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Internationally Common Features of Public Old-Age Pensions, and Their Implications for Models of the Public Sector

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Abstract

What does the international history of old-age Social Security program design say about the forces creating and sustaining it as a public program? First, because many program features are internationally common, and/or explained by country characteristics, SS may emerge and grow due to systematic political and economic forces. Second, some observations suggest that political forces are important: (a) SS redistributes from young to old, even when the elderly consume as much or more than do the young, and (b) benefits increase with lifetime earnings and are hardly means-tested. On the other hand, it is not simply a matter of the elderly out-voting the young, because: (c) benefit formulas induce retirement, especially in the countries with the largest SS budgets, and (d) similar public pension programs emerge and grow under very different political regimes. We explain how empirical observations, and some currently unanswered empirical questions, relate to various public pension theories.

KEYWORDS: Social Security, Pensions, Elderly, Retirement, Political Economics

As populations age and pension programs continue to grow faster than GDP, more and more government officials seriously consider Social Security reform, regardless of their political persuasion. In order to evaluate a reform of old-age Social Security (hereafter SS), two important questions must be answered. First, is the reform desirable? That is, will the reform improve welfare for a significant number of people? Fully answering this question is impossible without a positive theory of the creation and evolution of SS. For example, the evaluation of a transition to an individual accounts system is different if, say, SS is designed to make sure that the young "save enough" for their elder years, than if SS is designed to induce the elderly to retire so their jobs could be given to more productive young workers. Reform evaluation is also different if the current system derives from the demands of, say, misinformed voters, rather than interest group pressures, or the current system exists as a correction of a market failure.

   The second question in evaluating reform is whether it is sustainable. Is the proposal (like a "fully funded" or an "individual accounts" system) sustainable? An important reason to question the sustainability of fully funded reforms is that no SS program in history has been fully funded for any important length of time.[1] At the same time several SS programs were supposed to be fully funded, but were unfunded by the political system in short order. Take, for example, Chile's original SS program (Foxley et al., 1979, p. 124; Edwards, 1998, p. 37), Germany's original program (Börsch-Supan and Schnabel, 1999, p. 147), one of the original French programs, the first U.S. SS law (passed in 1935, scheduled to come into effect in 1937 and to be partially funded, but rescinded in 1939; Miron and Weil, 1998, p. 301), and Sweden's first system (Palme and Svensson, 1999, p. 366). A number of individual accounts systems have also failed to be politically sustainable, including those in Seychelles, Egypt (Gruat, 1990, p. 416) and St. Vincent (Haanes-Olsen, 1989, p. 19), the system for the American clergy (Mulligan, 1997), and some African (Gruat, 1990, p. 408) and Caribbean (Jenkins, 1981, p. 633) Provident Funds.

   A good theory of SS, therefore, needs to explain what are the social, economic, and political forces that create these programs, keep them in place and allow them to grow. The main purpose of this paper is to present a number of empirical "observations," or potential observations, of the design of social security programs that are important for distinguishing reasonable theories of SS from unreasonable ones. These observations are chosen because of their potential power for distinguishing among theories, and not for the degree to which there is a consensus on their validity or universality. As a result, only some of the observations have been the subject of several previous empirical studies, while three or four others have not been previously explored (perhaps because their theoretical relevance was not previously anticipated?) and are original to this paper. One of our contributions is to present several pieces of evidence suggesting that the relative consumption of the elderly has grown in recent decades to substantially exceed that of the young. Second, we present

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[1]For our purposes, a fully funded system is one which delivers a rate of return greater than the growth of labor income without taxing that income at higher and higher rates. This definition rules out, for example, systems like Singapore's "Provident fund" which appears to be a fully funded system but in fact delivers rates of return to contributors of no more than the rate of labor income growth.

evidence on the international prevalence of the practice of paying old-age benefits as a lump sum versus a life annuity. Third, we make a first attempt to calculate the generational incidence of the large collection of regulations enforced by the federal government. We also look at the empirical relation between retirement incentives and SS program size in additional detail, and further discuss some of the observed effects of political regime change on the size and design of SS systems.

It remains unclear whether all of these observations will hold up to additional study, especially as regards to observations that were rarely explored before this paper. We therefore present the observations in three groups. The first group of eight might be called "stylized facts" since there seems to be a fair amount of agreement on them. These eight are also distinguished from the others because, as we argue here and in the companion paper "Political and Economic Forces Sustaining Social Security" in this volume (hereafter, MX04), they are the most important for evaluating the positive theories. Six other stylized facts are relevant, and have been firmly established by the previous literature. However, in our judgement these six are relatively less crucial for distinguishing positive theories so our presentation of them is more brief, and delayed until Section II. Our Section III poses six other empirical questions that are important for distinguishing positive theories, but whose answers are presently unclear. We offer some very tentative answers to these questions, and hope that one of them intrigues a reader enough to formulate a more precise answer.

Another important step in our paper is to begin to relate theories from the literature with the empirical observations. We propose two ways to partition positive theories: "political" versus "efficiency" and "induced retirement" versus "transfer." The political and efficiency theories usually differ, for example, about the relation between political institutions and SS policies, or the nature of redistribution by SS programs. Theories can also be grouped according to their emphasis on "induced retirement" vs "transfer" motives, each with different predictions about the amount and type of spending done by SS. Our Section IV makes these two kinds of comparisons. Our companion paper MX04 reviews the political and efficiency theories in more detail.

I. Eight Stylized Facts Important for Evaluating Positive Theories

At least 166 countries have public old-age pension programs.[2] In some of the countries, public old-age pensions can be dated back at least a hundred years. Although each of the programs is unique in many respects, they also tend to have many common features. These common design features may help us understand why all these countries have SS programs, what are the forces keeping them in place and perhaps allowing them to grow over time. This section describes the eight empirical regularities which we find to be most important for evaluating positive theories. Four of them have appeared in the literature, and our main purpose is to summarize and synthesize the results from the literature that relate most to the positive theories. A comparison of the SS systems of democratic and nondemocratic regimes briefly appeared in previous studies; we report their results as well as the results of a recent

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[2]U.S. SSA (1997).

paper devoted exclusively to this comparison and utilizing the most recent data. Finally, we apply the Danzinger et al. (1984) and Hurd (1990) methodologies to recent data to estimate the relative consumption of the elderly in eleven countries.

I.A. Social Security induces retirement, with benefits being a declining (and often nonlinear) function of elderly labor income

The majority of SS programs in the world implicitly or explicitly tax the labor income of the elderly (Sala-i-Martin, 1996). Retirement and earnings tests are among the implicit methods. The retirement test means that a person must be retired in order to receive any of his SS benefit. With the earnings test, a SS beneficiary has his benefit reduced in proportion to the amount he earns from a job (the proportion is often referred to as the "benefit reduction rate" or BRR). BRRs are sometimes even 100 percent, that is, $1 of benefits lost for each $1 earned by the beneficiary. Sometimes future benefits are incremented in exchange for benefits foregone (due to earnings or retirement tests) during years worked past the retirement age, increments that are sometimes known as Delayed Retirement Credits (DRC). Mulligan and Sala-i-Martin (1999) find that in 1995, 47 percent of the countries required retirement and had no DRC, 12 percent had a retirement test and an unfair DRC,[3] 11 percent had earnings tests with no DRC, 3 percent had earnings tests with an unfair DRC, and 3 percent had current retirees covered by a previous law that induced retirement. The U.S. case (see below) may suggest that SS programs are reducing retirement incentives over time, but Mulligan and Sala-i-Martin found only five countries eliminating their retirement or earnings tests between 1958 and 1995, while three countries actually adopted retirement tests after having no retirement or earnings test in 1958.

A third work disincentive for persons at or beyond the normal retirement age is that they are liable for the payroll tax if they work but, unlike working persons below retirement age, their production of taxable earnings does not earn them credit toward future retirement benefits. For these reasons, SS tax and benefit formulas explicitly and implicitly tax work by the elderly, and do so at a higher rate than for the young.

Consider, for example, the U.S. SS benefit formulas. Between 1939 and 1959 retirees lost all of their SS benefit if their earnings exceeded a rather low earnings limit by even one dollar.[4] The 100 percent tax was used somewhat less between 1960 and 1971, when a 50 percent benefit reduction rate was introduced on some of the earnings above the exemption amount (Myers, 1993, p. 274).[5] Since 1975, the U.S. has been introducing and

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[3]In other words, the incremented future retirement benefits were less in expected present value than the benefits foregone due to the retirement test.

[4]Those aged 75+ were exempt from the earnings test beginning in 1950, those aged 72+ exempt beginning in 1954, and those aged 70+ beginning in 1982 (Myers, 1993, pp. 272-5).

[5]More examples of 100 percent taxes in the U.S. are found in old-age assistance programs prior to the 1970s. State administered old assistance programs typically

increasing DRCs (House Committee, 1996, p. 31), which by themselves tend to reduce but not eliminate the elderly work disincentive of SS benefits. By 1995, Gruber and Wise (1999, Table 1) calculate the implicit tax rate on earnings to be about 20 percent. Since then, the U.S. earnings test has been eliminated.[6] But the recent U.S. years without the earnings test are very few in the context of the international history of Social Security. Furthermore, as we explain above, even in 2004 U.S. SS tax rules discourage work by the elderly.

In addition to old-age pensions, another quantitatively important subsidy for the elderly is government financed health care. These programs are typically available to all elderly regardless of the amount or composition of their income. However, U.S. Medicare policy has a "secondary payer" provision which requires elderly workers to continue to purchase medical insurance from their employers until they retire, which may act as a tax on elderly work. Requiring government medical subsidy beneficiaries to queue prior to receiving services may also serve to discourage work by the elderly.[7]

International examples are also common: elderly Spaniards and Belgians are not allowed to collect their government pension if they earn any labor income at all (Boldrin et al., 1999, p. 322; U.S. SSA, 1997, p. 330; Pestieau and Stijns, 1999, p. 49[8]). Gruber and Wise (1999) compile eleven OECD country studies for the year 1995 of SS retirement incentives, and find nine of the ten (non-U.S.) countries have SS retirement incentives that exceeded those in the U.S. In three of those countries, SS reduced an elderly person's incentive to work by *an order of magnitude*! Not surprisingly, these are countries with less than 20% of their elderly employed.

I.B. Spending on the elderly dominates government budgets in developed countries

Old-age subsidies are very important parts of government budgets in developed countries. Mulligan and Sala-i-Martin (1999) calculate that nearly 10 percent of U.S. GNP is spent by government at all levels on those aged 65 and over in the U.S., including Social Security (5 percent of GDP) and Medicare (2 percent of GDP). Furthermore, American government expenditures on the elderly are smaller relative to other developed countries. For example,

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(implicitly) taxed earnings at a 100 percent rate (Myers, 1993 pp. 827, who also points out that some states administering old-age assistance exempted the first 80 dollars of monthly income).

[6]The recent law change eliminated the earnings test for persons over the normal retirement age. For persons below that age, the retirement incentives were arguably already pretty small.

[7]There are other potential effects of government financed health care on retirement; the interested reader should see Madrian and Beaulieu (1998).

[8]The Belgian rule may have changed in recent years since, according to U.S. SSA (1997, p. 35), 282118 francs ($8993) could be earned in 1997 without sacrificing the pension benefit.

public *pensions* represent 13 percent (of GDP) in Italy, 16 percent in Sweden, and 20 percent in Belgium. Some less developed countries also have large SS programs. For example, SS represents 7 percent of GDP in Brazil.[9] Even larger shares are computed when medical and other old-age subsidies are added to public pensions. In some countries, the government even pays for travel expenses for the elderly to go on vacation. An example of this is Spain, with its INSERSO program (translated as "National Institute of Social Services," now called IMSERSO).

I.C. Social Security is mostly pay-as-you-go and redistributes across cohorts

Mulligan and Sala-i-Martin (1999) show that the overwhelming majority of the programs (98 percent) have pay-as-you-go features.[10] Of these, a fraction have full-funded much, but not all, of their program. This means that most SS programs throughout the world entail intergenerational redistribution in favor of the old. In fact, the cross-cohort redistribution is much more important than redistribution in any other dimension by these programs (e.g., Auerbach et al., 1992; McClellan and Skinner, 1997; Jensen and Raffelhuschen, 1997; Hagemann and John, 1997; House Committee, 1996, table 1-50).

Other tax and spending policies favor the elderly, although their generational incidence may not be as visible. Many governments, for example, (especially in Europe and countries with high unemployment rates) give tax breaks and other benefits to firms and older workers who agree to early retirement, with the purpose of managing the "unemployment problem." Obviously such taxes and subsidies favor the elderly since they tend to get "subsidies" to leave their jobs, "pensions" for staying retired, and leisure. Auerbach, Kotlikoff, and colleagues have made a number of calculations of the generational incidence of public policy as a whole, including Social Security, health, education, and other programs. They usually find the net generational transfer to be large, in the direction of older cohorts. Social Security and health programs are the major contributors to this result: "the real culprit in most of the countries with imbalances is the interaction of their population aging with their large and growing transfer payments to the elderly in the former pension payments and health care expenditures." (Auerbach et al., 1999, p. 6). Education spending does redistribute in the other direction, but to a much lesser extent (Auerbach et al., 1999, p. 77).

Public policy as a whole usually, but not always, redistributes from young to old. Auerbach et al. (1999, p. 5) explain how "Canada appears to be essentially in generational balance. The remaining three countries – New Zealand, Thailand, and Sweden – have negative imbalances; that is, their policies, if maintained, would leave future generations facing lower lifetime net tax rates than current newborns." More research is needed on the time pattern of generational redistribution, but it is likely that even in these four countries

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[9]These are 1989 numbers from IMF (1991).

[10]A pay-as-you go system pays retirees according to the labor income taxes levied on the young, which typically means returns are less than "fair" unless labor income tax rates increase over time.

public policy as a whole was redistributing from young to old during the growth years of their SS programs.

I.D. In the most developed countries, elderly's net income nears or exceeds nonelderly's

SS is sometimes modeled as an anti-poverty program, rather than a program that transfers from the politically weak to the politically powerful. According to the anti-poverty theories, consumption by the elderly would have been much less than consumption by the young if it were not for SS. The purpose of SS, so the argument goes, is to *partly* close this consumption gap, but not fully close it because of the deadweight costs of redistribution, and certainly not to reverse the sign of the gap (see also the discussions of Danziger et al., 1984, and Hurd, 1990). Conversely, it is supposed that SS would be a lot smaller if the elderly could otherwise obtain a good standard of living. This is the essential, although usually implicit, argument behind mandatory private retirement savings policies, namely that there would be no "need" for cross-cohort redistribution if the elderly had other sources of income.

It is hard to know for sure what elderly consumption would be in the absence of SS, but we can measure whether elderly consumption exceeds young consumption in the presence of the program, and thereby obtain some insight into the validity of the anti-poverty view. This section begins with estimates of the elderly's relative *money income* for eleven countries. Section I.E. recalls previous findings that elderly relative living standards are understated by their relative money income, and applies the consumption measurement methodologies of Danziger et al. (1984) and Hurd (1990) to French and more recent U.S. data.

Table 1 suggests that elderly income net of SS taxes and transfers nears or exceeds nonelderly's, and that elderly's relative money income may be higher in European countries than in the U.S. The first column is pension (old age, disability, and survivors) spending as a percentage of GDP, which we convert in the second column to a percentage of national labor income by dividing by 0.65.[11] Notice how column (2)'s percentage typically meets or exceeds the percentage of the population that is elderly, shown in the next two columns for two definitions of elderly. Since pension programs are financed out of labor income, and labor income cannot be negative, a larger column (2) implies that the average elderly person has more labor income net of SS taxes and transfers than the average person. These basic data are accepted in the literature,[12] where it is recognized that pension programs have gotten large considering the size of the elderly population. Our contribution is to translate these basic data into estimates of relative elderly money income, which can be compared with previous U.S. calculations of relative living standards.

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[11]The basic result – that elderly's relative money income is higher in Europe – is the same if we use other labor shares in the range [0.6,0.7], and/or allow labor's share to vary across countries in this range.

[12]Canada's public pension spending seems low, but we have verified this from other sources, including Gruber (1999, p. 73).

Table 1: Aggregate Estimates of Elderly Relative Money Income, 1995
(11 countries sorted by our first estimate of relative money income)

| | basic data | | | | 3 estimates of per capita elderly income, relative to nonelderly, based on:[‡] | | |
| | pensions, % of:[*] | | pop. %, aged:[†] | | | | |
country	GDP	labor inc	60+	65+	60+	65+	60+, w
Japan	6.6	10.2	20	15	0.45	0.64	0.66
Canada	5.4	8.3	16	13	0.48	0.61	0.64
US	7.2	11.1	17	13	0.61	0.83	1.07
UK	9.9	15.2	21	16	0.68	0.94	0.84
Sweden	11.2	17.2	22	17	0.74	1.02	0.98
Spain	10.6	16.3	20	16	0.78	1.02	0.93
Belgium	12.0	18.5	21	16	0.85	1.19	1.01
Germany	12.0	18.4	20	15	0.90	1.28	1.06
Neth.	11.9	18.2	18	13	1.02	1.49	1.16
France	13.3	20.5	20	16	1.03	1.35	1.21
Italy	15.0	23.0	22	17	1.06	1.46	1.30
	(1)	(2)=(1)/.65	(3)	(4)	$(5)=\frac{(2)}{100-(2)}\frac{100-(3)}{(3)}$	$(6)=\frac{(2)}{100-(2)}\frac{100-(4)}{(4)}$	(7)[‡]

Notes: [*]public pensions include old age, disability and survivors (OECD, 1997)
[†]Aged 65+ population from U.S. SSA (1997, Table 2). Aged 60+ from U.N.
[‡]Columns (5) and (7) assume that public pension income accrues only to persons aged 60+; column (6) assumes aged 65+. Columns (5) and (6) assume that the elderly have no labor income; column (7) estimates elderly labor income (as a fraction of pension income) from Gruber and Wise (1999, Figures 1.9, 2.12, 4.10, 5.14, 6.11, 7.8, 8.11, 9.10, 10.12, 11.11, and Table 3.1). i.e., column (7) uses the same formula as column (5), except that column (2) is first inflated by proportion [1+(elderly labor income)/(public pension income)]

Assuming for the moment that capital income has the same age distribution as labor income net of SS taxes and transfers, we use columns (2)-(4) to construct estimates of elderly per capita money income as a ratio to nonelderly per capita money income. The estimates (5)-(7) vary according to assumptions about the age distribution of SS benefits, and the

amount of labor income earned by the elderly. Assuming that the elderly earn no labor income themselves, and that pensions are earned only by persons aged 60+, the relative money income of the elderly is just column (2) divided by (100 minus column (2)), adjusted for the relative elderly population size – see the formula at the bottom of column (5). If we assume instead that persons aged 65+ have all of the pension income and earn no labor income, column (6) has the appropriate formula. Both columns (5) and (6) suggest that elderly money income per capita is near, and sometimes exceeds, nonelderly income per capita, and that relative money income is lowest in the U.S., Canada, and Japan. Assuming that the adjustments to relative money income required to calculate relative consumption are in the same direction in the ten foreign countries as in the U.S. (namely that relative consumption exceeds relative money income), this suggests that elderly consumption per capita exceeds nonelderly consumption per capita in several countries.

The various chapters in Gruber and Wise (1999) explain how household income composition varies with age in the eleven countries shown in Table 1, suggesting two reasons why columns (5) and (6) may report downward biased estimates. First, capital income is a more important income source as people age. Second, the elderly earn some labor income themselves, especially between the ages of 60 and 65. Our column (7) uses their data on the relative importance of elderly labor and public pension income to adjust column (5)'s estimate.[13] Column (7) still suggests that elderly may have more money income per capita, but that relative money income in the U.S. is as high or higher than in several of the other ten because the U.S. elderly have more labor income than in the other countries.

The same may be true for undeveloped countries, although data are more difficult to obtain and the tendency for poor elderly to merge with younger households is probably greater. D. Gale Johnson (1998, pp. 2-3) calculates very similar rural incomes per family member across age groups in his study of the Chinese provinces of Sichuan and Liaoning.

I.E. Elderly relative living standards are understated by their relative money income

Relative money income is just a first indicator of relative living standards. Here we offer relative consumption estimates for the U.S. and France, based on the previous literature. Although it seems clear that elderly relative living standards are understated by their relative money income, entire papers should be devoted to calculating the exact amount of understatement. Our purposes here are merely to give the reader an impression of the overall result, and to clarify the kinds of adjustments required for an ideal calculation.

We begin with the U.S. in 1973 and 1997, with elderly defined to be persons aged 65+. In 1997, the elderly-nonelderly ratio of U.S. median imcomes was 0.64 and means was 0.72.[14] In 1973 (means, CEX), 1973 (means, CPS) and 1973 (medians, CPS), the ratios were

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[13]We do not attempt to make an adjustment for capital income because the estimates reported in Gruber and Wise are suspiciously low.

[14]Census Bureau (1998), Table FINC-03. 0.72 not directly comparable to the relative *per capita* money incomes shown in the previous Section (Table 1), because 0.72

0.49, 0.63, and 0.49, respectively (CEX: Danzinger et al. 1984, pp. 177-9, CPS: Census Bureau 2002, Table F-11). In order to measure consumption per capita, several adjustments to income are necessary. To what extent:

(1)   do the elderly own larger stocks of household durables and equity?
(2)   are different taxes paid by the elderly?
(3)   do the elderly head smaller households with fewer children?
(4)   can the elderly draw down asset stocks?
(5)   do the elderly enjoy in-kind government transfers?
(6)   do the elderly have time available for household production or economizing on market expenditures?
(7)   do the elderly avoid job related expenditures?
(8)   do the elderly have gifts as an additional income source?
(9)   do the elderly enjoy Medicare and Medicaid as additional consumption?
(10)   do the elderly misreport money income?
(11)   do the elderly have greater medical needs?
(12)   do the elderly miss job-related fringe benefits?
(13)   do the poor elderly live with nonelderly households?

Items (1)-(9) suggest that the elderly would consume more when relative money incomes were the same. Some research (Radner, 1981) suggests that the elderly understate money income in response to census surveys significantly more than do the nonelderly, so item (10) may also go in the same direction as the previous items. Items (11)-(13) are biases in the other direction.

Danziger et al. (1984) have quantified items (1)-(3) for 1973, and their results are shown in the lefthand bar in Figure 1. The lowest bar's height of 0.486 indicates the reported elderly household cash income from all sources (including SS), expressed as a ratio to the cash income of nonelderly households. Accounting for the greater household durables and equity owned by elderly households suggests that the elderly consume 9 percent more than is indicated by their relative cash income and increases the relative consumption estimate from 0.486 to 0.522. Special elderly tax treatment was another 10 percent of elderly household cash income in 1973, increasing the relative consumption estimate from 0.522 to 0.562. Elderly households are significantly smaller than nonelderly households, although this is mitigated somewhat by the fact that the nonelderly households include children and children are thought to have lesser "needs" than adults. The net result is to revise the estimate of 1973 relative consumption per adult from 0.562 to 0.853. Household

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is relative household money income. Below we add 0.29 to 0.72 as an adjustment for relative household size and composition. We guess that 0.20 of the adjustment is for household size (our Table 1 makes no adjustment for household composition), so that 0.92 = 0.72+0.20 would be comparable with Table 1's estimates, at least if the relative importance of reported capital income did not vary with age.

composition is their most significant adjustment, although it may not be the most significant on the list (1)-(13) since the elderly enjoy 61 percent more leisure time.[15]
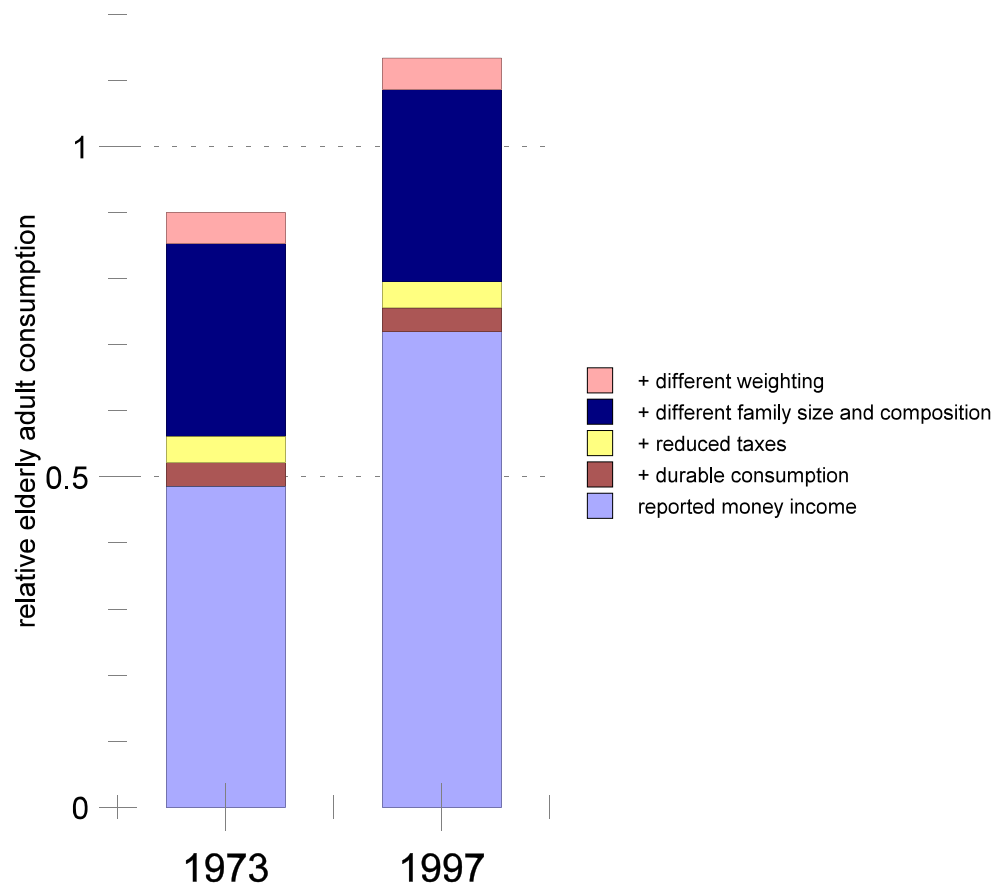
Figure 1 American Relative Elderly Adult Consumption, 1973-97
1973 from Danziger et al. (1984).
1997 from the authors, based on Danziger et al.'s method

The relationship between income and household size differs between the elderly and nonelderly populations (Danzinger et al., pp. 184), so it matters whether relative incomes are weighted by households or persons. The relationship between household income and the propensity to live in a household headed by someone of a different elderly/nonelderly status also varies with age, so it also matters whether relative per capita incomes are classified according to the age of the head or assigned to individuals and then classified according to

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[15]Authors' calculations from the March 1997 CPS, assuming daily leisure hours = 16 - daily hours worked.

the age of the individual. So a final adjustment made by Danzinger et al. is to reweight their 1973 data and compute that the 1973 relative consumption per adult is 0.900, rather than 0.853.

We use Danzinger et al.'s 1973 numbers to construct a rough estimate of 1997 relative consumption. As computed by the Census Bureau (1998), relative elderly reported cash income has risen substantially, a finding that we enter in Figure 1 as the lower part of the right-hand bar with height 0.72. We then make the conservative assumption that the Danzinger et al. adjustments have been unchanged as a fraction of *nonelderly* income over the period 1973-97. This is a conservative assumption because, presumably, some of the adjustments increased over time together with elderly money income.[16] We then find elderly consumption to exceed nonelderly consumption by 13 percent in 1997.[17]

Hurd (1990, Table 10) quantifies items (2), (3), (5), (10) and (12), and suggests that Danziger et al. (1984) missed two quantitatively important items, and mis-estimated a third. First, Hurd's calculations suggest that item (5) is significantly greater than item (12) in magnitude.[18] Second, the effect of household-size on the relation between consumption and money income may have been understated. Third, the underreporting of asset income by the elderly seems to be substantial. Figure 2's left bar displays each of Hurd's adjustments, and we see that elderly consumption may have exceeded nonelderly consumption even in the 1970's. Since Hurd did not have a durable consumption adjustment, we add Danziger et al.'s adjustment at the very top of the bar, so that the 1979 bar has a total height of 1.32. The right bar then offers an estimate of the 1997 relative elderly consumption, beginning with

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[16]We find some direct evidence that elderly federal tax favors have increased substantially over time. Nelson (1983, Table 1) found tax expenditures on the elderly to increase from 1974 to 1982 by 464 percent in nominal terms and 215 percent as a ratio to GNP (U.S. Council of Economic Advisers, 1992). 1997 fiscal year amounts for the tax expenditure categories studied by Nelson can be found, among others, in OMB (1998). Combining these sources, we find a 13 percent decrease in the ratio of elderly federal tax expenditures to GNP over the period 1982-1997, which implies a net 182 percent increase in the GNP ratio over the years 1974-97.

[17]If we do the 1997 calculation beginning with the ratio of median elderly family income to median nonelderly family income (0.64), we find the elderly consuming 6 percent more per adult. Other percentiles could be studied (eg., how does the 10th percentile elderly compare with the 10th percentile nonelderly? Danziger et al. (1984, p. 188) estimate that about 4/5's of nonelderly households are net taxpayers, while only 1/5 of elderly households pay more in taxes than they receive in transfers), but we explain in Section VI.A how the mean and median comparisons are the more relevant ones if the anti-poverty theories are to explain why a *universal participation* program like SS would be used to alleviate elderly poverty rather than a means tested program.

[18]Hurd reports the aggregate effect of items (2), (5), and (12), which can be compared to Danziger's 1973 calculation of item (2) alone.

the left bar and using the same procedure as used in the production of Figure 1.[19] We see how 1997 elderly consumption might be estimated to exceed nonelderly substantially; the right bar's total height is 1.52. Even without regard for the durable and capital income adjustments, elderly consumption seems to exceed nonelderly consumption by 20 percent or more.
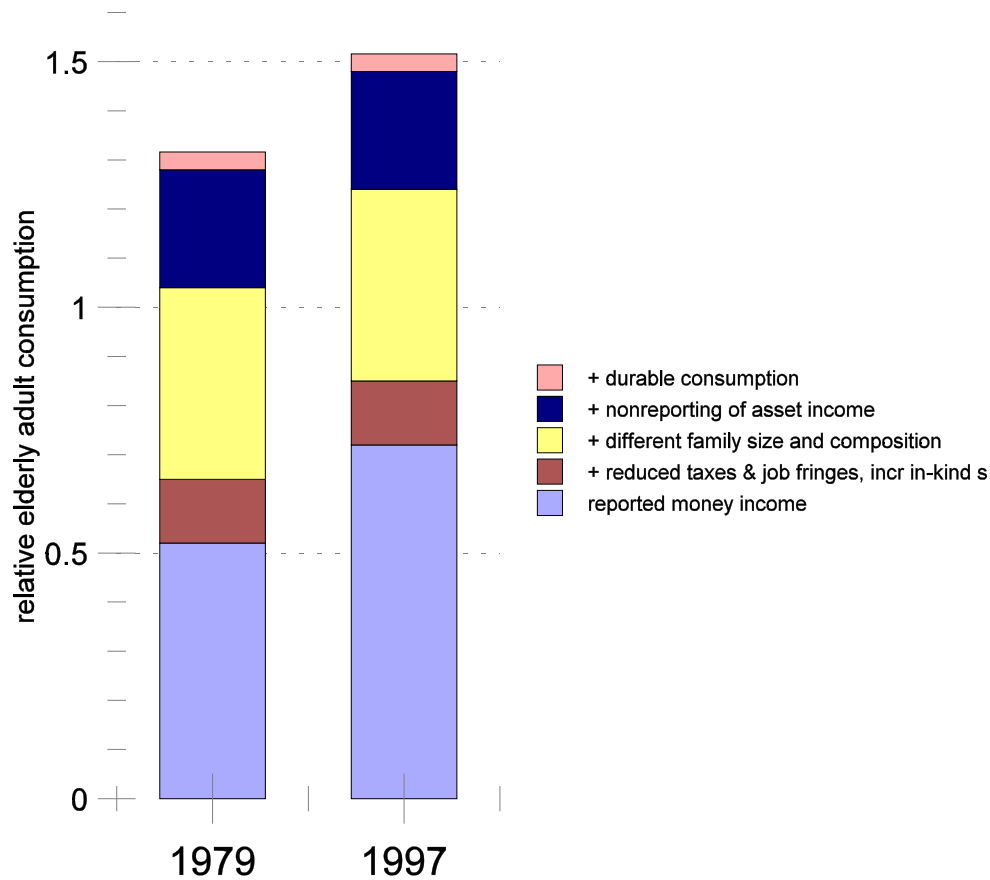
Figure 2 American Relative Elderly Adult Consumption, 1973-97
1979 from Hurd (1990).
1997 from the authors, based on Hurd's and Danziger et al.'s methods

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[19]Remember that our procedure assumes that the various adjustments are the same fraction of nonelderly money income in 1979 as in 1997. This assumption may be fairly accurate for the items considered in Figure 1, but Figure 2's adjustments include one for the value of elderly medical subsidies, and these have grown dramatically as a fraction of nonelderly money income. For this reason, our 1997 value of "reduced taxes and fringes, increased in-kind subsidies" is too small.

Fuchs' (2001) calculations for the calendar year 1997 can be used to calculate an upper bound for item (11), namely that some of elderly expenditure goes toward medical care. If we suppose that none of his public health care expenditure counts as personal income (and that personal income is essentially the same as the "money income" concept used by Danzinger et al. and Hurd), then Fuchs' Table 2 implies that health care expenditure is 48 percent of money income for the elderly. Since the 1997 money income bar has height 0.72 in Figure 2, and the young presumably have some health care expenditure, we have that item (11) reduces the 1997 consumption bar by no more than 0.34. We also suspect that Figure 2's 1997 consumption bar is too short for comparison with Fuchs' calculations, because our Figure 2's understatement of the "reduced taxes and fringes, increased in-kind subsidies" item (see our previous footnote). An update and improvement of Danzinger et al.'s and Hurd's analysis is certainly appropriate, but it appears difficult to make the case that the elderly are consuming significantly less than are nonelderly adults.

Another indicator of the generous government treatment of the elderly is the poverty rate among the old as compared to that among children. Preston (1984) shows how the American old are significantly better in this dimension and how their advances in this dimension have coincided with the growth of SS.

A French 1995 household budget survey measures consumer expenditures, which we report in Figure 3 as averaged by the age of household head.[20] The solid bars graph consumption adjusted for family size and composition by the INSEE, which we convert to 1995 dollars using an exchange rate of 5.36.[21] The hollow bars graph unadjusted consumption. Since the majority of French men retire by age 60 (Blanchet and Pelé, 1999, Figure 3.11), it is interesting to compare the consumption of the groups aged 55-64 and aged 65-74 with that of younger age groups. We see the two older groups consuming somewhat more when adjusted for family composition and somewhat less unadjusted. It should be noted that the calculations in Figure 3 include housing and durables services only to the extent that households are paying rent or making mortgage payments.[22] Presumably both the incidence and tenure of French home ownership are highest among older age groups as they are in the U.S., so true consumption is understated most in Figure 3 for the aged. The biases (5)-(13) are also unaccounted in Figure 3.

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[20]The INSEE (1995) data was kindly provided by Didier Blanchet.

[21]The first adult (age 15+) is counted as 1 consumer unit, additional adults 0.7, and children 0.5. Exchange rate from U.S. SSA (1995).

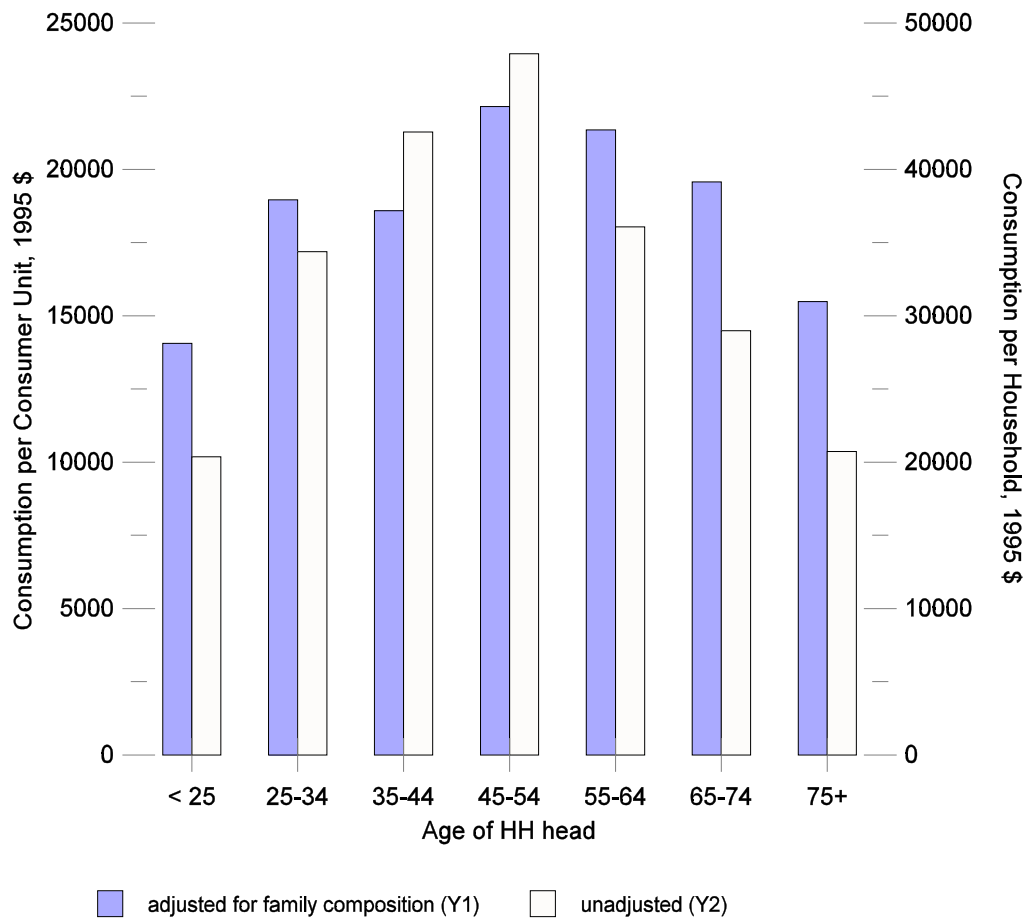[22]Didier Blanchet, personal correspondence, February 25, 1999.

Figure 3 French Consumption Age Profiles, 1995

A number of studies, including Banks, Blundell and Tanner (1998), Bernheim, Skinner, and Weinberg (2001), Hurd and Rohwedder (2003), report that consumption drops at the time of retirement. These reports are consistent with our findings because consumption may be rising enough prior to retirement that the new retirees still consume more than many workers even though they consume less than do the relatively few workers near retirement. For example, when compared with young workers, the workers near retirement probably have more money income, have accumulated more consumer durables, home equity, and financial assets, and have seen children leave the household.[23] All of these

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[23]BLS calculations from the 1999 CEX cross-section (series CXUTE000301-8 and CXUPIP00301-8) show how household consumption expenditure (excluding pension contributions) rises from about $21,000 when head is 24 years old or younger, to $33,000 with head aged 25-34, to $42,000 with head aged 45-54. Fernandez-Villaverde and Krueger

behaviors are associated with adjustments shown in our Figures 1 and 2, and would be relevant when calculating income and consumption profiles for workers just prior to retirement.

I.F. Benefits do not depend on non-labor income, and increase with pre-retirement earnings

Although SS benefits are tightly linked to the beneficiary's labor income, 98 percent of the countries for which we have data have no link to the beneficiary's non-labor income. Only two of the 89 countries studied by Mulligan and Sala-i-Martin (1999) have old-age public pension formulas which depend on the non-labor income of the beneficiary.

Mulligan and Sala-i-Martin's finding is based on analysis of benefit formulas, but in principle benefits and non-labor income might be linked in other subtle ways. For example, the non-labor income of the elderly could be directly taxed more (or less) heavily than the non-labor income of the young. We have not systematically studied foreign tax systems in this regard, but the U.S. and other governments seem to do just the opposite by having favorable tax treatment of retirement savings, and allowing elderly taxpayers special exemptions from property and home sales taxes. Another example is the taxation of SS benefits in a way that is related to asset income. The U.S. has taxed SS benefits since 1983 (Myers, 1993, p. 147) and, because marginal tax rates vary with a taxpayer's income, the amount of that tax has some relationship with a beneficiary's asset income. On the other hand, the U.S. has offered special tax exemptions to the elderly for an even longer period and the after-tax value of these exemptions increases with asset income.

Another way to (implicitly) reduce old-age benefits as a function of non-labor income is to have a special means-tested program for the elderly in addition to a public old-age pension program. The U.S. has such a welfare program, Supplemental Security Income (formerly Old Age Assistance). However, it is a small program compared with SS and Medicare – the old-age portion of SSI is than $20 billion, as compared to more than $500 billion for SS and Medicare (House Committee, 1996; OMB, 1998, Table 8.5). Medicaid is another welfare program enjoyed disproportionately by the elderly because they have a greater demand for medical care. However, this has been a quantitatively important program only in recent years, and did not even exist for most of the history of SS. Furthermore – when taken together with the favorable tax treatment of elderly non-labor income – it is not clear that old-age benefits are, on average, reduced in an important way with elderly non-labor income.

Although benefits decline with earnings late in life, benefits typically increase with average annual earnings before retirement. For 130 out of 139 countries studied by Sala-i-Martin (1996), the pension is linked to previous wage history. In some countries the benefits are simply proportional to the contributions. In some others (e.g., Canada, Denmark, Finland, Iceland, Japan, New Zealand, Norway, and Sweden) the pension has two or even several tiers: a basic pension, usually unrelated to previous contributions, provides a minimum amount of income for all the elderly. A second tier relates the pension benefits to

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(2002) show how households headed by 65-year-olds have about 15 percent fewer adult equivalents than those headed by 50-year-olds.

the history of previous wage earnings. In some countries, the income earned during the years nearest to retirement typically count more than the income earned earlier in life. In some others (e.g., U.S.), nearly the entire life history of earnings is used and each year is given equal weight. Other countries (e.g., Turkey) only use the very recent earnings history prior to retirement for benefit calculations.

A related question is whether SS, tax, and other government policies for the elderly redistribute from rich to poor (hereafter, "progressive") or vice-versa (hereafter, "regressive"). Many studies of American SS (Burkhauser and Warlick, 1981; Garrett, 1995; Coronado et al., 1999[24]), Medicare (McClellan and Skinner, 1997), and elderly tax policy (Nelson, 1983) suggest that government policy toward the elderly is neither progressive nor regressive.[25] Third World Social Security Programs appear to be regressive (Pampel and Williamson, 1989, page 10; Midgley, 1984). Several European programs have far more generous benefits at higher salary levels (apRoberts, 1996, pp. 109, 112) and may thereby be more regressive than American SS. Perhaps these results are surprising, because, in some countries at least, a year of retirement benefits is a smaller fraction of lifetime income for the rich (see, for example, the U.S. replacement rate calculations by House Committee, 1996, p. 27). This observation would be enough for the incidence analysis if income were uncorrelated with the likelihood of paying taxes or receiving benefits, but these studies point out that the (lifetime) poor enter the labor market (and begin paying payroll taxes) earlier in life, have shorter life expectancies, and are less likely to be married (and thereby value less the widow component of benefits). Furthermore, especially in developing countries, the poor are less likely to be in the urban areas where it is easiest to know about and collect benefits, more likely to be in a minority group treated differently by the program, and less likely to be in an occupation preferentially treated by the program. Mulligan and Philipson (2000) suggest that, if SS has had the effect of changing life cycle consumption profiles among the poor (perhaps intentionally, as in some of the positive theories we discuss below, or perhaps as an accidental byproduct of other policy motives), then SS may be substantially more regressive than suggested by previous studies because the poor value the income they give up in taxes when young more than the additional old-age benefits these taxes (with interest) might purchase. SS may also appear regressive in recent years if we take consumption as the measure of well-being, and include the age dimension of redistribution, because the elderly seem to consume more than do the nonelderly (see above).

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[24]More specifically, Coronado et al. (1999) consider future retirees as distinguished by their lifetime income. They estimate that, under current law, the bottom quintile will have paid 3.3 percent of their lifetime income *more* in Social Security taxes than they receive in benefits. The top quintile are also expected to pay more in Social Security taxes than they receive in benefits, but only an amount equal to 2.6 percent of their lifetime income.

[25]Boskin et al. (1987) is one study showing a little progressivity in the old-age and survivors system. Bhattacharya and Lakdawalla (2002) claim that Medicare is progressive. Lee et al. (1999) find a little progressivity in the Medicare system between 1990 and 1995, mainly due to increased spending on home health care; the authors speculate that this change is temporary.

I.G. Similar public pension programs are found in democracies and nondemocracies

Pension programs seem to appear in democratic countries as much as they do in nondemocratic ones. One of the very early programs was created in Emperor Wilhelm's autocratic German state in the 1880s. Other examples of nondemocratic countries that created such programs are Lenin's USSR in 1922, King Alfonso XIII's Spain in 1919, Emperor Hirohito's Japan in 1941, Kuwait in 1976, General Peron's Argentina in 1946, and General Avila-Camacho's Mexico in 1943. Examples of democracies with early SS systems include the United Kingdom in 1908, Sweden in 1913, or the United States in 1935.[26]

Modern Soviet and Chinese (presumably nondemocratic) pension systems are interesting case studies. The Soviet Union 1960-1990 had a system similar to Western European systems, including retirement at early ages, pay-as-you-go, and payroll taxes (although not "paid by employees") (Liu, 1993, p. 61). These basic similarities with American and Western European programs did not change under, or since, Gorbachev (Liu, 1993, pp. 62ff). China also has a system for urban workers with a number of similarities to Western European systems including payroll taxes, benefits based on pre-retirement earnings, no means test, pay-as-you-go, and probably induced retirement (Tyabji, 1993, pp. 56-59; SSA, 1995). Hong Kong (with a very different political system), on the other hand, has a public assistance program for the elderly rather than an earnings-related public pension system for nongovernment employees (Tyabji, 1993, p. 59; SSA, 1995).

Mulligan, Gil, and Sala-i-Martin (2002) report on nine dynamic case studies – Greece, Portugal, Spain, Italy, Argentina, Brazil, Chile, Peru, and Uruguay – for the period 1960-90. The countries were selected based on their extreme political changes or their economic and demographic similarities to countries with extreme changes. With the exception of Greece and Chile, Mulligan, Gil, and Sala-i-Martin find that formerly nondemocratic countries do not, relative to their democratic neighbors, change their program after experiencing democracy (in terms of the amount of SS spending, and the design of tax and benefit formulas). Similarly, formerly democratic countries do not change their program when becoming nondemocratic. Greece is an exception, because spending grew slowly under the 1967-74 military regime – relative to spending growth before and after the regime and relative to contemporaneous spending growth in democratic countries. However, Mulligan, Gil, and Sala-i-Martin find no evidence that the Greek military regime had different tax or benefit formulas. They also find an opposite pattern in Chile: most of the spending growth 1925-80 occurred under nondemocratic regimes, and payroll tax rates reached extremely high levels under General Pinochet.

It is well known that rich countries are more democratic (Barro, 1998, is a recent study), and they devote a larger fraction of their income to SS. But multiple regression studies of the determinants of SS spending (e.g., Pampel and Williamson, 1989; Lindert, 1994; Mulligan, Gil, and Sala-i-Martin 2002; Cutler and Johnson 2004), holding constant

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[26]The POLITY IV (2000) project rates each of the regimes mentioned in the text (and many others) in terms of their degree of democracy on a 0 to 10 scale (10 most democratic): Germany (1), USSR (0), Spain (6), Japan (5), Kuwait (0), Argentina (0), Mexico (0), UK(8), Sweden (10), and US(10).

population age or per capita income, find neither a significant partial correlation between democracy and SS spending's share of GDP, nor a significant interaction between democracy and the other variables in a spending regression. This result is robust to the inclusion of alternative control variables such as the Gini coefficient, religion variables, the female labor force participation rate, and various dummies for continent and colonial status. Perhaps Lindert's results show most easily the point that democracies do not spend more on SS. Half of the observations were democratic in his panel study of 26 (currently) OECD countries for the years 1880-1930. Holding constant GDP per capita, the fraction of the population that is elderly, and other variables, Lindert finds SS/GDP varying among democracies according to the voter turnout rate, but that the typical democracy spends the same on SS as the typical nondemocracy.[27] He also points out that most of the now developed countries were switching to democracy in the 19th and early 20th century, while the vast majority of SS growth in those countries occurred at least 50 years later (Lindert, 1994, p. 5).

Mulligan, Gil and Sala-i-Martin (2002) also study the design of SS programs in a multiple regression framework. Holding constant economic and demographic variables, they find no evidence that democracies and nondemocracies are systematically different in terms of their use of retirement tests, earnings tests, or in their splitting of the payroll tax between employer and employee.[28] They do find democracies to be (marginally) significantly more likely to cap their payroll tax.

I.H. Program size is positively correlated with retirement incentives

In a cross-section of countries, the fraction of GDP devoted to public pensions is positively correlated with the incentives to retire implicit in benefit formulas. In a cross-section of 55 countries for the period 1972-90, Mulligan and Sala-i-Martin (1999) find that countries whose SS benefit formulas include an implicit 100 percent tax rate devote 3 percent more of GDP to SS. Regressing SS's fraction of GDP in the same cross-section on income per capita, the fraction of the population aged 60 and over, and the dummy variable for whether SS benefit formulas include an implicit 100 percent tax rate, they find the coefficient on the dummy variable to be positive and statistically significant (with 2-3 percent more of GDP devoted to SS in countries with 100 percent tax rates). In other words, countries with SS programs providing larger incentives for retirement tend to have larger programs.

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[27]By SS, we refer to Lindert's "government subsidies to old-age pensions."

[28]See below for an analogous result for annuity/lump sum benefit provisions. Mulligan, Gil, and Sala-i-Martin (2004) explain how the zero-democracy-correlation findings are not easily attributed to measurement errors because (a) the democracy classifications are in many cases pretty obvious (e.g., recent western Europe and U.S. are democratic; Pinochet, Franco, and Stalin were not democratic), and (b) democracy-nondemocracy gaps are readily found in other policy arenas such as military spending, torture, execution, and censorship.

Mulligan (2000) looks in more detail at 11 OECD countries, many of which have a retirement test. The countries differ in terms of the degree to which their programs induce retirement, not only due to the use of retirement and earnings tests, but also from the use of different DRC's, different BRR's, different income ranges over which the retirement test is effectively a 100 percent tax, or different payroll tax rates. All of these inducements are summarized by an elderly earnings tax rate (see also Gruber and Wise, 1999), which Mulligan graphs versus a measure of SS program spending per elderly person. He finds a high correlation, and that program size increases especially rapidly with the elderly tax rate as the elderly tax rate exceeds 40 percent, as it does in Belgium, France, Italy, and the Netherlands. Again it appears that countries with SS programs providing larger incentives for retirement tend to have larger programs.

II. Six Other Stylized Facts

II.A. *Social Security is financed with special payroll taxes*

The vast majority (96.6 percent) of countries have payroll taxes earmarked for SS (Sala-i-Martin, 1996). Some of the payroll taxes are paid by the employer and some by the employee (the relative importance of each varies widely across countries – see Mulligan & Sala-i-Martin, 1999). In some countries an additional share is paid by the government.

Although public programs are usually financed through the regular budget, perhaps tax earmarking is not a key economic difference between SS and other public programs because tax dollars are fungible. However, it turns out that – both in cross-section and time-series – the amount of revenue collected by payroll taxes is an excellent predictor of the amount of revenue spent on SS beneficiaries.

II.B. *Benefits are often, but not always, paid as a life annuity*

Table 2 considers the same 89 countries studied by Mulligan and Sala-i-Martin (1999), and tabulates public provisions for payment of old-age and survivors benefits as either a lump sum or an annuity (two of the 89 countries did not have information available). About half of countries pay essentially all benefits as a life annuity: benefits begin at retirement age[29] and are paid in regular intervals (usually monthly) until the beneficiary dies.

About half of the world pays at least some old-age benefits as a lump sum, and these countries can be divided in two categories. The countries in the first category (represented

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[29]We define *retirement* age as the age at which the person starts collecting SS benefits, whether he actual "retires" (stops working) or not. As we argued above, in most countries, people start collecting benefits when they stop working.

A few of these countries, such as the U.K., do not offer lump sum payments from their public pension programs, but leave lump sum private pension distributions untaxed while taxing pension payments – thereby encouraging lump sum distributions (Daykin, 1998, pp. 45, 55).

in Table 2's rows 3-5) mainly have Provident Funds, which are the less developed former British colonies (eg., India, Malaysia, Singapore, Jamaica, Bahrain). Theirs are typically individual accounts systems which, upon retirement, pay back lifetime contributions and interest. Most have no annuity option, but some do (see Table 2's rows 4-5).

Table 2: Annuity and Lump Sum Payments
by Old-Age and Survivors Programs in 87 Countries

	annuity policy	% countries
1	all benefits paid as life annuities[*]	46
2	only lump sum benefit is for widows	5
3	all benefits paid as lump sum from "Provident Funds"	10
4	all beneficiaries receive both lump sum and annuity	6
5	all beneficiaries choose lump sum or life annuity	3
6	lump sum "old age settlement" paid to ineligible or low pension retirees,[†] other beneficiaries paid with life annuities	30
7	TOTAL	100

Source: authors' calculations based on *Social Security Programs Throughout the World 1995*.
Notes: [*]except perhaps grants for funerals, remarriage, or surviving children
[†]typically these are people who contributed to the system for less than 10 or 15 years

The second category of countries is represented in Table 2's row 6. An "Old age settlement" is a lump sum typically paid to retirees who contributed to the system for only part of their life (usually less than 10 or 15 years), instead of the annuity available only for the retirees who contributed to the system for many years. Small and poor countries are most likely to pay old age settlements.[30] Because they are poor, the countries offering old age settlements probably have an important (and poorer) fraction of their population that are eligible for a lump sum, and not life annuities.

The prevalence of old age settlements, and the fact that most countries having them are quite small, suggests that administrative costs may have an important effect on SS

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[30]This finding is based on the authors' calculations from *Social Security Programs Throughout the World 1995*. For example, a cross-country probit regression of having old age settlements on the fraction elderly, log average GDP 1960-89, a dummy for British legal origin, log population 1960-90, and a democracy index for 1975-90 has two statistically significant coefficient estimates: -0.14 on log average GDP and -0.08 on log population (these coefficients are marginal effects on the probability of having an old age settlement).

program design. The administrative cost per participant of a lump sum payment is probably less than the costs of monthly payments, and may be sufficiently low to overwhelm the insurance and other efficiency benefits of annuities. Maybe this is also why most countries make lump sum payments to the disability beneficiaries (not shown in Table 2) who are least disabled.

Interestingly, our sample includes 16 former Communist countries, and to our knowledge all of them pay life annuities and none have provisions for lump sum old-age or survivors' payments. POLITY IV's democracy index (averaged for the years 1975-90) is not correlated with annuity/lump sum provisions.

II.C. Governments finance and administer most old-age pensions

Private pensions operate in many countries, but more people are covered by government pensions than by private pensions.[31] Along with government finance and administration goes compulsion: the vast majority of so-called "contributions" to SS systems are not voluntary, in the sense that all workers are forced to participate. The importance of the government in the old-age pension market contrasts with its lesser importance in other markets such as manufacturing, or automobile insurance, to name a couple.

II.D. The public sector determines benefit formulas

Not only is the government involved with financing and administering pensions, but the amount of pension to be paid to any individual is determined by a formula that itself is politically determined, rather than determined by some non-government institutions. For example, in the United States, the Congress and the SS Administration determine how benefits depend on earnings, age, health, and marital status. Political considerations seem to be an important determinant of the overall level of benefits paid to the old, as pointed out by Diamond (1977, p. 277).

It should be noted that public benefit formulas could very well be determined privately. The government could, for example, match public pensions to private pensions dollar for dollar, but this is almost never the case.

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[31]One study showing this in a sample of 10 countries is Torrey and Thompson (1980).

II.E. The relation between demographics and spending per elderly is not stable

Demographics are certainly related to government spending on the elderly, but the relation is not a simple one. Some of the evidence suggests that, as a proportion of GDP, older countries spend more per elderly. We see this across countries and, since WWII, over time for developed countries. For example, in 1950 the number of U.S. citizens aged 65+ was 12.4 million (8.1 percent of the U.S. population) while in 1996, they were 33.9 million (12.8 percent of the population). The population share of the 65+ has therefore grown by a factor of 1.6. However, the share of SS in GDP has grown by a factor of 15.6, while the share of all federal programs devoted to the retired has grown by a factor of 7. Government elderly spending at all levels has grown by more than a factor of 5 (Mulligan and Sala-i-Martin, 1999, Table 1, Figure 1). Hence, the fraction of GDP devoted to the retirement aged through public programs has grown more over the period 1950-96 than one might have predicted by the growth of the elderly population.

Other comparisons suggest that government spending per elderly is independent of the age of the population. The last 100 years in the U.S. is one case, where Union Army Pensions in the 1890's amounted to 1.2 percent of GNP for beneficiaries who were only 1.5 percent of the population (Costa, 1998, p. 162; Census Bureau series HS Y-457, A-7, and F-1) – a ratio of 0.80. Today's government spending on the elderly amounts to 9.4 percent of GNP and represent a 12.7 percent of the population – a ratio of 0.74. Lindert (1994, p. 28) obtained similar results in his panel study of 26 OECD countries for the years 1880-1930.[32] Parsons (1982) found no cross-state relationship between the fraction of the population over age 65 and 1930's state old-age assistance benefits per beneficiary.

II.F. It is difficult to borrow against future SS benefits

It seems to be difficult for a worker to borrow against future SS benefits. Perhaps part of the difficulty is due to government regulation and another part due to reluctance of lenders to allow those benefits as collateral. This may be an important difference between SS and government debt, because the former is difficult to use as collateral while the latter is among the best collateral in the world.

III. Six Empirical Questions

As we present the various SS theories (below, and in MX04), six empirical questions arise that are rarely posed in the literature, and/or have very uncertain answers. The first two regard co-movements of SS with other government policies. The co-movements are

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[32]Some of Turner's (1984) specifications suggest that, holding constant other variables, U.S. spending per elderly *declines* with the population fraction elderly over the period 1947-77. Others of his specifications suggest the opposite result. Our unsuccessful attempts to replicate his results suggest that spending per elderly increases with the population fraction elderly over the period 1947-77 (and over the period 1947-1995).

important because they help distinguish efficiency models from models in which a shift in political power in favor of the elderly is expected to cause multiple policy instruments to shift in their favor (more on this below). The third question concerns the political behavior of the elderly, which differs across political models. The last two questions concern the efficiency attributes of Social Security, which are the foundation of some of the efficiency theories.

III.A. Does government regulation increasingly favor the elderly?

In addition to the taxes and regulation shown on government budgets, four areas of regulation might be categorized as favoring the elderly or taxing the elderly:

(i)   regulation of business, except environmental regulation
(ii)   environmental regulation
(iii)   retirement and disability regulation
(iv)   age discrimination laws

A careful analysis of the generational incidence of regulation (and whether regulations even promote their advertized objectives) is well beyond the scope of this paper, but two important factors in such analysis would be the disproportionate ownership of capital by the elderly and disproportionate supply of labor by the young, so that regulations harming current capital and benefitting labor are harming mainly the current elderly.

It is unclear whether regulations of type (i) have increased or decreased over time. Over the last 100 years, Becker and Mulligan's (2000) measures suggest that the amount of anti-business regulation has increased more rapidly than population and probably more rapidly than GNP. This trend may have reversed with the massive deregulation around 1980. Hopkins' (1996) data show that the per capita costs of paperwork, price controls, and entry controls have fallen enough that total per capita costs of Federal Regulation (and perhaps also the portion of that cost falling on business) may have fallen over the period. Thus Hopkins' data suggest that the elderly may have been net gainers from regulation (and deregulation) over the period 1977-94.

Hopkins' (1996) data also show that the per capita costs of environmental regulation have risen over the period 1977-94. But the generational incidence of environmental regulation is especially unclear. On one hand, environmental regulations restrict the operations of current businesses, owned disproportionally by the elderly. Some environmental regulations convey benefits decades in the future. On the other hand, U.S. Environmental Protection Agency (1997) argues that within 20 years of the passage of the Clean Air Act, air particulates were reduced, which in turn reduced mortality especially among the elderly, and infants.[33]

New retirement regulation and age discrimination laws might be seen as allowing older workers to renegotiate previous implicit contracts. Young workers, of course, would

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[33]We owe this point to Don Fullerton. Even if the benefits to the elderly are much smaller (e.g., Chay et al., 2003, argues that EPA's estimates are overstated), we may learn something about generational politics from the fact that environmental programs are described in Washington as having important benefits for the elderly.

like to promise not to engage in this kind of regulation when they are older but, once they become older and the implicit contracts are given, the older worker will benefit from renegotiation. Retirement legislation and age discrimination laws (e.g., the 1990 Americans with Disabilities Act and Regulation B of the 1975 Equal Credit Opportunity Act) have undoubtably increased over time. Perhaps one indicator of the increased retirement-related regulatory activity is the number of Federal District Civil Social Security court cases commenced, which increased from less than 1 percent to more than 5 percent of all Federal District Civil court cases 1960-87 (Becker and Mulligan, 2000).

Based on Hopkins' findings that business regulation costs have fallen in the last 20 years and our findings that retirement regulation has increased over time, our overall, but necessarily tentative, impression is that the elderly have been net losers from regulation over the long period but net gainers over the last couple of decades. We show later in the paper how important this conclusion is for distinguishing among positive theories of SS, so carefully calculating the generational incidence of regulation may be one of the more important areas for future empirical research on generational questions.

III.B. Does Social Security "crowd out" other government spending?

It is not clear whether a greater share of GNP devoted to SS is associated with more or less of other government spending as a share of GNP. In a cross-section of 57 countries with available data for the years 1972-90, the correlation between SS/GNP and other government spending/GNP is 0.5. Some, but not all, of that positive correlation can be "explained" with GNP per capita (authors calculations using the IMF *Government Finance Statistics* and the Penn World Tables). We conjecture that another part of it can be explained by the fact that governments spend resources on the elderly without necessarily referring to those expenditures as public pensions.[34]

In U.S. history, SS growth has not seemed to crowd out other spending. On the other hand, SS has not been associated with much growth of other government spending. Government spending on the elderly/GNP at all levels grew by 8 percentage points over the period 1950-96 while other government spending grew by only 2 percentage points (OMB, Mulligan and Sala-i-Martin, 1999, Figure 1). Lindert does find some evidence suggesting that spending on the elderly crowds out education spending in his panel study of OECD 26 countries for the years 1880-1930.

Other studies have found that aging of the population is associated with less government spending on education, which is consistent with the hypothesis that government spending on the elderly crowds out other government spending. One example is Poterba's (1997) panel study of U.S. states for the period 1960-90. In sum, whether or not SS crowds out other government spending is an important conclusion for distinguishing among positive theories of SS, but it appears that cross-country, time-series, and regional data sets are contradictory on this point.

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[34]However, health care is an important example and results are similar if public health expenditures are reallocated from "other" spending to "social security spending".

III.C. Are the elderly more single-minded than the young in their politics?

Many politicians believe that the most important concerns among elderly voters are government old-age subsidies and that the votes of the elderly are much more elastic to a candidate's stance on old-age subsidies than are the votes of any other group. *Fortune* magazine recently conducted a poll of 329 Washington "insiders", defined to include "members of Congress, their staffs, and senior White House officials" (Birnbaum, December 8, 1997, p. 146). Respondents were asked to rank the clout in Washington of 120 interest groups, labor unions, and trade associations and to assess the importance of a list of lobbying techniques.[35] Two of the three top rated lobbying techniques were "having *active* allies in a Congressman's district" and "mobilizing *grassroots* action, such as phone calls and letters" (p. 146, italics added). A successful group has "large numbers of geographically dispersed and politically *active* members who focus their energies on a *narrow range of issues*" (p. 146, italics added). The same survey identified the *American Association of Retired Persons* as the most powerful lobby in Washington.

Some academic research support these impressions. Rhodebeck (1993) shows how the elderly are more likely than other voters to incorporate their opinions on Social Security and Medicare into their vote choices. Recent empirical work by Campbell (2003a,b) describes a simultaneous and reinforcing relationship between a group's political activity and the public subsidies it receives "... mass [political] participation influences policy outcomes – the politically active are more likely to achieve their policy goals ... their ability to do so is in part a legacy of existing public policy...." (Campbell 2003b, Chapter 1). This relation is readily seen with regards to Social Security and the elderly, where there is a "distinctive message behind [elderly political] participation ... do not tamper with Social Security and Medicare" (Campbell 2003b, Chapter 1).

III.D. How is program size correlated with economic growth?

In cross-sections of countries, the fraction of GDP devoted to public pensions is positively correlated with per capita income growth. Sala-i-Martin (1996) regresses per capita income growth in a cross-section of 74 countries on SS's fraction of GDP, income per capita, public investment's fraction of GDP, private investment's share of GDP, and government consumption's share of GDP, and finds a positive partial correlation between the SS variable and economic growth. Cashin (1995) finds a similar result following OECD countries over the time period 1971-88. And, of course, SS and economic growth are correlated in very long time-series because SS and economic growth are both relatively recent historical phenomena.

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[35]Each list presented to the respondents was chosen by a panel of experts which included "members of Congress, professional lobbyists, academics, congressional staff, and pollsters" (p. 158).

III.E. Can Social Security be administered more cheaply that private pension plans?

Some, although not all, private pension plans appear to be administered as cheaply as SS. According to Mitchell (1998), Social Security Administration costs are 3.28 percent of benefits, as compared to Vanguard's 2 percent of benefits and 5 percent-10 percent of benefits for 401(k) plans.[36]

This interpretation of Mitchell's findings is debatable. Diamond (1998, pp. 14ff) argues that administration involves substantial fixed costs per beneficiary (this is consistent with the international use of old age settlements – see above) and that SSA has more beneficiaries per benefit dollar, so that SSA's administrative costs per benefit dollar cannot be directly compared to those of Vanguard or other 401(k) plans. He suggests that Vanguard or other pension management group would not manage private pensions for the American labor force as cheaply as does SSA.

III.F. Why do governments monopolize some insurance markets, but not others?

Because governments finance, administer, and compel participation in SS, it can be said that they monopolize annuities, disability, and health insurance markets. Governments intervene much less in many other insurance markets such as automobile, fire, and life.

IV. Positive Theories of Social Security Broadly Classified

IV.A. Political vs. efficiency

Formal theories of SS can be partitioned into two broad categories: *political theories* and *efficiency theories. Political theories* view SS as redistribution, the outcome of a political struggle. Two or more groups of citizens fight (politically) to extract resources from each other and, if a theory predicts the elderly's winning the fight, it becomes a SS theory. We categorize as *efficiency* those theories that identify market inefficiencies and explain how a SS program might be created to alleviate them. Typically, although not always, these theories explain why it must be the government who administers a SS program. For example, one may argue that the market fails to provide a certain kind of insurance for the elderly so that the government needs to step in. Sometimes, the model shows why SS of the kind we observe is the optimal way to eliminate the inefficiency. Other times SS just alleviates the inefficiency, and leaves room for further policy improvement.

Even with many examples of both political and efficiency arguments, models within these two basic groups share a number of characteristics and predictions. Before going into detailed descriptions of particular explanations (see our companion paper MX04), we describe these broad common characteristics. One characteristic shared by many political stories of SS is that the outcomes of political struggles may be economically inefficient.

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[36]Mitchell computes private sector administrative expenses as a fraction of assets; we assume benefits to be 10 percent of assets.

Inefficiency may arise because of resources devoted to political competition, or because of frictions in political institutions that mute preference intensity and/or exclude some groups from the political process.

Myerson (1995) and Mulligan, Gil, and Sala-i-Martin (2004) emphasize that many political theories are built upon formal game theoretic political models (for example, a median voter model), and thereby predict that the amount and type of redistribution is highly sensitive to the form of the game. Hence they predict programs to differ across countries according to political institutions, when in fact similar programs are found in countries with very different political institutions (programs are even similar across democracies and nondemocracies). Efficiency models, and political models that put less emphasis on game theory, have an advantage in this regard. Presumably the inefficiency that SS is trying to correct appears in all economies, regardless of their political system, so that the emergence and conduct of SS policy should depend much less on political system than on economic and demographic variables that determine the degree of inefficiency. On the other hand, game theoretic models explain how large groups of individuals make collective decisions, and can generate refutable predictions about the relationship between political activity and SS.

Redistributive political models also predict that other dimensions of government activity – such as regulations and mandates – favor the elderly. Although the models differ in terms of the means of obtaining and exercising political power, they usually presume that the elderly are politically powerful (the power creates and sustains the SS program), and therefore predict that the elderly use their power on a variety of margins, obtaining some other political benefits in the process of creating or expanding SS.[37] As long as the old are "winners", redistributive political models are also consistent with more consumption per old, SS crowding out other spending, and SS redistributing from young to old.[38] This contrasts with efficiency models that do not identify "losers" from policy, so they usually make no connection between SS and other government spending and legislation.[39] As long as the

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[37]Consumer economics offers a good analogy. When households differ mainly in terms of income, rather than tastes, consumer economics predicts that households spending more in one category also tend to spend more in other categories. Redistributive political models have a lot to say about the distribution of political power, which is used to obtain policy favors just as income is used in consumer theory to obtain various consumer goods.

[38]Because the political models emphasize intergenerational competition, they implicitly rule out the kinds of intergenerational linkages assumed by Barro (1974), or at least assume that intergenerationally-linked individuals are (by supporting intergenerational redistribution) inadequately expressing their self-interest in political affairs.

[39]One exception is the hypothesis that taxation has become more efficient over time, and that essentially all government spending programs grow as a consequence (see Becker and Mulligan, 2003, for a detailed explanation, several references to this literature, and a discussion of whether this is a "political" or "efficiency" hypothesis). Notice how the efficient-tax hypothesis and the redistributive political models predict the opposite correlation between SS and other government spending.

political struggle is perennially decided in favor of the elderly, it makes sense that much of the benefits to the old look like an annuity, although differences in this regard with some of the efficiency theories are subtle.

Political theories might be combined with efficiency theories in a hybrid model. For example, Becker (1983), Ledyard (1984), Wittman (1989), and many others have argued that an efficient policy can be the outcome of voting and other public decision mechanisms. But, when used in combination with efficiency models, are political models informative as to the design of the policies ultimately adopted? We do not consider such hybrid models – because they have not received attention in the literature as positive theories of SS – but suspect that in some cases the political component of the model would not be informative about policy design, but rather be a minor "add-on" to the efficiency model. In other cases, we suspect that the political component could be informative in several dimensions: (1) why a policy has a particular incidence, (2) how different political institutions might be associated with different policies, (3) which countries would be late to adopt, or have difficulty sustaining, an efficiency-enhancing policy, and (4) why an otherwise efficient policy might have some inefficient features.

IV.B. "Induced retirement" vs. transfer motives

Political and efficiency models are most different in terms of the cohort- and income-incidence of taxes and spending, and in terms of the relation between program size and political activity. However, a number of the empirical regularities describe other aspects of SS, especially the benefit formulas. Following Mulligan (2000), we classify potential motives for SS policies as "inducing retirement" (INR) or transferring resources over the life cycle or across cohorts (IGR), regardless of whether one or both of these motives arise from political or economic forces.

Assuming that the transfer motive is in the direction of subsidizing the old, INR, IGR, and hybrid models all imply that the old receive relatively more from the Treasury and the young receive relatively less (or pay relatively more). The reason is clear in the IGR case, because cash transfers from young to old are the desired outcome. But transfers are also likely to occur in the INR model, although as an unintended byproduct, because forcing the old to retire by itself makes the old worse off. Whether public policy is determined by voting, a utilitarian planner, or even a dictator (at least if he has some sensitivity to the effects of his policies on the welfare of various groups), we are not surprised if policies inducing retirement by the elderly are associated with compensatory cash transfer policies.

All models of the INR motive, and only some of the IGR motive, explain why borrowing against SS benefits is prohibited. To see how this prohibition makes sense in INR models, suppose that a worker were to borrow against his future SS benefits which, as a result of the INR motive, are paid only if retirement occurs. When he reached old age, he would have a stronger incentive to work than those who did not borrow, because the latter give up benefits by working. The former also gives up benefits, but that is the problem of his lender who effectively has purchased those benefits. Because allowing borrowing increases the incentive for the old to work, those who benefit from induced retirement (the unemployed? other elderly?) would be against borrowing unless there were another means to encourage retirement. Furthermore, lenders would be unwilling to lend to a worker using

his SS future benefits as collateral unless that worker could also credibly give up his future rights to work.[40]

In models with both motives, empirical implications depend on which motive counts more at the margin (i.e., which motive explains why SS grows over time, or why countries differ in the amount they spend on SS). As the motive to redistribute to the old increases, cash transfers to them increase while the intensity of policies inducing their retirement *decreases* because the best way to raise the utility of the old is to raise their transfer in combination with reducing policy distortions of their behavior. In other words, varying the IGR motive traces out a negative relation between cash transfers to the elderly and the intensity of policies inducing their retirement. Varying the INR motive traces out a positive relation, because a larger distortion requires greater compensation.

Mulligan (2000) also argues that the reason for the existence of SS, and for some of its growth over time, can be different from the reasons why some countries currently spend more on SS than others. Namely, we observe that SS does a lot to induce retirement, so that the INR motive is part of the story (for some qualifications of this, see MX04), but that cash transfers are large relative to the intensity of policies inducing retirement, so that the IGR motive is also part of the story. On the other hand, his comparison of eleven OECD countries shows that countries spending more per elderly person have sharply higher retirement incentives – suggesting that the INR motive is the primary difference across these countries.

V. Conclusions

In this paper we introduce a number of facts about SS programs around the world. Some of the facts have been individually reported in previous studies, and others are original (or substantially extended here). Of course, one of the more consistent and quantitatively important factual findings is that SS redistributes across cohorts. But we report some other findings that are much less recognized, but hardly less robust or less relevant for evaluating positive theories: that SS benefits are paid in a way that induces a beneficiary's retirement but does not depend on his asset income, that the old consume as much or more than do the young, and that similar programs are found in democracies and nondemocracies.

The fact that so many SS program features are internationally common, and/or explained by country characteristics, suggests that SS is not a random influence or a "bad idea" inexplicably hatched by policymakers, but rather is some kind of equilibrium phenomenon. Whether the equilibrium balances efficiency forces or political forces, and what types of political forces are involved, are the difficult but important questions. Efficiency models, to the extent that they argue that SS is already the optimal policy to

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[40]In countries where benefits are reduced continuously with beneficiary earnings, lenders may be willing to lend to workers using the sum of their old-age earnings and benefits as collateral since the sum would not decrease with their work decision. Such an arrangement would not work in countries that withhold all benefits from any elderly person who works, even if his earnings fall short of the benefit amount.

combat some kind of market malfunction, predict that SS reform is less likely to increase welfare. In contrast, political models have plenty of room for sustained reforms to improve efficiency, because the political process is expected to generate inefficiency due to resources devoted to political competition, or to frictions in political institutions that mute preference intensity and/or exclude some groups from the political process. Political forces create another set of problems with SS reforms: (a) they may not be politically feasible without reforms that alleviate the political frictions, and (b) we currently have too little information about the political frictions to confidently recommend practical political reforms. But perhaps the good news is that, to the extent that efficiency motivates SS, reforms that harm efficiency will also be hard to sustain, at least without simultaneous "reforms" exacerbating political frictions.

Considering the details of positive SS theories is beyond the scope of this paper (see MX04), but the evidence presented here already says something about the basic forces creating and sustaining SS programs. Regardless of whether SS is political or efficient, it seems to be motivated in part by redistribution and, especially in the countries with the largest programs, in part by a desire to induce the elderly to retire. Politics seem important, because cross-cohort redistribution is so readily seen in SS programs around the world, even though the old are (in some countries at least) consuming as much or more than do the young. This implies, among other things, that plans to reduce generational redistribution are not politically sustainable merely because they provide "adequate" incomes for the elderly.[41] At the same time, the game theoretic details of SS politics are still unclear, because the size and design of SS programs are apparently uncorrelated with democracy, and other measures of political institutions.

More empirical research is needed to further distinguish among alternative theories of SS. Does SS crowd out other government spending? What is the cohort-incidence of regulatory policy, and has that changed over time? Which political activities are correlated with SS program spending and design? We also limit our empirical observations to the public sector (e.g., how SS is designed, and how it relates to other public policies), but to some degree SS theories also differ in terms of their predictions for co-movement of public and private behaviors. We leave to future research the tasks of deriving and empirically investigating such differences.

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[41]Gratton (1996) observes that the U.S. creation of SS cannot be a explained by an adverse shift in the relative incomes of the elderly. If he's right, why should a favorable relative income shift significantly help eliminate the program?

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