Session Number 8c: Pension Issues II
29 August, Afternoon

Paper Prepared for the 30th General Conference of
The International Association for Research in Income and Wealth

Portoroz, Slovenia, August 24-30, 2008

Implicit social security and pension wealth in households' assets in the US and France[1]

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This paper is posted on the following website: http://www.iariw.org

[1] The opinions expressed in this article are those of the authors and do not necessarily express the views of the Banque de France or the Bureau of Economic Analysis.

The main purpose of this paper is to compare the present financial situation of current and future retirees in the US and France. The two countries have a very different retirement income systems, the first relying more on funded pension schemes sponsored by employers and on private asset accumulation, and the latter relying more on social security and pay-as-you go financing.

The situation of future retirees is gauged by the total wealth of households, including real estate, long term financial assets and entitlements on social security, measured with the present value of accrued rights. The estimate of pension entitlements is made on the basis of published official data extended with the authors' own estimates from analysis of microdata and from the World Bank pension model (PROST) of social security liabilities. It also tries to account for the risk borne by households on such assets.

This paper is organised as follows: section 1 briefly describes the French and American retirement systems; section 2 compares French and American households' balance sheets in the light of their assets holdings for retirement purposes; section 3 deals with pension entitlements in Social Security in France and in the United States; section 4 focuses on asset structures and wealth effects. Section 5 concludes.

I. Sources of Retirement Income in France

In France, retirement benefits come primarily from a pay-as-you-go (PAYG) social security scheme, and from a government employee pension scheme that is tightly integrated with the social security scheme. According to the Fiscal income survey for 2006, 67 percent of income of households with a reference person between 65 and 74 (74 percent when he/she is older than 75) come from social security benefits, while 19 percent (21 percent) comes from direct holding of financial assets[2]. By comparison, American retirees earn much less from social security (40 percent of cash income of households with reference person older than 65, see IV-A). Moreover, they add to direct property income (15 percent of income) some revenues from pension and annuities (18 percent of income), that is negligible in France.

This comparison puts forward the near-absence of funded pension and personal retirement plans together with the major role of social security in the provision of retirement benefits, both for the basic pension (no more than 50 percent of the reference salary) and the supplementary pension (up to 84 percent of the reference salary).

Social security in France comprises several mandatory pay-as-you-go multi-employer schemes: in 2005 80.4 percent of benefits (and 86.3 percent of pension entitlements) went to employees of the private sector and local governments; 17.1 percent of benefits (12.3 percent of pension entitlements) went to State (national government) civil servants[3]. The State civil servant pension scheme is run on the same pay-a-you-go basis as social security, with slight differences in contribution rates and reference salaries. Financial transfers between the different schemes are needed to compensate for imbalances between contributions and benefits in some of them. For example, the State pays significant amounts to the "general regime" every year.

Two pension reforms were implemented in 1993 and 2003 with a view to closing an anticipated financing gap of the social security and civil servant schemes and to harmonizing the two systems. First, the required number of years of work for full benefits increased from 37.5 years to 40 years. Conditioned on the evolution of life expectancy, it is expected to reach 41.75 years in 2020. Second, work after the normal retirement age of 60 was allowed and even encouraged. Those retiring with fewer years of work

[2] These data have been substantially revised in 2008 in order to better account for revenue from financial assets.. See Goutard, Pujol [2008]

[3] See technical annex B for a more complete description of French social security and how we measure it. See also Durant, Frey [2008]

history than the number required for full benefits suffer a further reduction in benefits for retiring early if they have not reached age 65; conversely, any year worked between 60 and 65 in surplus of the required number of year gives rise to a bonus. Just one major difference between the social security and civil service schemes remains: the reference salary for State civil servants remains the last years' salary because of the larger role of bonuses in their income. For the private sector the reference salary is now calculated on the best 25 years instead of the best 10 years used before the reforms. Finally, the pension and reference salary are now indexed for inflation as measured by the CPI rather than by a faster-growing wage index.

For an employee in the private sector retiring in 2003 and having worked the required number of years, the replacement rate on after-tax income lies after the reforms between 64 percent for an executive and 84 percent for a non-executive. The corresponding rates will be 53 percent and 73 percent for people who retire in 2050. The replacement rate for civil servants will remain around 69 percent throughout the same period.[4]

Voluntary supplementary retirement schemes, either autonomous or recorded as book reserves of employers, are still poorly developed in France, accounting for just 2 percent of pension entitlements in 2005 (table 1.) They are growing rapidly, however, so their share of pension contributions, at 4 percent, is much higher than their share of pension entitlements. These schemes include defined benefit plans, either recorded as uncovered book reserves in employers' accounts or managed by insurance companies. Insurance companies also run some defined contribution plans. In addition, a new type of collective pension scheme was created in 2003 (so-called PERCO, comparable to 401(k) defined contribution plans in the US), which appears as a component of mutual investment funds in French financial accounts.

Table 1: Pension Entitlements and Flows in France, 2005

(Persons in thousands, balances and flows in billions of euros; accrued to date pensions)

	DC Plans and Life Insurance	DB Plans and Book Reserves	Civil Servants Plan	Social Security	Total (1)	Social Security from PROST
1 Contributors	2635	1586	2459	16638	19097	*22058*
2 Beneficiaries	NA	NA	1961	11939	13900	*11994*
3 Pension entitlement, opening balance	**70**	**87**	**950**	**6565**	**7672**	***5980***
4 Actual contributions	4	4	24	136	167	*139*
5 Transfers	0	0	0	11	11	*13*
6 Imputed contributions	*1*	*6*	*34*	319	360	*281*
7 Benefits paid	2	2	33	160	197	*153*
8 Pension entitlement, closing balance	**74**	**94**	**975**	**6872**	**8015**	***6260***

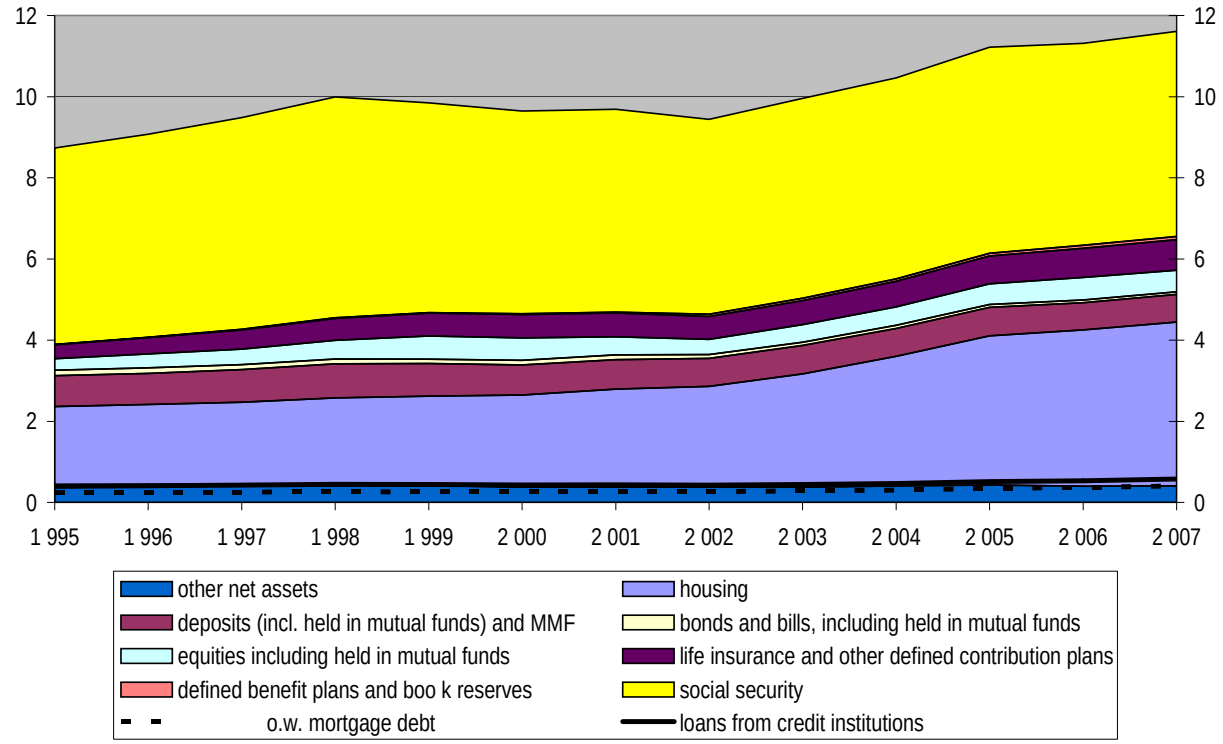
Italics denote authors' estimates using discount rate of 2%. Line 8 = 3 + 4 + 5 + 6 – 7.
(1) Contributors and beneficiaries may participate in several schemes, thaough the numbers don't add up.

[4] See Conseil d'orientation des retraites [2006] p.142

II. Explicit and Implicit Assets of French Households

To see how households in France may navigate the demographic transition to a more aged society, we must look at the structure of the household sector's wealth, including the actuarial value of pension entitlements. Actuarial estimates are subject to a considerable uncertainty because they are sensitive to assumptions about interest rates, future longevity, future retirement timing and other factors, so they should be viewed as indicative of the location of a plausible range of values, not as precise measures. (For information about our assumptions and methods, see technical annex B.) Nevertheless, it is clear that taking the actuarial value of expected benefit entitlements from PAYG schemes into account changes the picture of French households' wealth, the riskiness of their portfolio, and their saving behaviour from the one that considers only funded pension plans, financial assets and real estate.

Chart 1: French households' assets and liabilities including those held in unincorporated businesses (ratios to household disposable income, corrected for actuarial accounting of social security)



In the years from 1995 to 2006, households' implicit social security wealth, calculated as the actuarial value of future benefits less future taxes over a 50 year window, increased from 6.1 years of disposable income to 6.5 years (table 2a.) The increase reflects the ageing of the population. Yet at the same time, households' implicit social security wealth fell from 54 percent of households' total assets to 43 percent. One possible explanation for this restructuring of the balance sheet is that concerns about the solvency of the social security scheme have prompted French households to invest more in long term financial assets. In years of disposable income, households' holdings of corporate equity shares (including in mutual funds) and life insurance reserves have more than doubled (from 0.4 to 0.7 years in the former case and from 0.4 to 0.9 years in the latter) and DB pension assets have grown rapidly from a base of effectively 0.

To be consistent with a treatment of social security entitlements as an asset, the growth of these entitlements as income can included in income. Doing so implies a ratio of social security wealth to

corrected gross disposable income of 5.1 in 2007 (Chart 1). An estimate using comparable methods for the United States is much less, at 1.9 years of disposable income (Chart 3).

The voluntary (in an accounting sense) component of the portfolio shifts that have occurred since the late 1990s can be measured by investment flows, which by definition exclude holding gains and losses.[5] Investment in long term financial assets was an important contributor to their growth, especially in the case of life insurance. Life insurance is a very popular vehicle for saving for retirement, with net investment inflows in the range of 5.3 to 8.5 percent of household disposable income (table 3.) Although life insurance no longer enjoys all the income tax advantages that it once had in France, it remains the only financial asset that can be transmitted to heirs without taxation. Moreover, the implementation of directive EC2003 on pension funds entitled French life insurance companies to act as pension funds and to provide retirement benefits. Investment in shares combined with other securities assets was under 2 percent of gross income in most years (table 3.). Holding gains added on average 1 more percent each year, with strong variation due to the ups and downs of the stock exchange.

French households have traditionally built wealth by investing in real estate. In the past decade, however, gross residential investment has accelerated, rising from 6.8 percent of gross disposable income in 1996 to 8.9 percent in 2007. This extra investment in real estate was not funded by households from their own saving, however: deducting net increases in mortgage debt from investment in residential real estate reveals that the investment of households' own funds was in the range of 2.5 to 3.3 percent of their gross disposable income in 2004-2007, down from 5.8 to 7.0 percent in 1995-1998.[6] Nevertheless, the value of real estate equity grew rapidly, as holding gains on real estate far exceeded even gross investment in real estate: cumulated holding gains from 1995 are 3.7 times higher than the cumulated investments. Mostly because of these revaluations, households' residential real estate assets rose from 2.5 times gross household income in the late 1990s to 5 times income in 2006-2007.

These gains have made homeownership a major source of wealth for elderly households in France. According to a 2002 housing survey, 73.4 percent of households whose reference person is retired own their residence (80 percent for those between 65 and 69), compared with a homeownership rate of 56 percent for population as a whole. Moreover, few older homeowners have mortgage debt. A wealth survey in 2004 found that 72 percent of households whose reference person is over 55 own their residence with no mortgage, while just 6 percent of households over 55 are homeowners with a mortgage[7]. In effect, implicit rental income of homeowners is a major resource supporting the standard of living of retirees in France. (Implicit rental income is the hypothetical income that homeowner receives by renting to himself after payment of mortgage interest and other expenses borne by a landlord.)

The actuarial value of social security entitlements in France is even larger than the value of residential real estate owned by households. Current contributions by employers and employees to social security net of benefits paid to retirees are negligible. (Indeed, in a pure pay-as-you-go system, by design each year's benefits are funded by that year's contributions.) Yet, the actuarial investment flows to social security needed to provide promised future pensions amount to 26.4 percent net of benefits in 2007.[8] This

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[5] In an economic sense most portfolio restructing may be voluntary, because, at least for financial assets, households have the option of making investment flows that rebalance their portfolio following holding gains or losses.

[6] Indeed, deducting consumption of fixed capital (CFC) in additional to net mortgage borrowing implies that the net amount of saving used to build up equity in residential real estate was barely positive in 2007.

[7] Baclet [2006]

[8] We calculated the actuarially required investment net of benefits as the change in required year-end pension reserves estimated by PROST with a 2 percent real interest rate.

Table 2a: Balance sheet for the Household Sector in France, including sole proprietorships

ratio to gross disposable income

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Residential real estate	2.4	2.5	2.5	2.5	2.7	2.8	3	3.2	3.6	4.1	4.7	5.0	5.1
Deposits (incl. held in mutual funds) and MMF	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Bonds and bills, including held in mutual funds	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Equities including held in mutual funds	0.4	0.4	0.5	0.5	0.7	0.7	0.6	0.5	0.6	0.6	0.7	0.7	0.7
Life insurance and other defined contribution plans	0.4	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	0.9
Defined benefit plans and book reserves	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Other assets less other liabilities	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Loans from credit institutions	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7
o.w. mortgage debt	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5
total assets	5.1	5.2	5.3	5.4	5.9	6.0	6.0	6.2	6.7	7.3	8.0	8.4	8.5
Explicit net worth	4.4	4.6	4.7	4.7	5.2	5.3	5.3	5.5	5.9	6.5	7.1	7.5	7.5
Social security entitlement	6.1	6.3	6.3	6.3	6.4	6.3	6.2	6.2	6.4	6.4	6.5	6.5	6.4
Memo items:													
Gross disposable income (billions of euros)	**787**	**803**	**822**	**851**	**873**	**923**	**970**	**1015**	**1043**	**1089**	**1126**	**1181**	**1244**
Net worth as % of assets (gross)	87.6	87.9	87.9	87.3	87.9	87.9	87.7	88.4	88.7	89.2	89.2	89.1	89.0
Housing equity as % of housing asset	87.6	87.6	87.5	87.8	88.2	88.5	89	89.4	89.8	90.4	90.6	90.4	89.9
Value at risk													
real estate	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.10	0.11	0.12	0.14	0.15	0.15
interest bearing assets	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
equity	0.10	0.10	0.11	0.12	0.15	0.17	0.15	0.13	0.13	0.13	0.14	0.16	0.16
life insurance	0.02	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05
social security	1.27	1.29	1.31	1.32	1.34	1.32	1.32	1.31	1.33	1.33	1.34	1.33	1.32

Table 2b: Balance sheet for the Household Sector in France, including sole proprietorships

ratio to gross disposable income corrected for actuarial accounting of social security

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Residential real estate	1.9	2.0	2.0	2.2	2.2	2.3	2.4	2.5	2.8	3.2	3.7	3.9	4.0
Deposits (incl. held in mutual funds) and MMF	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Bonds and bills, including held in mutual funds	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Equities including held in mutual funds	0.3	0.3	0.4	0.5	0.6	0.6	0.4	0.4	0.4	0.5	0.5	0.6	0.5
Life insurance and other defined contribution plans	0.3	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.8
Defined benefit plans and book reserves	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Other assets less other liabilities	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Loans from credit institutions	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6
o.w. mortgage debt	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4
total assets	4.0	4.2	4.4	4.7	4.8	4.8	4.8	4.8	5.2	5.7	6.3	6.5	6.7
Explicit net worth	3.5	3.7	3.8	4.1	4.2	4.2	4.3	4.2	4.6	5.0	5.6	5.8	6.0
Social security entitlement	4.8	5.0	5.2	5.4	5.2	5.0	5.0	4.8	4.9	5.0	5.1	5.0	5.1
Memo items:													
Gross disposable income	**996**	**1005**	**997**	**981**	**1074**	**1157**	**1206**	**1319**	**1349**	**1407**	**1431**	**1530**	**1571**
Value at risk:													
real estate	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.09	0.11	0.11	0.12
interest bearing assets	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
equity	0.08	0.08	0.09	0.11	0.12	0.13	0.12	0.10	0.10	0.10	0.11	0.12	0.12
life insurance	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04
social security	1.00	1.03	1.08	1.14	1.09	1.06	1.06	1.01	1.03	1.03	1.06	1.03	1.04

Table 3: Net investment transaction flows of the Household Sector in France, including sole proprietorships

percentage of gross disposable income

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
gross investment in real estate	6,9	6,8	6,9	7,0	7,3	7,2	7,1	7,1	7,3	7,6	8,1	8,8	8,9
deposits and MMF	5,1	1,3	3,9	2,5	3,7	0,1	2,8	3,1	3,2	3,6	2,9	2,0	3,8
bonds and bills	-0,4	-0,7	-3,0	-1,7	-0,2	0,4	1,2	-0,3	-1,8	-0,1	0,2	0,5	-0,1
shares like securities	-0,9	0,9	0,2	0,4	0,7	0,3	0,5	2,3	2,7	0,4	2,3	1,3	0,9
life insurance and other defined contribution plans	6,9	7,8	8,5	6,0	6,5	7,1	5,9	5,3	5,2	6,6	7,2	8,3	7,2
defined benefit plans and boo k reserves	0,0	0,1	0,5	0,2	0,4	0,5	0,4	0,3	0,5	0,4	0,4	0,0	0,3
other net assets	1,3	1,2	2,6	1,2	1,2	-1,5	-0,6	6,7	-0,4	1,0	0,2	0,6	1,8
Liabilities	0,9	2,1	2,2	2,1	3,9	3,3	3,0	3,5	3,5	4,7	6,7	7,2	7,1
o.w real estate loans	*-0,1*	*1,0*	*0,8*	*0,8*	*2,4*	*2,3*	*1,9*	*2,7*	*3,6*	*4,3*	*5,5*	*6,3*	*5,8*
social security actual net investment	-0,6	-0,3	0,2	0,6	0,7	0,6	0,4	0,3	0,4	0,2	-0,1	-0,2	-0,4
social security actuarial net investment	27,2	25,3	21,3	15,4	23,0	25,5	24,3	30,0	29,5	29,3	27,2	29,7	26,4
o.w property income due to contributors	*24,0*	*23,0*	*19,4*	*13,7*	*20,6*	*21,9*	*20,5*	*26,2*	*25,9*	*25,7*	*25,2*	*25,2*	*24,7*
Memo item:													
Gross disposable income	**787**	**803**	**822**	**851**	**873**	**923**	**970**	**1 015**	**1 043**	**1 089**	**1 126**	**1 181**	**1 244**
saving rate	15,9	15,0	15,9	15,5	15,2	15,1	15,8	16,9	15,8	15,8	14,9	15,1	15,8
saving rate + actuarial contribution - pension	33,6	32,0	30,7	26,7	31,1	32,3	32,2	36,0	34,9	34,8	33,0	34,5	33,3

Data sources for tables 2a, 2b, and 3: national accounts. Estimates for pension detailed in annex 2. Split of general purpose mutual fund shares according to their investment with a combination of holding by type of mutual funds (table on investment and financing of non financial sectors and insurance corporation) and net asset by type of mutual funds (quarterly monetary statistics)

Table 4: Composition of US Household Income with Defined Benefit Pension Plans in Sector of the Employer*

(percentages of total)

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Compensation excluding employer contributions to DB pension plans	68.8	69.9	69.8	69.1	69.1	69.7	69.3	68.2	67.7
Mixed income	8.8	9.1	9.0	9.2	9.0	9.3	9.8	9.8	9.5
Property income excluding imputed income and DB pension plans[a]	13.3	12.0	12.5	12.1	11.3	10.1	10.2	11.3	12.2
Social security and railroad retirement benefits[b]	5.2	5.1	5.0	5.1	5.2	5.3	5.2	5.2	5.1
Other government social benefits (excluding PBGC)	8.1	8.0	7.8	8.4	9.2	9.5	9.6	9.5	9.6
Transfers from business and nonprofit institutions	0.8	0.9	0.9	1.1	0.9	0.9	0.8	0.9	0.8
Benefits from DB retirement plans or the PBGC	3.8	3.9	3.8	3.9	4.0	4.1	4.0	3.9	3.9
DEDUCT: Contributions for social insurance	-8.8	-8.9	-8.7	-8.7	-8.8	-8.9	-8.9	-8.8	-8.7
MEMO ITEMS:									
Contributions for social security and railroad retirement[b,c]	7.0	7.1	7.0	7.0	6.8	6.7	6.6	6.6	6.6
Contributions to DB and DC pension plans[c]	5.4	5.4	5.3	5.4	5.9	6.3	6.0	6.1	NA
Benefits from DB and DC pension plans and the PBGC	5.6	5.7	5.6	5.8	6.1	6.3	6.2	5.8	5.8
Property income excluding all pension plans and life insurers	9.9	8.8	8.8	9.0	8.4	8.4	8.6	9.2	NA
Property income including pension plans but not imputed income	16.1	14.8	15.0	14.3	13.5	13.3	13.2	14.2	NA
Property income including pension plans and FISIM	18.6	17.6	17.7	17.3	16.3	15.7	15.5	15.7	16.5
Net household saving as a percent of net household income	3.8	1.7	1.6	1.4	2.2	2.0	1.8	0.1	0.1
Gross household saving as a percent of gross household income	7.1	5.2	5.1	5.0	5.6	5.5	5.6	4.7	3.9

a. Excludes imputed income from implicit rental income of homeowners and implicit depositor services.

b. Includes disability and survivors insurance components.

c. Includes employer and employee contributions.

Source: Authors' calculations from US National Income and Product Accounts and Employee Benefits Security Administration Bulletins.

Table 5: Balance Sheet for US Households with Actuarial Measures of Pension and Social Security Wealth[a]

(Ratios to Gross Disposable Household Income; Unincorporated Businesses Consolidated)[b]

	2000	2001	2002	2003	2004	2005	2006	2007
Real estate and tangible assets of unincorporated businesses	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.8
Deposits and money market shares	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.8
Bonds and mortgages, including held in mutual funds, plus miscellaneous	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8
Corporate equities (directly held or held in mutual funds)	1.3	1.0	0.7	0.8	0.9	0.8	0.9	0.8
Life insurance, annuities and defined contribution pension and retirement plans	0.7	0.6	0.6	0.6	0.7	0.7	0.7	0.7
Actuarial value of defined benefit pension plans	0.8	0.8	0.8	0.8	0.8	0.8	0.8	NA
Actuarial value of future social security benefits net of future taxes	1.4	1.5	1.5	1.5	1.5	1.6	1.6	1.6
Home mortgage debt	0.7	0.7	0.8	0.9	0.9	1.0	1.0	1.0
Other liabilities	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7
Net worth with actuarial values of pension and social security wealth	6.4	6.2	5.9	6.2	6.3	6.5	6.7	NA
MEMO ITEMS:								
Assets of defined benefit pension plans	0.6	0.7	0.7	0.7	0.8	0.7	0.7	0.6
Assets of social security trust fund	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Social security trust fund+taxes less benefits for future participants if positive	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.3

a. Note that actuarial estimates are subject to a considerable range of uncertainty because they depend on assumptions.
b. Gross disposable household income is about 1.04 times net disposable income in most years.
Sources: For private DB plans, authors' estimates based on Form 5500 data and Employee Benefits Security Administration Bulletins; for state and local DB pension plans, Lenze (2008); for Federal pensions, US. Treasury Department reports, for social security actuarial estimates, Social Security Trustee's Reports; and for all other items the Federal Reserve Board's Flow of Funds Accounts.

Table 6: Balance Sheet for US Households with Actuarial Measures of Pension and Social Security Wealth [a]

(Ratios to Gross Disposable Household Income corrected for actuarial accounting in social security ; Unincorporated Businesses Consolidated)[b]

	2000	2001	2002	2003	2004	2005	2006	2007
Real estate and tangible assets of unincorporated businesses	2.1	2.2	2.3	2.4	2.5	2.5	2.6	2.5
Deposits and money market shares	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.7
Bonds and mortgages, including held in mutual funds, plus miscellaneous	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.7
Corporate equities (directly held or held in mutual funds)	1.2	0.9	0.6	0.7	0.8	0.7	0.8	0.7
Life insurance, annuities and defined contribution pension and retirement plans	0.6	0.5	0.5	0.5	0.6	0.6	0.6	0.6
Actuarial value of defined benefit pension plans	0.7	0.7	0.7	0.7	0.7	0.7	0.7	N.A.!
Actuarial value of future social security benefits net of future taxes	1.3	1.4	1.4	1.4	1.4	1.5	1.4	1.4
Home mortgage debt	0.6	0.6	0.7	0.8	0.8	0.9	0.9	0.9
Other liabilities	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6
Net worth with actuarial values of pension and social security wealth	5.8	5.7	5.4	5.7	5.7	5.9	6,0	N.A.
MEMO ITEMS:								
Assets of defined benefit pension plans	0.5	0.6	0.6	0.6	0.7	0.6	0.6	0.5
Assets of social security trust fund	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Social security trust fund+taxes less benefits for future participants if positive	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.3

a. Note that actuarial estimates are subject to a considerable range of uncertainty because they depend on assumptions.

b. Gross disposable household income is about 1.04 times net disposable income in most years.

Sources: For private DB plans, authors' estimates based on Form 5500 data and Employee Benefits Security Administration Bulletins; for state and local DB pension plans, Lenze (2008); for Federal pensions, US. Treasury Department reports, for social security actuarial estimates, Social Security Trustee's Reports; and for all other items the Federal Reserve Board's Flow of Funds Accounts.

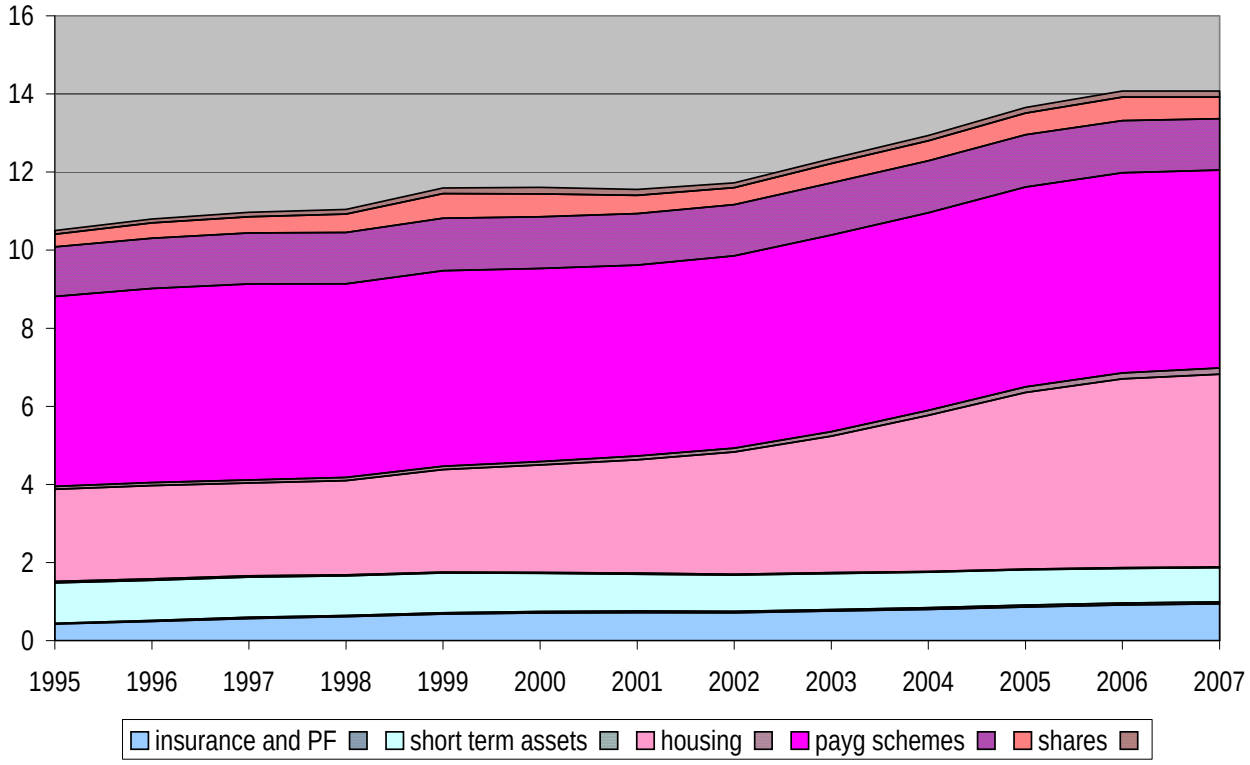
investment includes property income amounting to 24.7 percent of disposable income, which is implicitly received and reinvested by households in their huge notional social security assets. Adding this actuarial element to gross disposable income and to gross savings would dramatically increase the gross saving rate of French households, from 15.8 percent in 2007 to 33.3 percent. Of course, an equivalent adjustment would need to be subtracted from saving by government, implying that the taxes of today's households or future generations will have to be increased by this amount if all the promised benefits are paid.

III. Riskiness of Explicit and Implicit Wealth of French Households

Whether the assets are reliable is of utmost importance for secure financing of retirement, especially for those who are soon to retire or already retired. To gauge the riskiness of real estate and each type of financial asset, we calculated the largest cumulated percentage holding loss observed from 1978 to 2006 on each detailed type of asset. We also estimated the riskiness of social security wealth by the proportional reduction in benefits that will be necessary to restore fiscal balance if contributions grow as currently projected. Note that benefits of diversification make the riskiness of the entire portfolio less than the sum of the risks to each detailed class of asset, as changes in price for different types of assets tend to offset one another. We did not to calculate a measure of risk for the combined portfolio.

The largest source of risk for households in France comes from the social security entitlement. The 21 percent of the implicit social security wealth at risk based on the present value of the expected future deficit that we calculate using PROST amounts to almost 9 percent of total explicit and implicit wealth in 2007. As noted above, the high risk of social security entitlements may have motivated French households to diversify their portfolio. Note that our estimate of risk is a residual, as we discount the accrued right of present contributors and beneficiaries by the deficit that future participants will create. On a relative basis, the value at risk in equity shares is also high, representing 24 percent of the outstanding amount in 2007. Over the last ten years the value at risk in real estate has increased to 3 percent of its value, which is very low. Furthermore, the total value at risk of all assets other than social security is far smaller than the cumulated holding gains from 1978. These gains amount to 47 percent of the assets, with 40 percent due solely to gains in housing prices. Indeed, revaluation of real estate on that period is double from the cumulated flows while it is almost double (1.7) for shares and non monetary mutual fund shares.

Chart 2: Assets and "value at risk" (in grey) for Households in France[a]
(as a percentage of gross disposable income)



a. This chart includes neither "other net assets" nor book reserves.

IV. Comparisons to American Households

A. Sources of Retirement Income

Except near the bottom of the earnings distribution, earnings replacement rates are much lower in the American social security system than in the French one. For American claimants who attained the full retirement age of 65 and 10 months in 2007, the replacement rate ranged from 90 percent of average indexed monthly earnings for the lowest earners, to just over 30 percent for claimants with an average annual income of $80,000. (The marginal replacement rate was zero for earnings in excess of approximately $82,000.) For a claimant at the minimum age for filing of 62, these benefits were reduced by 24.2 percent in 2007. In contrast, in France, the social security replacement rate was 75 percent at the normal retirement age of 62 in 2007.

Despite the relatively low earnings replacement rates of social security in the US, the mean cash income per household member in households with a reference person 65 or older was 92.5 percent of the mean for all households according to the March supplement to the 2006 Current Population Survey (CPS).[9] These households had much higher income than social security alone would have provided because they received substantial amounts of income from employment or self-employment (22 percent of total cash income), pensions and annuities (18 percent of income), and direct property income (15 percent of income.) Social security provided, on average, just 40 percent of the cash income of these households.

[9] Omitting the correction for household size, the mean income of households over 65 was 63 percent of the mean income of all households.

Pension plans have a strong institutional role in providing retirement income in the US, and benefits from these plans are undoubtedly even higher than reported on the CPS. A plausible correction for under-reporting of pension benefits in the CPS would raise their estimated amount to about three-quarters as large as social security benefits for those 65 or over. The need for such a correction is evident from a comparison of the CPS with the national accounts for the US. The national accounts show that benefits from DB and DC pension plans substantially exceed benefits from social security (table 4.) Some of the difference between the national accounts estimates for all households and the CPS estimates for households 65 and over is caused by the greater relative importance of pension benefits for those under 65, but more of the difference appears to be caused by under-reporting on the CPS. In 2006, for example, CPS pension benefits for all households are about 35 percent below social security benefits, compared with pension benefits that are 13 percent higher than social security benefits in the national accounts. Also, property income excluding imputations, pension plans and life insurance reserves has a much larger ratio to wage and salary income in the national accounts than does property income in the CPS. Direct property income undoubtedly provides substantially more than the reported 15 percent of total cash income for households 65 or over.

B. Assets and Liabilities

American households hold significantly more financial assets than French households. In 2006, their financial assets amounted to about 3.8 years of gross disposable income, compared with 2.5 for households in France. (The calculations of the US balance sheet are discussed in annex A, and the results are shown in table 4) The gap becomes even larger if we include in income the imputed property income from implicit social security actuarial assets and exclude the cash benefits, as if the scheme were run by an insurance company. This correction is appropriate when comparing French and American data, because in the United States a large share of retirement income comes from pension plans whose property income is already included in the disposable income of households. Financial assets of French households represent only 2.1 years of the corrected disposable income (chart 1), compared to a ratio to corrected gross income of 3.3 for the US (chart 3).

The relatively large value of financial assets on the balance sheet of US households is consistent with the finding that these households receive substantial pension and property income, but neither of these patterns seems consistent with the very low saving rate of American households. In recent years, the US gross saving rate has fallen to below 5 percent, less than a third of the French saving rate of 15 percent (table 4.)[10]

Part of the answer to this paradox lies in the relatively large borrowing by American households: in part, Americans have more financial assets because they are willing and able to have a more leveraged balance sheet. In particular, households in the US have mortgage debt about equal to one year's gross disposable income, double the ratio for French households, and their nonmortgage debt is about triple the debt of French households (table 5 and chart 3.) Indeed, 32 percent of American households 65-75 still have mortgage debt, and total mortgage and non-mortgage debt for this age group amounts to half a year's income according to the 2004 Federal Reserve Board Survey of Consumer Finances (SCF.) Whereas French households over 65 have almost no debt servicing obligations, total debt service payments of 65-75 year old American households (which include required amortization of principle) have averaged almost 9 percent of their income in the 1998, 2001, and 2004 waves of the SCF.

By borrowing, households in the US are able to invest almost as high a proportion of their gross disposable income in acquisitions of residential real estate as French households despite their meagre saving and high investment in financial assets. Their gross investment in real estate is in the range of 5 to 8 percent of income, compared with almost 7 to 9 percent in France. Growth in the value of real estate assets is a different story, however, because it has been much higher in France. Residential real estate assets of American households increased in value by about 30 percent between 1998 and 2006, compared to a gain of

[10] A detailed comparison of French and American saving rates is beyond the scope of this paper, but a discussion of problems involved in this sort of comparison may be found in Audenis, Grégoir, Louvot (2002.)

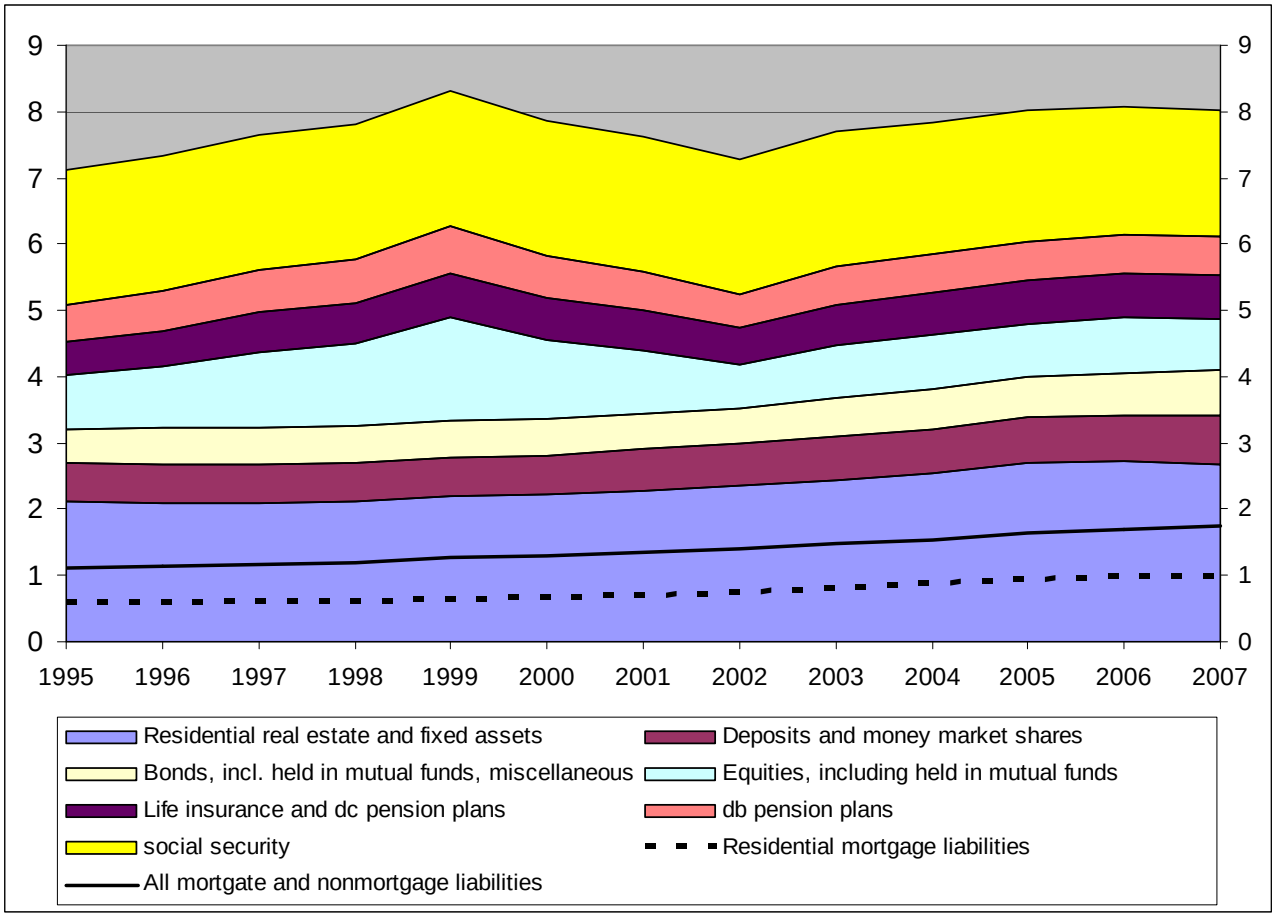
100 percent for France. Revaluations of real estate in the US, though substantial, was not as large as in France, where they propelled the value of residential real estate to 5 times their gross annual income, compared to a ratio of 2 for US households (or 2.7 if non-residential real assets are added.) The difference remains substantial with comparable corrected income: 4 years of income in France and 1.8 years in the US.

Further widening the gap between France and the US in household net worth relative to income is the difference in their social security wealth. For US households, social security wealth is less than 2 times their corrected disposable income according to our calculations using PROST (chart 3), compared to more than 5 times corrected disposable income for French households.[11] The lower value of social security wealth of US households partly reflects reforms enacted in 1983, which raised the full retirement age and social security contributions by amounts thought—at the time—to be sufficient to ensure the long term solvency of the scheme. As a result of these reforms, younger cohorts now alive had, or will have, negative social security wealth when they first enter the labour force, and contributions to social security are currently greater than benefits to retirees. Including actuarial wealth in social security and pension plans along with explicit financial assets and liabilities implies a financial net worth for US households of 3.4 times corrected gross disposable income in 2006, compared with a ratio of 7 for French households. Furthermore, with real estate included, the net worth of the household sector in France stood at over 11 times corrected gross disposable income, compared with 6 times corrected gross disposable income in the US (table 6.)

The greater wealth relative to income of French households would seem to suggest that they have better prospects of being able to maintain their standard of living in retirement than American ones. However, this is not necessarily the case, for three reasons. First, Americans need less wealth to finance their retirement because they retire later, and about 20 percent of the cash income of 65 to 74 year old households in the US comes from employment or self-employment. Second, housing wealth, which is comparatively high in France, may be subject to larger risks of holding losses after the fast increases in prices registered in the recent years, and significant transactions costs are incurred when housing wealth is converted to cash to pay general living expenses. Third, the value of the social security wealth of French households alive today is subject to significant risk of reforms, due to the remaining financing gap. The risk arises because the size of the actuarial deficit of French social security given current schedules of contribution rates and benefits is so large that a complete transfer of the cost of covering this deficit to future generations seems unlikely. The 21 percent of French social security wealth that is at risk according to our simulations using PROST would amount to over 1.3 times annual disposable household income. To be sure, social security wealth in the US also at risk: present projections are that if no increases in contributions are enacted, funds will be available to pay only 78 percent of scheduled old age benefits starting in 2042 (Board of Trustees, 2008. pp. 8-10.) Nevertheless, the risk is smaller for American households than for French ones. According to actuarial projections in the 2008 report of the trustees of US social security system, an immediate, permanent increase in the contribution rate equal to 1.7 percent of covered payroll would be sufficient to remedy its fiscal imbalance. The present value of the decline in wealth of today's households from capitalizing the resulting increase in their contributions to social security amounts to around a quarter of a year's disposable household income under reasonable assumptions about the real rate of interest and the rate at which today's contributors exit the work force. Thus, the risk-adjusted gap between France and US in social security wealth, though still substantial, is significantly smaller than the unadjusted gap. Note, however, that the balance sheet of American households is riskier than that of French households in other ways., including more use of leverage and more ownership of corporate equities.

[11]The Social Security Trustee's Report estimates the actuarial value of future benefits less future contributions for persons over 15 years old (the closed group liability) at 1.6 times gross household income. The accrued-to-date estimate from PROST for the US is calculated using methods comparable to those that we used for France, so we use it for comparison purposes even though we regard the Trustee's Report estimates as more appropriate for general purposes.

Chart 3: American households' assets and liabilities, including those held in unincorporated businesses (ratios to household disposable income, corrected for actuarial accounting of social security)



Source: Authors' calculations based on the Federal Reserve Board's Flow of Funds Accounts, authors' tabulations of private DB plan tax returns, US Treasury Department finical reports and PROST, and Lenze (2008.)

C. Differences in Saving partly reflect Differences in Balance Sheet Structure

A comparison of the household sector balance sheets in France and the US sheds some light on the large gap between French and American saving rates. On the liability side of the household sector balance sheet, the much larger amount of debt relative to income on the balance sheets for the US implies that differences in borrowing by households have a direct role in explaining differences in the two countries' saving rates. The greater borrowing by US households may partly reflect the greater or cheaper availability of credit resulting from institutions that provide credit assurance and securitization services for mortgages, from a legal system that allows lenders to foreclose on pledged collateral without excessive delays and expenses, and from innovations like securitization of many kinds of debt and software-based credit scoring models. In addition, the deductibility of mortgage interest is an important tax incentive for borrowing by American households to borrow.

Differences on the asset side of the balance sheet also suggest some reasons for the much lower saving of Americans as measured in national accounts. One way that Americans can accumulate wealth in financial assets without much saving being recorded in the national accounts is by holding financial assets that experience positive revaluations (chart 3.) These assets include corporate equities either held directly or in mutual funds, pension plans and variable life insurance. Over short horizons prices of corporate equities are highly volatile, but over longer intervals holding gains tend to be the most important source of the growth in

the value of households' financial assets in the US. Over the 13 years from 1995 to 2007, for example, US households and nonprofit institutions serving households acquired $6.8 trillion in financial assets by net investment, but revaluations added $18.8 trillion to the value of their financial assets (Flow of Funds Accounts, table R.100.)

Nevertheless, holding gains actually reduce the national accounts measure of disposable income. This occurs because realized holding gains result in income taxes that are subtracted in the calculation of disposable income, but all holding gains, whether realized or not, are excluded from the national accounts definition of income.[12] Taxes on realized holding gains depress the national accounts measure of personal saving in the US by an average of about 1 percentage point, because saving is measured as the residual that remains after consumption is subtracted from disposable income. Adding to the negative effect of holding gains on measured saving, these gains tend to increase consumption expenditures. Households have been estimated to consume a modest 2 to 3 percent of the holding gains on financial assets that they hold directly, but defined benefit pension plans rely heavily on holding gains to pay promised benefits, and contributions from sponsors of these plans are quite sensitive to holding gains and losses.

Differences in the role of pension plans in providing retirement income also contribute to differences in saving rates between France and the US in two ways. First, pensions in France are still in their infancy, but defined benefit plans in the US have mostly matured. Pension plans have high rates of saving in their early years, but once they mature most or all of their receipts from contributions and property income are disbursed as benefits. This is particularly so for defined benefit plans, as only defined contribution plans have assets that can be left to heirs.

Second, financial assets built up in defined contribution pension plans or in other retirement plans enable American households to borrow more than they could with a retirement system in which they accumulated only actuarial social security wealth. Assets in pension and retirement plans can furnish explicit collateral for borrowing: in the 1998 *Survey of Consumer Finances*, 5.3 percent on households had loans collateralized by assets in a defined contribution plan (Sundén and Surette, 2000), and Weller and Wenger, (2008), estimate that the outstanding balance of such loans was $30.8 billion in 2004.[13] These assets can also enhance access to credit by serving as a source of balance sheet strength that improves creditworthiness.

The access to credit made possible by the presence of explicit pension plan assets probably increases total borrowing, but it might not reduce overall saving if the extra borrowing is used to acquire assets such as housing or to avoid liquidating financial assets. At the aggregate level, the effect on saving of substituting explicit financial assets for social security wealth depends on whether or not most households are life-cycle savers who plan for retirement. If households engage in long term financial planning and perceive social security wealth as neither risky nor as a reason to increase bequests to offset the liability that will be inherited by future generations, their saving rate should be nearly insensitive to whether retirement wealth takes the form of explicit financial assets or the present value of expected net benefits from social security. Even for planners, saving would not be completely insensitive, however, because social security wealth does not lessen the precautionary motive to hold financial assets that provide liquidity for smoothing consumption as income fluctuates and for lumpy or unexpected expenses. On the other hand, the access to credit resulting from the presence of explicit financial assets *would* significantly reduce saving by households who are myopic or liquidity constrained (that is, unable to consume as much as they would like when their income fluctuates because of a lack of financial assets or access to credit.) Indeed, myopic households might even feel wealthier—and therefore want to consume more—if they have explicit pension plan assets than they would if they had an equivalent amount of less transparent, actuarial wealth. Lusardi and Mitchell (2007a, 2007b) find that a great many households have devoted little thought to financial planning for retirement and lack the financial literacy to do so effectively, which suggests that myopic behaviour is not uncommon.

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[12] See Reinsdorf (2004 and 2005).

[13] Indeed, there are even debit cards that allow US households to borrow against pension plan assets. Legislation to prohibit such cards was recently proposed by Senators Schumer and Kohl.

V. Conclusion

Differences between the household sector balance sheets of France and the US reflect their very different approaches to providing retirement income. In France, about 80 percent of cash income of households 65 or older comes from social security benefits. Also, about 80 percent of these households own their home without a mortgage, making implicit rental income of homeowners the other mainstay of the standard of living of older households in France. In contrast, in the US, households 65 and over on average receive less than half their cash income from social security, and for the household sector as a whole pension benefits are a more important source of cash income than social security. Furthermore, the balance sheet of the US household sector has higher values relative to income for many categories of financial assets, including actuarial wealth in defined benefit pension plans, securities such as bonds and corporate equities held directly or in mutual funds and defined contribution pension plans.[14]

Nevertheless, the pension and directly held financial assets of American households are not sufficient to bring their net worth to income ratios near those of French households once social security wealth is considered. Households in the US only partially offset their lower social security wealth by having higher pension wealth and higher levels of directly held financial assets. Furthermore, their housing assets have not grown as rapidly in value relative to their income as have those of French households. Taking into account actuarial values of social security and residential real estate, the ratio of net worth to income is about twice as high for households in France, leaving French households much better positioned to afford retirement.

Part of the explanation for the difference in retirement wealth is that American households do not need to accumulate as much wealth to have a comfortable retirement, as they retire later than their French counterparts. The full retirement age for American social security is presently almost 66, compared to a range between 60 and 65 depending on the length of career in France, and over 20 percent of 65 to 74 year old men in the US still work. Despite their lower retirement wealth, on average the income of the aged in the US is not markedly different from that of non-aged. The fact that US households have sufficient income to largely maintain their pre-retirement consumption level into old age suggests that its lower level of retirement wealth are mostly a result of later planned retirement ages, though some work at older ages is undoubtedly an unplanned response to a lack of resources that was not foreseen.[15]

Despite the adequacy of the resources that are available to today's retirees in France and the US, future retirees in both countries face some significant risks. Falling ratios of workers to retirees will strain social security's finances in both countries, making social security wealth risky for younger and future generations. The financial retirement wealth of households in France is not diversified, as it is heavily concentrated in social security. In the case of US households, the risk from projected shortfalls in social security financing is smaller, but that is partly because after-tax benefits are already scheduled to decline as part of the reforms of 1983. In addition, in the US private businesses, and to lesser extent state governments, have replaced defined benefit pension plans with defined contribution plans, which has had the effect of shifting risks from employers to households. In principle, employees have the opportunity to accumulate enough wealth in defined contribution plans to offset this change by contributing more of their own pay and by managing their investments wisely. Yet, according to Munnell and Sass (2008), the growth in defined contribution plan pension wealth is not turning out to be sufficient to replace the lost defined benefit plan wealth, so that the average retirement age of US households will have to rise from 63 to 66 if future retirees are to avoid a sharp decline in their standard of living.

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[14] Estimates of actuarial values of expected pension and social security benefits should be interpreted with caution because they depend on many assumptions.

[15] To obtain evidence on how often poor planning by US households results in inadequate resources for retirement, the aggregate data and sample means that we have investigated in this paper must be supplemented with micro data on distributions. Lusardi and Mitchell (2007a) and Lusardi and Beeler (forthcoming) find that a sizeable minority of households over 50 are unprepared for retirement because of a lack of financial planning, even though mean and even median net worth for households on the eve of retirement is substantial according to data from the 2004 US Health and Retirement Survey.

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Technical Annex A: Consolidated Balance Sheet for the Household Sector from the Federal Reserve Board's (FRB's) Flow of Funds Accounts

We made four types of adjustments to the balance sheet data published in the Flow of Funds Accounts (June 2008 releast) to arrive at the balance sheet shown for the US in table 5 in the main text. The first was to remove assets and liabilities of nonprofit institutions serving households from the published balance sheet of the personal sector to obtain assets and liabilities of a pure household sector. Second, in France the assets and liabilities of unincorporated businesses and farms are consolidated with those of the household sector, whereas in the main version of the personal sector balance sheet for the US, the net worth of unincorporated businesses and farms is shown as an asset representing households' equity in these businesses. (See the first table below.) To make the balance sheet for US households comparable with the one for French households we therefore consolidated households and unicorporated businesses and farms.

Third, we combined directly held equity in incorporated businesses (stock) with equity held in mutual funds, and we split equity in pension funds into defined benefit (DB) and defined contribution (DC) plans so that we could show the DB plans separately.

Fourth, participants in DB plans receive retirement benefits based on a formula that considers their pay and years of services, so their asset is really the actuarial value of the promised benefits, not the amount that is currently in their pension plan's trust fund. In contrast, participants in DC plans own the balances accumulated in their accounts and have no claims to additional retirement benefits from employer.

The balance sheet without the adjustments for unincorporated businesses and for the actuarial value of DB pension entitlements is shown in the table A.1 below, the balance sheet after the adjusment for unincorporated businesses is shown in table A.2, and the balance sheet after all adjustments in shown in table A.3. Table 1C differs from table 5 in the main text because table 5 shows ratios to gross disposable household income, which is about 3.5 to 4 percent higher than the net income used in the ratios in table A.3.

Table A.1: Balance Sheet for the Household Sector in the US
(Ratios to Net Disposable Household Income)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Housing	1.48	1.48	1.47	1.50	1.56	1.59	1.66	1.74	1.83	1.92	2.05	2.06	1.97
Deposits and money market shares	0.60	0.60	0.59	0.59	0.59	0.59	0.63	0.64	0.64	0.64	0.66	0.68	0.71
Bonds and mortgages, including held in mutual funds, plus miscellaneous assets	0.55	0.56	0.54	0.53	0.54	0.49	0.49	0.49	0.52	0.54	0.55	0.57	0.62
Corporate equities (directly held+in mutual funds)	0.88	1.01	1.26	1.35	1.69	1.32	1.03	0.71	0.88	0.89	0.88	0.92	0.84
Equity in noncorporate businesses and farms	0.64	0.64	0.64	0.63	0.63	0.64	0.63	0.62	0.65	0.67	0.71	0.74	0.76
Life insurance, annuities and defined contribution pension and retirement plans	0.55	0.58	0.64	0.69	0.74	0.70	0.65	0.61	0.68	0.70	0.72	0.74	0.74
Defined benefit pension plans	0.62	0.66	0.71	0.73	0.78	0.71	0.65	0.57	0.64	0.65	0.66	0.67	0.64
Home mortgage debt	0.62	0.63	0.63	0.64	0.67	0.67	0.71	0.77	0.84	0.90	0.98	1.02	1.03
Other liabilities	0.26	0.27	0.28	0.28	0.29	0.30	0.30	0.29	0.30	0.30	0.30	0.30	0.30
Net Worth	4.43	4.62	4.95	5.10	5.55	5.04	4.71	4.29	4.69	4.81	4.95	5.04	4.92
ADDENDUM:													
Disposible household income (billions of dollars)	5378	5659	5957	6372	6669	7167	7471	7822	8157	8674	9084	9623	10175
Net worth as percentage of assets	83.4	83.7	84.5	84.8	85.3	83.8	82.3	80.1	80.4	79.9	79.5	79.2	78.6
Housing equity as percentage of housing assets	58.2	57.6	57.1	57.5	57.5	57.6	57.0	55.5	53.9	53.0	52.4	50.2	47.5
Value at Risk assuming 45 percent drop in equity prices													
Equities (directly held+held in mutual funds)	0.39	0.45	0.57	0.61	0.76	0.59	0.47	0.32	0.39	0.40	0.40	0.41	0.38
Life insurance, annuities and defined contribution pension and retirement plans	0.09	0.10	0.13	0.15	0.18	0.16	0.14	0.11	0.14	0.15	0.16	0.17	0.18
Defined benefit pension plans	0.06	0.07	0.07	0.07	0.08	0.08	0.07	0.06	0.07	0.08	0.08	0.08	0.07
Value at risk assuming 20 percent drop in Real estate	0.30	0.30	0.29	0.30	0.31	0.32	0.33	0.35	0.37	0.38	0.41	0.41	0.39

Table A.2: Balance Sheet for US Households with Unincorporated Businesses Consolidated
(Ratios to Net Disposable Household Income)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007

Real estate and tangible assets of uninc. business	2.29	2.29	2.28	2.30	2.38	2.41	2.47	2.55	2.66	2.77	2.95	2.99	2.92
Deposits and money market shares	0.64	0.64	0.64	0.64	0.64	0.65	0.69	0.70	0.71	0.72	0.74	0.77	0.80
Bonds and mortgages, including held in mutual funds, plus miscellaneous assets	0.62	0.64	0.63	0.65	0.66	0.63	0.63	0.64	0.67	0.71	0.74	0.77	0.83
Equities (directly held+held in mutual funds)	0.88	1.01	1.26	1.35	1.69	1.32	1.03	0.71	0.88	0.89	0.88	0.92	0.84
Life insurance, annuities and defined contribution pension and retirement plans	0.55	0.58	0.64	0.69	0.74	0.70	0.65	0.61	0.68	0.70	0.72	0.74	0.74
Defined benefit pension plans	0.62	0.66	0.71	0.73	0.78	0.71	0.65	0.57	0.64	0.65	0.66	0.67	0.64
Home mortgage debt	0.64	0.65	0.66	0.67	0.70	0.71	0.76	0.82	0.88	0.95	1.03	1.08	1.09
Other liabilities	0.52	0.54	0.56	0.58	0.62	0.65	0.66	0.65	0.66	0.68	0.70	0.72	0.75
Net Worth	4.43	4.62	4.95	5.10	5.55	5.04	4.71	4.29	4.69	4.81	4.95	5.04	4.92
Effect of 45 percent drop in equity prices on net worth	3.95	4.06	4.25	4.34	4.62	4.29	4.10	3.86	4.15	4.26	4.40	4.45	4.37
Effect of 20 percent drop in real estate prices on net worth	4.14	4.32	4.65	4.80	5.24	4.72	4.38	3.94	4.32	4.43	4.54	4.63	4.53
Leverage indicators:													
Financial net worth	2.14	2.33	2.66	2.79	3.17	2.63	2.24	1.74	2.03	2.04	2.00	2.05	2.00
Net worth as percentage of assets:													
Baseline	79.2	79.5	80.3	80.3	80.8	78.8	76.9	74.4	75.2	74.8	74.1	73.7	72.8
Assuming 45 percent drop in price of corporate equities	77.3	77.4	77.8	77.6	77.7	75.9	74.4	72.4	72.9	72.4	71.7	71.2	70.4
Assuming 20 percent drop in price of household real estate	78.1	78.5	79.3	79.3	79.8	77.7	75.6	72.8	73.6	73.2	72.4	72.0	71.1

Table A.3: Balance Sheet for US Households with Actuarial Measures of Pension and Social Security Wealth
(Ratios to Net Disposable Household Income; Unincorporated Businesses Consolidated)

	2000	2001	2002	2003	2004	2005	2006	2007
Real estate and tangible assets of unincorporated businesses	2.41	2.47	2.55	2.66	2.77	2.95	2.99	2.92
Deposits and money market shares	0.65	0.69	0.70	0.71	0.72	0.74	0.77	0.80
Bonds and mortgages, including held in mutual funds, plus miscellaneous	0.63	0.63	0.64	0.67	0.71	0.74	0.77	0.83
Equities (directly held+held in mutual funds)	1.32	1.03	0.71	0.88	0.89	0.88	0.92	0.84
Life insurance, annuities and defined contribution pension and retirement plans	0.70	0.65	0.61	0.68	0.70	0.72	0.74	0.74
Actuarial value of defined benefit pension plans	0.85	0.87	0.85	0.85	0.85	0.86	0.85	NA
Actuarial value of benefits payable by the Pension Benefit Guarantee Corp	0.002	0.002	0.004	0.006	0.007	0.008	0.007	0.007
Actuarial value of future social security benefits net of future taxes	1.49	1.52	1.52	1.56	1.58	1.66	1.71	1.71
Home mortgage debt	0.71	0.76	0.82	0.88	0.95	1.03	1.08	1.09
Other liabilities	0.65	0.66	0.65	0.66	0.68	0.70	0.72	0.75
Assets of social security trust fund	0.13	0.16	0.18	0.17	0.17	0.19	0.20	0.20
Social security trust fund+taxes less benefits for future participants if positive	0.13	0.16	0.18	0.17	0.27	0.29	0.20	0.28
Financial net worth with actuarial values of pension wealth	2.78	2.46	2.03	2.24	2.25	2.21	2.24	NA

DC + DB plans + claims on the pension insurance for terminated DB plans equal 1.6 times DHI in 2006, compared with the net claim of current participants on social security of 1.7 times DHI. However the sum of the trust fund and the excess of taxes over benefits for future participants is only 0.2 to 0.3 times DHI. This implies that the balance in the trust fund will be exhausted during the lifetime of current participants. When that happens the full payment of promised benefits will be impossible because the present law does not give the system the authority to borrow. The likely solution will involve both benefit cuts and increases in taxes on future participants; it will not be possible to increase the unfairness to future participants by enough to close the funding gap without benefit cuts. If half the cost of closing the funding gap is borne by current participants, their actuarial social security wealth would be reduced to about 1 times DHI.

Technical annex B: Social security and pensions in France: building the data set

1. Social security

Social security in France includes several mandatory pay-as-you-go multi-employer schemes.

The bulk of the population is covered by 3 schemes. All these schemes are mandatory and run on a pay-as-you-go basis. They represent 83 percent of contributors and 79 percent of the pension paid in 2005.

1rst July 2005	contributors	in%	beneficiaries	in%
wage earners				
general regime (CNAVTS)	16 637 978	68	10 757 714	51
civil servant	2 459 134	10	1 960 765	9
farm wage earners (MSA)	666 998	3	2 353 373	11
Mines (CANSSM)	13 147	0	371 111	2
state workers (FSPOEIE)	55 260	0	108 472	1
local government and hospitals (CRNACL)	1 807 475	7	757 821	4
gaz and electricity (EDF-GDF)	141 662	1	185 023	1
Railways (SNCF)	168 132	1	306 768	1
Subway (RATP)	43 750	0	43 356	0
Sailors (ENIM)	31 036	0	114 842	1
notary clerks (CRPCEN)	44 545	0	52 221	0
Banque de France	15 015	0	14 781	0
other wage earners (SEITA, CAMR)	1 759	0	23 258	0
Own account workers				
farmers (MSA)	606 458	2	1 879 644	9
salespersons (ORGANIC)	693 403	3	974 991	5
craftspersons (CANCAVA)	552 795	2	776 462	4
independants (CNAVPL)	532 322	2	193 325	1
Clergymen (CAVIMAC)	15 311	0	63 622	0
Total social security	24 486 180	100	20 937 549	100
non management staff (ARRCO)	14 326 340	59	8 775 851	42
management staff (AGIRC)	3 590 660	15	2 106 363	10
government staff (IRCANTEC)	2 400 000	10	1 600 000	8
complementary scheme	20 317 000	83	12 482 214	60

2005	pensions	survivors	total
complementary scheme	44 297	8 813	53 110
general regime	65 634	8 662	74 296
civil servants	31 827	4 193	36 020
local government and hospital	9 977		9 977
others	43 615		43 615
Total social security	177 380	29 661	207 041

Financial transfers occurs between the different schemes in order to compensate for imbalances between contributions and benefits in some of them. For example, the State contributed 1,7 euro billion to the "general regime" in 2007. Moreover, unbalanced regimes were financed by the State (SNCF, RATP, ENIM, CANSSM for a total amount of 3,8 euro billion in 2007, and FSOEIE).

1.1 The state civil servant social security

State civil servants (10 percent of the contributors and 17 percent of the pension paid in 2005) are covered by a unique scheme directly paid on the State budget. It is included in the central government sector.

The civil servant regime were reformed in 2003 (law of the 21 August 2003).

The **maximum** retirement age was 60 before reform. It will progressively raises to 65 in 2020. No pension entitlement are earned under 15 years of service. The required number of years for a full pension is 38 $^{1/2}$ years in 2005, 40 years in 2008, and potentially 41 years in 2012, 41$^{3/4}$ in 2020. The reference wage is the average 6 last months wage. The replacement rate is 75 percent for people having worked the total required time or leaving at the limit pension age (from 61 in 2006 up to 65 in 2020). Any missing quarter reduces the replacement rate by 1.25, progressively raised to 5 percent.

Employee contributions amount to 7.85 percent of the basic salary without bonuses +5 percent under ceiling of 20 percent of basic salary. Employer contribution is complemented in order to attain the amount of pensions paid during the year. It amounts to 49.9 percent for civil servants and 100 percent for military servants. Survivors receive 50 percent of the retiree pension. The regime also covers disabled workers.

Accrued to date pension liabilities of the State civil servants' scheme are calculated by the Ministry of Finance from 2003, with a generational model (Ariane) taking into account the specific feature of civil servants (career, gender structure, life expectancy…). It is based on the PBO method. These data are now published[16] in the State accounts and checked by the Commission of Audit of public sector (Cour des comptes).

Civil and military State servant social security
data published by the Ministry of Finance for a 2% discount rate

	2005	2006	2007	2008
Pension entitlement (opening BS)	950	975	1033	1056
actual contribution	24	20	22	25
imputed contributions	37	40	38	38
pension paid	33	35	37	38
revaluation				
other change in volume (1)	*-3*	*33*		
Pension entitlement (closing BS)	975	1033	1056	1081
Other schemes financed by the State			270	

(1) calculation of the author in order to reconcile pension entitlement discounted at 2%

1.2 The other social security schemes

The bulk of the wage earners of the private sector are covered by two defined benefit schemes, included in the social security sub-sector, which benefits add-up:

- the basic general regime (CNAVTS – Caisse nationale d'assurance vieillesse des travailleurs salariés) represent 68 percent of contributors and 36 percent of the pension paid in 2005.
- mandatory complementary schemes federated in two institutions: AGIRC (Association générale des Institutions de retraite des cadres) for executives, and ARCCO (association des régimes de retraite complémentaires) for both executive and non executives. This scheme complement the general regime as well as the minors scheme (since 1967) and the farm wage earners scheme

[16] See Direction générale de la comptabilité publique [2005], Pellé [2006]

(since 1991), the later adding 5 percent of contributors to the general regime. It pays 26 percent of the pensions in 2005.

This regimes were reformed in 1993 and further in 2003. In addition to the increase of the required working time, the 1993 reform indexed the pension and the reference salaries on inflation.

The benefit formula is different for each of these 3 regimes.

For the **general regime** pension is calculated as:

$$\frac{\text{Average annual salary (1)} \times \text{replacement rate (2)} \times \text{time in regime limited to the total required time (3)}}{\text{total time required (4)}}$$

(1) the average is calculated on 22 best years for people born in 45 up to 25 best years for people born in 1948, under the social security ceiling. This ceiling is proportional to the average earning income of the private sector.
(2) the replacement rate is 50 percent for people having worked the total required time or leaving at 65. Any missing quarter reduces the replacement rate by 1.25 percent. The maximum rate is 50 percent of the social security ceiling.
(3) By derogation, people having worked the required time at 60 can go on working. Each supplementary quarter give them a surplus of 0.375 percent
(4) the required number of years for a full pension was 37 $^{1/2}$ years in 1993 and raises after reform from 40 years in 2003 to 41 years in 2012.

The contribution rates are the following:

2005	under ceiling	whole salary
employee	6,7	0,1
employer	8,3	1,6

Survivors receive 54 percent of the benefit. Disabled enter the regime after the age of 60. Beforehand, they are compensated by the health regime.

The benefits of the **AGIRC and ARRCO** for year N are calculated as:

Ratio (1)*value of the point in year N (2)* [Σcontribution of year T/reference salary of year T](3)

With year N: any year after retirement year T: any year as contributor

(1) the ratio lies between 43 percent if retirement occurs at 55 to 100 percent if retirement occurs at 65.

(2) value of the point and the reference salary are fixed by the social partners and their relation does not necessary reflect a discount rate. Usually, the reference salary is indexed on the average salary of the private sector. The value of the point is indexed on inflation.

1rst April 2006	ARCCO	AGIRC
reference salary	13,0271	4,5444
value of the point	1,1287	0,4005

(3) The number on brackets is usually called the “number of points earned”

Pension can be obtained from 55. If it is demanded before 65, the points are reduced by a coefficient which raises from 0.43 at 55 to 1 at 65. Survivors obtain 60 percent of the initial pension. The contribution rates are the following:

	non executives	executives		
under 1 SSC*	7,50%	7,50%	0,39%	under 1 SSC*
1-3 SSC*	20%	20,71%		1-4 SSC*
		20,65%		4-8 SSC*

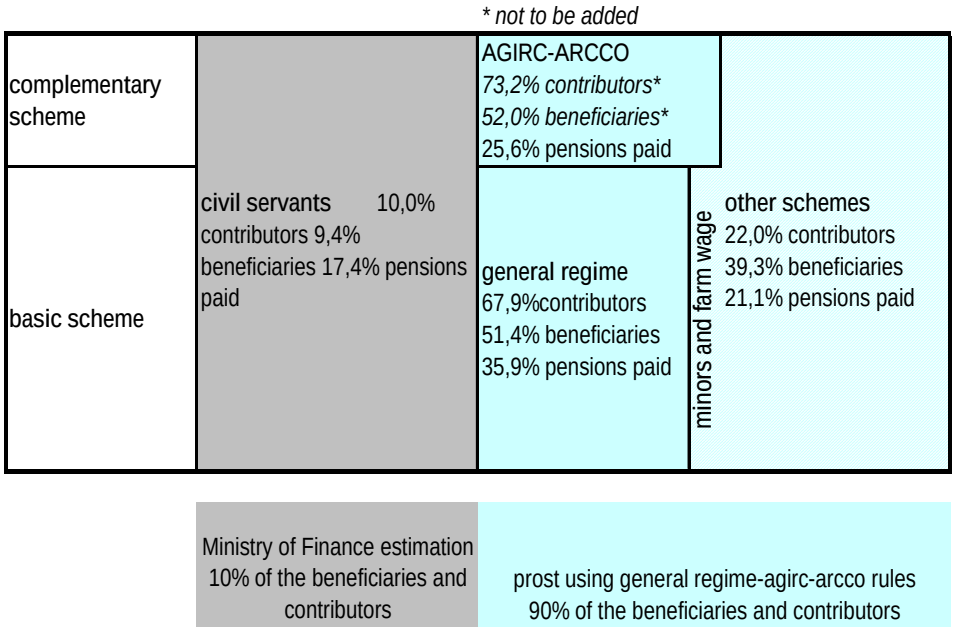
*SSC = social security ceiling = 30 192 euros in 2005

paid to ARCCO: 60% employer 40% employee

paid to AGIRC: 62,07% employer 37,93% employee

1.3 Running PROST for the private sector social security.

Data used to run PROST refer to the general regime AGIRC and ARRCO rules. The amounts are thus extended to include specific schemes such as local government and hospital civil servants schemes (CNRACL), own account workers (CNAVPL, CANCAVA, ORGANIC), and some special schemes financed by the state by the mean of subventions (state owned companies schemes[17] -SNCF, RATP,…- or declining profession schemes -minors, sailors, farmers, State workers…).



The benefit formula of the main regime was used and simply extended to the whole population covered by the social security schemes (thus excluding the State civil servants). Macro economic assumptions and projections from 2005 to 2050 are the one provided to the Aging working group (AWG) of the European Commission[18]. Mortality tables are the one published by the INSEE and used by the COR. Data on labour are available from the INSEE. Data on social security are available from the social security regimes (CANVTS, AGIRC, ARRCO).

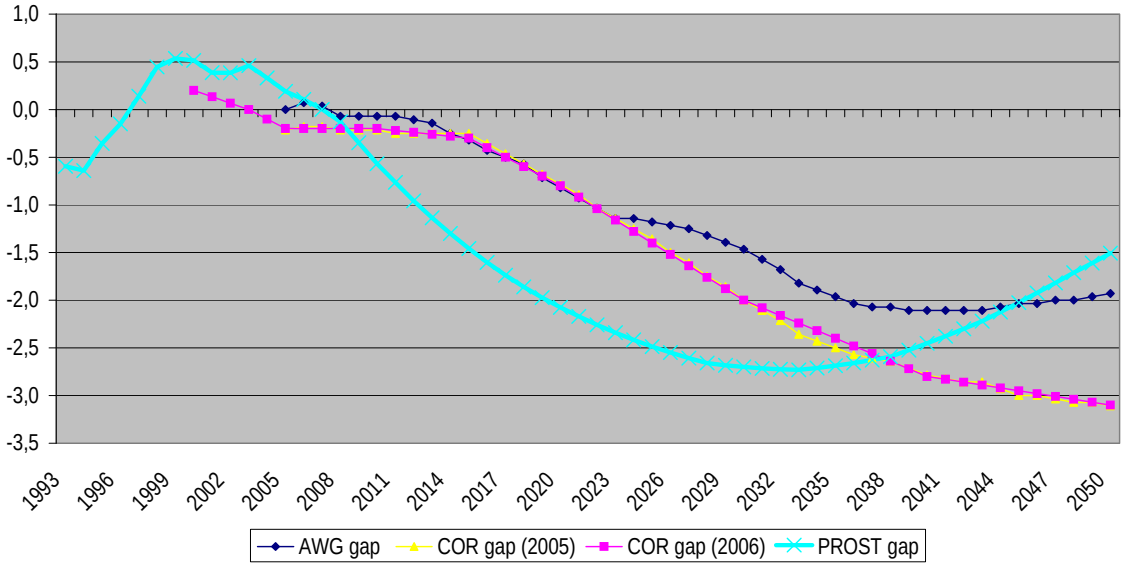
[17] From 2005, the EDF and GDF schemes are now included in the general regime and the complementary scheme i.e. social security for the bulk of it. The small part in excess is maintained as an employer scheme.

[18] See European Commission [2005]

PROST provides the accrued to date pension liabilities using the PBO method In order to gauge the quality of the PROST estimates, the results have been compared to official data. For the social security, the national statistical institute (Insee) runs a micro-simulation model (Destinie). Accrued to date pension liabilities using the PBO method were published for 2005 with 2050 as time horizon[19]. The calculation was based on the benefit formula of the main schemes, which covers about 70 percent of the population. The results were extended to the whole population thanks to data collected from the social security offices by the "Conseil d'Orientation des retraites" (COR), a public body devoted to the pension reforms follow-up. Destinie provides several *scenarios*, using in particular several discount rates. The result of the comparison is reported in table 1.

The financing gap calculated by PROST fits roughly with both the estimates of the AWG and the COR. The reasons for differences are mainly in the use of a simplified benefit formula (for example, it was not possible to take into account the benefits caused by children) and the use of a unique formula to describe the diverse situation of the different social security schemes.

Four estimates of the financing gap



For data in annex 4, PROST was run with a 2 percent discount rate and 2085 as time horizon.

2. Private pensions

Private pension are still poorly developed in France. Apart from book reserves, on which statistical data are scarce, they were located exclusively in insurance corporation. In 2003, the PERCO a new type of employer pension funds based on investment funds is created. The French transposition in 2006 of the European directive on pension funds provided some tools for further development. Insurance companies are entrusted with employer pension funds. The PERP is a personal retirement scheme run by insurance corporation. Data for outstanding amounts, contribution and pension in insurance contracts are publish by the professionnal association of insurance companies, the Fédération française des sociétés d'assurances (FFSA). The professionnal assiocation of investment funds (AFG) publishes similar dat on PERCO.

DB schemes and book reserves include:

[19] See Blanchet, Ouvrard [2006], Conseil d'orientation des retraites [2006]

- DB plans in insurance companies, where the risk is born by the employer (art. 39 CGI, “indemnités de fin de carrière”)
- Book reserves have been estimated from a Mercer study on pension liabilities of CAC40 groups in 2005 and 2006. The amounts not covered by financial assets have been kept and further reduced for the share of non resident employees of the group.To estimate the amount form 1995 to 2004, the increase in DB insurance companies has been used. The information being very scarce, transcation flows have been set as a difference between outstanding amounts.

Private pensions, data sources, estimation methods and classification

outstanding amounts as at en 2006, in euro million

nature	classification in the present study	sources	type	status in fin. accounts	reserves	contributions	pensions
	life insurance and other DC plans						
pension in life insurance	*insurance contracts with fiscal provisions*						
	defined contribution (art 82 CGI)	FFSA	dc	life insurance reserves	2 734	190	160
	defined contribution (art 83 CGI)	FFSA	dc		20 933	1 899	1 224
	individual workers (Madelin)	FFSA	dc		11 154	1 705	188
	farm worker	FFSA	dc		2 214	205	37
	specialised insurance corporations						
	Institution de prévoyance	estimates		life insurance reserves	4 000	?	17
	Institutions de retraite supplémentaire	estimates			19 600	?	83
	Mutual insurance	estimates			15 000	?	63
life insurance	individual pension plans						
	PERP	FFSA	dc	life insurance reserves	2 350	852	0
	other individual plans	FFSA	dc		29 041	3 520	893
pension in pension funds	*specialised financial corporation*						
	PERCO	AFG	dc	mutual funds shares	761	432	0
pension in employer sector (risk born by the employer)	**DB plans and book reserves**						
	defined benefit (art 39 CGI)	FFSA	db	life insurance reserves	30 993	2 797	1 812
	retirement benefit	FFSA	db		11 901	1 275	696
	companies net liabilities	Mercer	?	not yet recorded	25 674	?	?

Technical Annex C : Modeling the US social security with PROST

The benefit formula in 2007 is described as:
90 percent of the first 711 monthly indexed dollars earned in one of the best 35 years,
+ 32 percent of the next monthly indexed dollars earned in one of the best 35 years up to 4288 dollars
+15 percent of the monthly indexed dollars above 4288 and under the indexed ceiling.

This is the monthly benefit at 66 years old. It is reduced from 25 percent if the person retire at 62.

Due to this formula, the maximum but unattainable replacement rate is 90 percent. The Social security administration describes a 40 percent replacement rate as usual. The "maximum" replacement rate of our formula is the average. The incremental replacement rate is the result of the division of 64 percent by 45 years.

Benefit Formula Parameters for old age	
Required Years of Service for Basic Replacement Rate	10
Basic Replacement Rate	14,3%
Incremental Replacement Rate	1,43%
Maximum Replacement Rate	64%
Years in Final Average Wage	35
Wages are Valorized to Nominal Wage Growth	100,0%
Pension Indexation To Inflation	100,0%
Actuarial Reduction for Early Retirement	
% Reduction for Each Year Before Normal Retirement Ag	6,0%
Maximum Number of Years of Reduction	4
Revenue Sources	
Contribution from Employees	6,2%
Contribution from Employers	6,2%
Contribution Ceiling Applies for Employers	Yes
Contribution Ceiling Indexation To Nominal Wage Growth	100,0%

	2002	2009	2020	2027
Retirement Age	65	66	66	67
replacement rate for survivors as a % of old age pension	38%	35%	35%	33%

Length of Service at Retirement			
Male		*Female*	
2002	*2050*	*2002*	*2050*
41,0	42,0	37,0	38,0

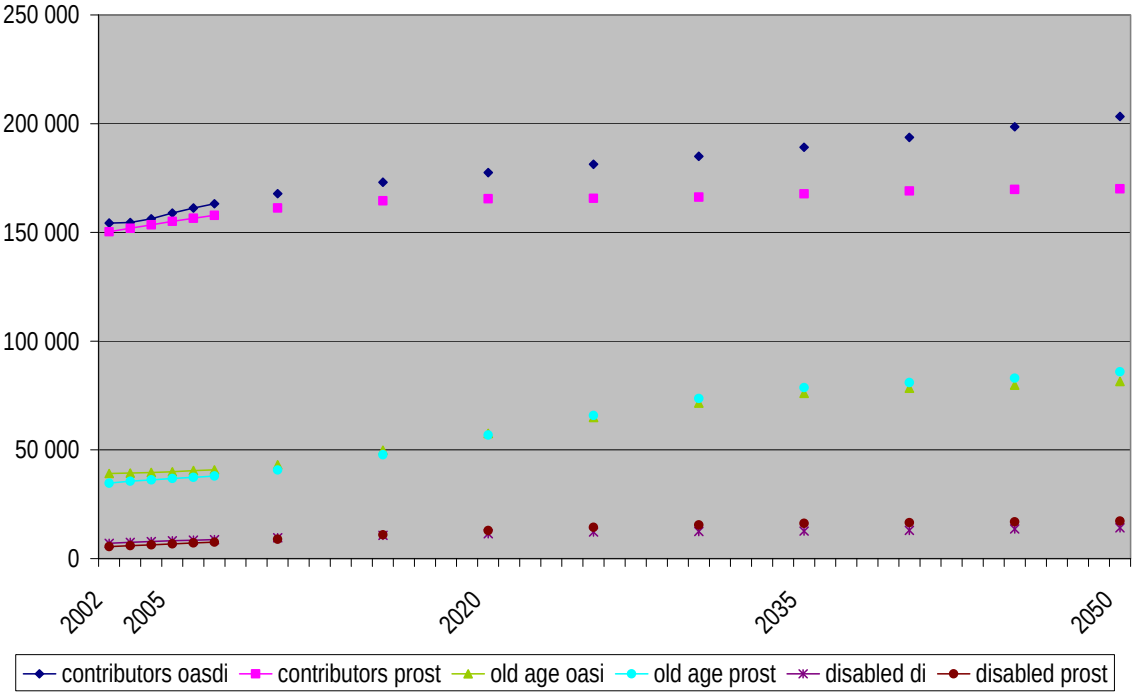
In order to gauge the quality of the estimates, the results of PROST have been compared to the long term estimates of the OASDI actuaries report for 2007. The results are shown in the tables and graphs below.

Pension obligations according to the OASDI report and to PROST,
In years of disposable income

	2002	2003	2004	2005	2006	2007
OASDI closed group unfunds obligation (1)	1,3	1,4	1,4	1,5	1,5	1,5
PROST accrued to date liabilities	2,2	2,2	2,2	2,2	2,1	2,1

(1) equals Present value of future cost less future taxes for current participants less current trust fund

Number of contributors and beneficiaries of the social security (in thousand).



Balance (contribution and taxation less benefit payments) of the social security (in $ billion)