990-1998 plan years.

of consumption after retirement because of the shortage of retirement resources from Social Security, pensions, and private savings? In addition, how to calculate retirement needs and resources and evaluate the accuracy of these estimates for younger people who have many years to retire?

<Figure 6> shows the rate of return for DB & DC plans and <Figure 7> shows the rate of return for 401 plans and both of plans has been decreased and it may explains why the individual consumer need to prepare private pension plan for their retirement.

V. Discussion and Implication

This paper reviews the trend of the U. S. pension system, research on worker's behavior of defined contribution retirement plans, and studies on retirement income adequacy. These themes may have common or different features in other countries, such as Korea. I hope this paper

provides helpful information for private and public policy makers and researchers of these topics in Korea to advance their understanding of pension and retirement behavior and facilitate effective policy making of pensions and retirement.

All households experience changes in income. In the long term, retirement needs and resources of the household change in response to changes related to the family life cycle. Size of household changes as members enter or leave. Retirement needs of individual members change as they grow older. Month-to-month, season-to-season, and year-to-year variations occur also. For example, price increases may cause increased consumption expenditure even though retirement income and amounts purchased have not changed. Some consumption expenditures are controllable for adjusting some uncontrollable consumption expenditures. Illness and injury cause unanticipated health-care needs, and usually health care costs are regarded as uncontrollable expenditures that may have serious consequence.

People may cope with changes in consumption needs that require additional expenditure in several ways. Some may be able to handle most variations out of current income by reducing amount of savings, some may draw on assets or use credit if available, or some may choose or be forced to reduce other expenditures by more careful shopping or deferring purchases.

Elderly households, however, are likely to have fewer choices available to them than are other households. The flexibility in incomes as well as the employment opportunities are more severely limited to the elderly, because of their health limitations, lack of skills, or sometimes labor market discrimination. Credit may be less available to the low-income elderly. Elderly households are not likely to achieve substantial savings through more careful shopping, because they often have limited access to information and transportation and they spend relatively little for food and other commodities for which such savings are usually available. Thus, for those elderly whose incomes are not substantially higher than their normal expenditures and who lack assets and Social Security income that can be drawn, the most likely means of coping with large, uncontrollable expenditures would be a reduction of other expenditures by deferring or going without.

There is substantial empirical evidence that in the existing situation defined with respect to prices, retirement incomes, and provisions for health insurance and income supplements or non-cash benefits many of the elderly, especially the elderly poor, accommodate health care expenditures by reducing their spending in other areas.

Since the elderly poor are particularly at risk

economically, public policy makers should be aware of planning for the retirement needs of the elderly poor who appear to be problem group and who need to be considered in determining programs and priorities. The fact that the elderly poor households have high health cost burden and their expenditures on other necessities were squeezed out of their budgets by more pressing needs of health care suggests that government programs that provide easy access to health care resources and the programs that provide home-care assistance to the sick and disabled are highly important for the well being of the elderly poor households. Allowing the elderly poor households to reduce their spending in health care where their allocation is much higher may enable them to achieve a more balanced consumption pattern and thus improve their quality of life. Otherwise, health problem for those poor elderly could worsen considerably in coming years.

In the early years of retirement, if the consumption is less than the return from the wealth, the nominal wealth increases. However, the annual consumption increase at a compound rate, while the wealth increases at a simple rate due to the fact that consumption expenditures are subtracted from the wealth every year. As a result, the annual increase in wealth, and ultimately wealth starts to decline. The shape of the wealth function depends upon mainly the initial wealth, life span, interest rate, inflation rate, and the initial level of consumption, and the amount of planned bequest is a secondary factor. Thus, by the rate of capital decumulation alone, or by the shape of wealth curve alone, we will be unable to tell the significance of the bequest motive.

This paper may provides helpful information for private and public policy makers and researchers of these topics in Korea to advance their understanding of pension and retirement behavior and facilitate effective policy making of pensions and retirement.

■ References

- Anderson, J. G., Xiao, J. J., & Garman, E. T. (1999). Retirement planning mathematics. In E. T. Garman, J. J. Xiao, B. Brounson (eds.). *The mathematics of financial planning*. Houston, TX: Dame.
- Andrews, E. S. (1992). The growth and distribution of 401(k) plans. In J. A. Turner and D. J. Beller (eds.). *Trends in pensions 1992*, (pp.149-176). Washington, DC: U.S. Department of Labor, Pension and Welfare Benefits Administration.
- Bajtelsmit, V. L., & VanDerhei, J. L. (1997). Risk aversion and pension investment choices. In M. S. Gordon, O. S. Mitchell, & M. M. Twinney (eds.). *Positioning pensions for the Twenty-first century* (pp45-66). Philadelphia: University of Pennsylvania Press.
- Benartzi, S., & Thaler, R. H. (1998). Naive diversification strategies in defined contribution savings plans. Report to U.S. Department of Labor.
- Bernheim, B. D. (1992). Is the baby boom generation preparing adequately for retirement? Technical report prepared for Merrill Lynch & Co., Inc.
- Bernheim, B. D. (1993). *Is the baby boom generation preparing adequately for retirement? Summary report*. Merrill Lynch & Co., Inc.
- Bernheim, B. D. (1996). *The Merrill Lynch Baby Boom Retirement Index: Update '96*. Stanford University, Merrill Lynch.
- Bernheim, B. D., Skinner, J., & Weinberg, S. (1997). What accounts for the variation in retirement wealth among U.S. households? Working paper. Stanford University.
- Clark, R. L., & Schieber, S. J. (1998). Factors affecting participation rates and contribution level in 401(k) plans. In O. S. Mitchell and S. J. Schieber (eds.). *Living with defined contribution pensions: Remaking responsibility for retirement*. (pp69-97). Philadelphia: University of Pennsylvania Press.
- Even, W. E. & Macpherson, D. A. (1997). Factors influencing participation and contribution levels in 401(k) plans. Report to Department of Labor.
- Goodfellow, G. P., & Schieber, S. J. (1997). Investment of assets in self-directed retirement plans. In M. S. Gordon, O. S. Mitchell, & M. M. Twinney (eds.). *Positioning pensions for the Twenty-first century* (pp67-90). Philadelphia: University of Pennsylvania Press.
- Hinz, R. P., McCarthy, D. D., & Turner, J. A. (1997). Are women conservative investors? Gender differences in participant-directed pension investments. In M. S. Gordon, O. S. Mitchell, & M. M. Twinney (eds.). *Positioning pensions for the Twenty-first century* (pp91-106). Philadelphia:

University of Pennsylvania Press.

- Hinz, R. P., & Turner, J. A. (1998) Pension coverage initiatives: Why don't workers participate? In O. S. Mitchell and S. J. Schieber (eds.). *Living with defined contribution pensions: Remaking responsibility for retirement.* (pp17-37). Philadelphia: University of Pennsylvania Press.
- Juster, F. T., & Suzman, R. (1995). An overview of the Health and Retirement Study. *Journal of Human Resources*, 30 (Supplement), S7-S56.
- Kusko, A. L., Poterba, J. M. & Wilcox, D. W. (1994). Worker decisions with respect to 401(k) plans: Evidence from individual-level data. National Bureau of Economic Research Working Paper 4635.
- Malroux, L., & Xiao, J. J. (1995). Perceived retirement income adequacy. *Financial Counseling and Planning*, 6: 17-23.
- Mitchell, O. S. & Moore, J. F. (1997). Retirement wealth accumulation and decumulation: New developments and outstanding opportunities. Pension Research Council Working Paper 97-12, The Wharton School of the University of Pennsylvania, Philadelphia.
- Mitchell, O. S., & Schieber, S. J. (1998). Defined contribution pensions: New opportunities, new risks. In O. S. Mitchell and S. J. Schieber (eds.). *Living with defined contribution pensions: Remaking responsibility for retirement.* (pp1-13). Philadelphia: University of Pennsylvania Press.
- Mitchell, O. S., Moore, J. F., & Phillips, J. W. (1998). Explaining retirement saving shortfalls. Pension Research Council Working Paper 98-13, The Wharton School of the University of Pennsylvania, Philadelphia.
- Moore, J. F. & Mitchell, O. S. (1998). Projected retirement wealth and savings adequacy in the Health and Retirement Study. Pension Research Council Working Paper 98-1, The Wharton School of the University of Pennsylvania, Philadelphia.
- Papke, L. E. (1995, Spring). Participation in and contributions to 401(k) pension plans. *Journal of Human Resources*, XXX(2), 311-325.
- Papke, L. E. (1998). How are participants investing their accounts in participant-directed individual account pension plans? *American Economic Review*, 88(2), 212-216.
- Poterba, J. M. (1996). Personal saving behavior and retirement income modeling: A research assessment. In E. A. Hanushek & N. L. Maritato (eds.). *Assessing knowledge of retirement behavior.* Washington, DC: National Academy Press.
- Poterba, J. M., Venti, S. F., & Wise, D. A. (1998). 401(k) plans and future patterns of retirement saving. *American Economic Review*, 88(2), 179-184.
- Shefrin, H. M., & Thaler, R. H. (1988). The behavioral life-cycle hypothesis. *Economic Inquiry*, 26, 609-43.
- Social Security Administration (1999). News release: Social Security Trust funds gain

- two additional years of solvency. Washington, DC: U.S. Department of Health and Human Services, Social Security Administration.
- Stelluto, G. L., & Klein, D. P. (1990, February). Compensation trends into the 21st century. *Monthly Labor Review*.
- Sundn, A. E., & Surette, B. J. (1998). Gender differences in the allocation of assets in retirement savings plans. *American Economic Review*, 88(2), 207-211.
- Thaler, R. H. (1994). Psychology and savings policies. *American Economic Review*, 84, 186-92.
- U. S. Bureau of Labor Statistics (1998). Employee benefits in small private industry establishments, 1996. Washington, DC: Author.
- U. S. Bureau of Labor Statistics (1999). Employee benefits in medium and large private establishments, 1997. Washington, DC: Author.
- U. S. Department of Labor (1996). *Abstract of 1992 Form 5500 Annual Reports. Private Pension Plan Bulletin*. No. 5, Washington, DC: U. S. Department of Labor Pension and Welfare Benefits Administration.
- U.S. General Accounting Office (1996). *401(k) pension plans: Many take advantage of opportunity to ensure adequate retirement income*. Washington, DC: Author.
- Xiao, J. J. (1997). Saving motives and 401(k) contributions. *Financial Counseling and Planning*, 8(2), 65-74.
- Xiao, J. J. (1998). 401(k) plan contributions: Do plan features or employee preferences matter? Report to the U.S. Department of Labor.
- Xiao, J. J. (1999). Asset Allocation of Self-directed Defined Contribution Retirement Plans and Private Savings. Report to the U. S. Department of Labor.
- Xiao, J. J., & Anderson, J. G. (1997) Income sources before and after retirement: Implications for retirement planning. *Proceedings of Association for Financial Counseling and Planning Education* (pp112-120).
- Xiao, J. J., Yuh, K., & Malroux, L. (1998) Retirement income inequalities: Implications for personal financial education. *Proceedings of Association for Financial Counseling and Planning Education* (pp169-175).
- Yuh, Y. & DeVaney, S. A. (1996). Determinants of couple's defined contribution retirement funds. *Financial Counseling and Planning*, 7, 31-38.
- Yuh, Y., Montalto, C. P., & Hanna, S. (1998). Are Americans prepared for retirement? *Financial Counseling and Planning*, 9(1), 1-12.
- Yuh, Y., Hanna, S., & Montalto, C. P. (forthcoming). Mean and pessimistic projections of retirement adequacy. *Financial Services Review*.

Received April 13, 2004

Accepted May 25, 2004