

# Demographics and the Political Sustainability of Pay-as-you-go Social Security

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August 6, 2005

## **Abstract**

The net present value of costs and benefits from pay-as-you-go social security is negative for young people and positive for the elderly. If people vote their financial self-interest, there is a pivotal age such that those who are younger favor smaller benefits and those who are older favor larger benefits. We estimate the expected present value of benefits and costs to US voters of each age and sex for a small permanent increase in social security benefits. We find that if voters vote their self-interest, a substantial majority will favor maintaining benefit levels at least at current levels. Over the next four decades, as the population ages, maintaining social security will become more expensive. Consequently, the pivotal age at which voters begin to favor social security will rise. At the same time, the median age of voters will also rise and remain above the pivotal age. Throughout the period, a majority of selfish voters would favor maintaining current benefit levels.

We also investigate support for changes in the age at which benefits begin. Self-interest on this issue does not divide simply between old and young. Young voters and some old voters will favor a later benefits age, while middle-aged workers will oppose. Over the next 30 years, proposals for an immediate once-and-for-all increase in the benefits age would be defeated in majority voting. Proposals for a deferred, gradual increase in the benefits age might under some circumstances receive majority support.

## 1 Introduction

The baby boom of the 1950's and the subsequent decline in the birth rate will produce a large increase in the proportion of retirees in the population over the next three decades. These demographic changes will greatly increase the tax burden imposed by the United States Social Security system. In 2001, there were about 5.3 people of working age for every one aged 66 or higher. By 2020, this ratio will fall to 4.15 and by 2030 to about 3.2. Thus, over the next 25 years, the average cost per worker of maintaining social security benefits for the retired will increase by almost 70 percent.

Since 1986, social security tax revenue has significantly exceeded benefits paid out. The resulting surplus is used to purchase treasury bonds and is credited to a Social Security trust fund. Recent projections are that with no change in social security tax rates or in benefit schedules, benefits paid out will begin to exceed Social Security tax revenue in about 2018 and the trust fund will be depleted by about 2040.

Doubts have been raised about whether the Social Security trust fund provides a credible guarantee that current levels of social security benefits will be maintained, even until the fund is depleted. Feldstein [9] argues that since the excess of current social security tax receipts over current payments is simply loaned to the government to finance other government activities, the Social Security trust fund is "just an accounting mechanism for keeping track of past Social Security surpluses."

There is evidently no legal or constitutional requirement that money in the Social Security trust fund must be devoted to maintaining benefit levels for those who have paid into the fund. The US Social Security Adminis-

tration website<sup>1</sup> emphasizes that payment of FICA payroll taxes does not entitle individuals to Social Security benefits “in a legal, contractual sense.” According to the website, this issue was finally settled by a 1960 Supreme Court ruling, *Flemming vs Nestor*.

Miron and Murphy [14] observe that

“The benefits a person receives depend on the law at the time the person receives benefits. They are not linked to the taxes this person paid during working life . . . Congress has the power to increase or decrease benefits, even for those already retired, subject only to the political ramifications of so doing.”

In the absence of a binding contractual obligation to maintain social security benefits, it is crucial to assess the likelihood that voter support for this system will be maintained through the anticipated demographic changes. Two countervailing forces are at work. As the population ages, an increasing proportion of voters will be at or near retirement age and thus will enjoy a high rate of return from maintaining at least the current level of benefits. But there is an opposing force. As the large baby boom cohorts begin to collect benefits, the working population will have to be taxed more heavily to pay for these benefits. Therefore the net present value of the social security program will decrease for young and middle-aged workers.

This paper investigates the balance of these two effects on political support for pay-as-you-go retirement plans in the United States. We estimate the impact of a small once-and-for-all change in social security benefits on the expected present value of taxes paid and benefits received for persons of each age and sex. For each sex, there is a pivotal age such that the ex-

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<sup>1</sup><http://www.ssa.gov/history/nestor.html>

pected net present value of an increase in Social Security benefits is positive or negative depending on whether one is older or younger than this age. For projected populations between now and the year 2050, we estimate the fraction of voters whose self-interest favors maintaining social security at least at current levels.

We also investigate the fractions of the population that would gain or lose from a change in the age at which people begin to receive social security benefits. This issue deserves separate attention because the age distribution of support for such changes is not the same as that for changes in benefits. Although currently retired persons have a strong financial interest in maintaining or increasing current benefit levels, they have no direct financial interest in a change in retirement age so long as it does not affect their own retirement status.

## **2 Political Support for Benefit Levels**

### **2.1 Methods**

We built an Excel spreadsheet<sup>2</sup> to calculate the net present value of social security taxes and benefits for US voters by age and sex in 2001. To make these projections, we used US census figures on the age distribution of the current population, along with age-specific birth and death rates to estimate future age distributions. We repeated this exercise to estimate present values to voters at the end of each decade, from 2010 to 2050.

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<sup>2</sup>The Excel format makes it relatively easy to explore the effects of parameter variations reflecting alternative assumptions about the discount rate, excess burden in taxation, voter participation rates, changes in projected mortality and birth rates, immigration rates, and retirement age.

We made the following simplifying assumptions about the system. There is a predetermined age  $S$  (66 years in our benchmark case<sup>3</sup>) at which workers begin to receive a constant pension level for the rest of their lives. In every year, the cost of current social security payments is collected through taxes which are divided equally among all persons of who are of ages between 18 and  $S$  in that year.

A worker's expected present value of benefits from future social security payments must be discounted not only by the time discount rate  $r$  (assumed to be 5 per cent in our benchmark case) but also by the probability that he or she will survive to receive them. Let  $L_t(a, x)$  be the probability that someone who is of age  $a$  at time  $t$  will survive to age  $x$ . (To simplify calculations, we assume that nobody lives beyond age 100.) At time  $t$ , for a working person whose current age is  $a < S$ , the expected present value of the benefits resulting from a \$1 increase in annual social security payments is

$$B(a) = L_t(a, S)(1+r)^{-(S-a)} \sum_{j=0}^{100-S} L_{t+S-a}(S, S+j)(1+r)^{-j} \quad (1)$$

We define the *dependency ratio*  $D(\tau)$  to be the ratio of the number of retired persons to the number of workers in year  $\tau$ . Since the cost of current social security payments is assumed to be collected in equal amounts from each current worker, the cost of social security to workers in year  $\tau$  will be proportional to  $D(\tau)$ . For a working person of age  $a$ , the expected present value of the costs of a permanent \$1 increase in social security benefits is seen to be

$$C(a) = \sum_{j=0}^{S-a-1} L_t(a, a+j)D(a+j)(1+r)^{-j} \quad (2)$$

Net present values of an increase in social security benefits are positive

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<sup>3</sup>This is the US Social Security retirement age for persons born between 1943 and 1954.

or negative for a person of age  $a$ , depending on the sign of  $B(a) - C(a)$ . We use sex-specific survival rates to construct separate estimates of age-specific expected benefit and cost functions for men and for women at each age between 18 and the retirement age. Persons older than retirement age are assumed to collect benefits without paying social security taxes and thus will always gain from increased benefit levels.

## 2.2 Results

Figure 1 shows net present values of social security benefits under our benchmark assumptions for individuals of each age and sex, using projections from the year 2001.<sup>4</sup> We see that in 2001, the pivotal age at which voters' self-interest begins to favor increased social security is about 42 for men and 40 for women.

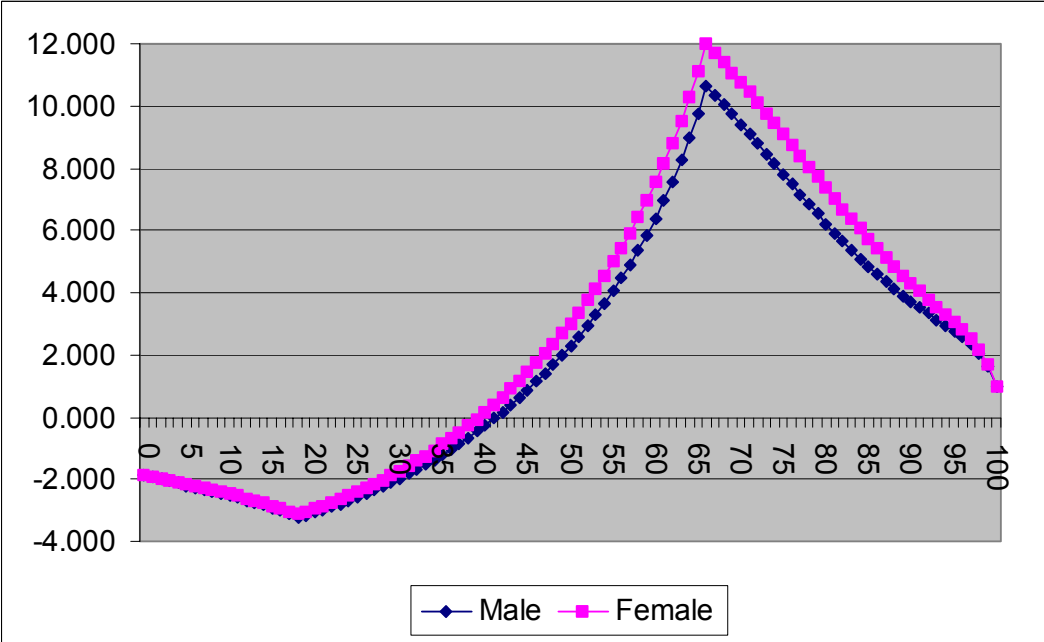
In 2001, the median age of the voting population in the United States was about 43 years. If voters voted their self-interest and voter-participation were the same for all ages, then about 55 percent of voters would favor maintaining at least the current level of social security benefits. But in the United States, voter participation increases sharply with age. The participation rate is about 36 percent for those under 30 years of age and 67 percent for persons over 50. If we take account of age-specific voting rates, we find that under our benchmark assumptions, approximately 65 percent of voters would favor maintaining or increasing benefits.<sup>5</sup>

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<sup>4</sup>The units on the vertical axis represent the expected net present value of a \$1 increase in annual benefits paid to persons over 66.

<sup>5</sup>Voter participation rates in the November 2000 election are reported by age in a US census document found at <http://www.census.gov/population/socdemo/voting/p20-542/tab01.xls>

Figure 1: Net Present Values by Age and Gender



As the population ages over the next few decades, maintaining the social security system will become more expensive for working people. In our model, the annual social security tax paid by workers is proportional to the *dependency ratio*, which we define as the ratio of the number of persons over 66 to the number of persons of ages 18-65. Table 1 shows how this ratio will increase over the next half century. As the dependency ratio rises, and with it the tax burden of social security, so does the pivotal age at which one’s expected present value of future Social Security benefits begins to exceed lifetime expected tax costs. This effect, in itself, reduces political support for social security. But over this period, the median age of voters rises at about the same rate as the pivotal age. Consequently, throughout the entire period, for more than half of voters, the expected present value

of Social Security benefits exceeds the expected present value of the taxes needed to sustain the Social Security program.

Table 1: Dependency Ratio, Pivotal Age, and Median Age

Year	2001	2010	2020	2030	2040	2050
Dependency Ratio	0.19	0.19	0.24	0.31	0.33	0.33
Average Pivotal Age*	40	42	44.5	46	45.5	45.5
Med Age of Voting-Age Pop.	43	45	47	48	48	48
Med Age of Actual Voters	47	50	52	53	53	53

\*The pivotal age for women is about two years less than that for men. These figures are the average of those for men and for women.

Table 2 shows that in 2001, under our benchmark assumptions, a substantial majority of voters stood to gain from maintaining or increasing the current level of social security benefits. Moreover, the size of this majority is not likely to change significantly over the next fifty years. Thus if current levels of social security benefits constitute a political equilibrium, there is little reason to expect that the expected aging of the US population will result in political support for substantial changes in benefit levels.

Table 2: Percent Favoring Higher Benefits (Benchmark Assumptions)

Year	2001	2010	2020	2030	2040	2050
Percent of Voters	65	65	63	62	64	63

Our conclusion that social security is likely to have strong political support is consistent with the results of public opinion polls. A recent survey by Shaw and Myseiwicz [16] reports the results of a large number of public opinion polls over the course of the last decade. Interviewees

were asked questions such as: “Is the US government spending too much, too little, or about the right amount on Social Security?” These polls have uniformly found a majority of respondents favoring an increase in social security benefits, while fewer than 10 per cent favor a decrease. Even when polling questions emphasize that maintaining benefits is likely to require increased taxes, the results favor maintaining benefit levels. A recent survey conducted by the Pew foundation [6] asked

“When decisions about Social Security’s future are being made, which do you think is MORE important?”

The options offered were, “AVOIDING any tax INCREASES for workers and employees” and “AVOIDING any cuts in Social Security benefit amounts.” About 60 per cent of respondents thought that avoiding cuts in benefits was more important, while 30 per cent thought avoiding tax increases was more important. A Gallup poll [4] in April-May of 2005 offered respondents a choice between two options: increasing social security taxes or cutting social security benefits. About 53 per cent preferred increasing taxes and 38 per cent preferred reducing benefits.

Another interesting indicator is the experience of European democracies that have older populations than the US has today, but similar age ratios to those that the US will experience in twenty years. The political balance in these countries has so far maintained high social security benefits which has required high taxes on earnings. Boeri, Börsch-Supan, and Tabellini [1] recently surveyed voters in France, Germany, Spain, and Italy, where they asked the following question:

In your opinion, should the state (a) reduce taxes and compulsory contributions, cutting pensions and/or transfers to house-

holds, (b) maintain taxes and compulsory contributions at current levels, or (c) increase pensions and/or transfers to households, by raising taxes and/or compulsory contributions.

In Table 3, the first column reports ratios of the number of persons older than 65 to the number in the labor force, the second column reports the social security tax rate, and the third column reports the percentage of those surveyed who prefer either constant or increased benefits.<sup>6</sup>

Table 3: Cross-Country Comparisons European Countries

Country	Ratio of 65+ to Labor Force	Social Security Tax Rate	Favor at Least Present Benefits
US	.25	12.6%	60%
France	.38	14.75%	65%
Germany	.37	19.5%	73%
Spain	.37	28.3%	81%
Italy	.46	32.7%	56%

By 2030, in the US, the ratio of persons over 65 to those in the labor force will be very close to that currently found in France, Germany, and Spain. As Table 3 shows, in all of these countries, despite the fact that social security tax rates are significantly higher than those in the US, a majority of voters favor maintaining or increasing current levels of benefits.<sup>7</sup>

<sup>6</sup>Sources: Column 1: OECD Factbook [15]. Column 2: Galasso and Profeta [10]. Column 3: Pew foundation survey [6] for US, Boeri, *et al* [1] for European countries.

<sup>7</sup>The poll also reports a significant positive relationship between respondents' age and probability of support for high benefit levels.

## Excess Burden of Taxation

Our benchmark calculations do not account for the excess burden of taxation. Social Security is financed by a tax on labor income.<sup>8</sup> If labor supply decreases in response to a tax on labor, then the actual cost to taxpayers of paying for benefits exceeds the amount of revenue collected. The excess burden of a tax is defined to be the amount by which the cost to taxpayers exceeds the revenue raised by the tax. If the ratio of excess burden to revenue collected is  $b$ , then in order to obtain a correct estimate of tax costs, we need to multiply the benchmark costs by  $1 + b$ .

The size of excess burden depends on the elasticity of labor supply. Although this issue has been much studied, there is wide divergence of opinion. Feldstein [8] maintains that when one takes account of all the consequences of increased taxation for human capital formation, the labor supply elasticity is very high and the costs imposed by labor taxation are between two and two-and-one-half times as great as the amount of money raised. If this is the case, the ratio  $b$  of excess burden to benefits would be between 1 and 1.5. Feldstein's opinion does not seem to be widely shared. In a survey article, Slemrod [19] reports that "with some exceptions, the profession has settled on a value for (the labor supply) elasticity close to zero for prime-age males, although for married women, the responsiveness of labor force participation appears to be significant." A study by Ziliak and Kneiser [21] concludes that when intertemporal effects are properly accounted for, labor supply is somewhat more elastic. Their results suggest that the excess burden ratio  $b$  is about 0.2. A recent study by Liu and Retten-

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<sup>8</sup>The Social Security tax rate for 2005 is 12.4 per cent of all earnings less than \$90,000. Half of this tax is collected from employers and half directly from workers.

maier [13] pays closer attention to the details of the social security tax, such as the fact that benefits received by individuals increase with the amount of taxes that they pay.<sup>9</sup> They arrive at an estimate of the excess burden ratio from the Social Security tax of approximately  $b = .07$ .

Table 4 indicates that even with excess burden as high as 66 per cent, a majority of voters would benefit from increases rather than decreases in benefits. The majority in favor of higher benefits would disappear only if voters believed that the ratio of excess burden to benefits is close to 100 per cent.

Table 4: Percent In Favor of Maintaining Benefits

Year	2001	2010	2020	2030	2040	2050
No Excess Burden	65	65	63	62	64	63
With 25% Excess Burden	58	60	58	57	58	58
With 66% Excess Burden	52	54	53	51	53	53
With 100% Excess Burden	47	49	50	50	50	51
With 150% Excess Burden	42	45	46	47	47	47

### Alternative Discount Rates

For our benchmark calculations, we discounted future income flows at 5 per cent. Workers cannot use their future social security benefits as collateral for loans. For those who are credit-constrained, the relevant discount

<sup>9</sup> Social security benefits are determined by an indexed average of lifetime annual incomes according to the following rule: annual benefits include 90 percent of the first \$7500 in earnings, plus 32 percent of the next \$38,000, plus 15 percent of earnings between \$45,500 and \$90,000. For details see <http://www.ssa.gov/OACT/ProgData/benefits.html>.

rate is likely to be very high. Table 5 shows how estimated support for social security depends on the assumed discount rate. At a discount rate of 8.25 per cent, support falls to 50 per cent.

Table 5: Percent In Favor of Maintaining Benefits

Year	2001	2010	2020	2030	2040	2050
With 3% Discount Rate	81	78	74	74	75	75
With 5% Discount Rate	65	65	63	62	64	63
With 7% Discount Rate	55	57	56	55	56	56
With 8.25% Discount Rate	51	52	52	51	52	53

### **Doubts about Future of Social Security**

Public opinion polls indicate that a significant number of voters believe that social security benefits will decline in the future. Shaw and Mysiewicz [16] report on a survey that asked adults 25 years and older: “How confident are you that the Social Security system will continue to provide benefits of equal value to the benefits received by retirees today?” In 2003, 40 per cent were “somewhat confident” or “very confident,” 26 per cent were “not too confident,” and 26 per cent were “not at all confident.” While it is difficult to assign quantitative probabilities to adjectival responses like “somewhat confident,” or “not too confident”, there do appear to be significant doubts.

If voters do not believe that the present level of social security benefits will be available for their own generation, they are not likely to favor maintaining these benefits. The effect of voter doubts on voting outcomes depends on the age distribution of those who lack confidence in future benefits. While survey responses to this question were not reported by age, it is

reasonable to assume that younger voters will be less confident than older voters that they will enjoy current levels of benefits when they retire.

Let us consider a simple model that reflects this assumption. Voters believe that social security benefits are subject to a constant hazard rate. Thus in any year in which benefits are still present, there is a probability  $h$  that they will disappear for the future. The effect of this hazard on expected present value of costs and benefits can be shown to be the same as an increase of  $h$  in the rate at which both future benefits and costs are discounted.

With an annual hazard of  $h = .01$ , the probability that benefits would still be present when a 45 year-old voter retires is about .8. If  $h = .02$ , this probability is about .67, and if  $h = .0325$ , it is about .5. From Table 5, we see that under baseline assumptions, a majority of voters gain from a marginal increase in social security benefit levels so long as future benefits and costs are discounted at a rate less than .0825. Thus if the ordinary time discount rate is .05 and the annual hazard rate for Social Security benefits is less than .0325, a majority of voters will benefit from maintaining at least the current benefit level.

### 3 Voting on the Benefits Age

Suppose that self-interested voters select the age at which social security benefits begin. In the US, workers who have reached the appropriate age can receive social security benefits regardless of whether they retire from the labor force.<sup>10</sup> In 2004, labor-force participation rates for persons aged

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<sup>10</sup>This has been the case since the year 2000. Previously, social security benefits were reduced by \$1 for each \$3 in earnings.

65-69 were about 28 per cent, for persons aged 70-74, about 15 per cent, and for persons older than 75, about 6 per cent.<sup>11</sup> It is therefore important to distinguish the age at which benefits start, which we will call the *benefits age* from the *retirement age*, at which people stop working.

There is an interesting theoretical difference between voting on the benefits *levels* and voting on benefit *ages*. There is a pivotal age at which voters' self-interests about benefit levels divide. Those older than the pivotal age gain from larger benefits and those younger gain from smaller benefits. The alignment of self-interest in voting over the benefits age is more complex. Typically, there is a coalition of young voters and some older voters who would benefit from increasing the benefits age and an opposing coalition of middle-aged voters who would lose from such an increase.

Median voter models of political economy normally rely on the assumption of single-peaked preferences. Preferences over an issue are single peaked if policy alternatives can be arranged in a one dimensional array so that each voter has a preferred point on the array and such that for any two points on the same side of his favorite point, a voter likes the one closer to his favorite at least as well as the other. An alternative that would win in pairwise majority voting against any other option is known as a *Condorcet winner*. If preferences of all voters are single-peaked, the median of the preferred points of all voters is the unique *Condorcet winner*.<sup>12</sup> The Condorcet winner is the predicted outcome for the usual median voter models.

Selfish voters' preferences on the benefits age are, not in general, single-

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<sup>11</sup>See Employment Status of the Civilian Noninstitutional Population by Age, Sex and Race at <http://www.bls.gov/cps/cpsaat3.pdf>

<sup>12</sup>This statement needs minor modification if some individuals are indifferent between more than one best outcome.

peaked. For any selfish voter, the best social security plan is one in which benefits begin at exactly his own age. Consider a voter of age  $A$  who compares two alternative benefits ages  $x$  and  $y$  where  $x < y < A$ . This voter is older than either of the two proposed ages and hence will receive the same benefits under either alternative. If this voter is not in the labor force, she pays no social security taxes in either case and thus is indifferent between  $x$  and  $y$ . If she is still in the labor force, she will pay higher social security taxes with  $x$  than with  $y$  and hence strictly prefers  $y$ . In either case, her preferences are consistent with single-peakedness. Now suppose that  $A < x < y$ . A worker of age  $A$  will receive more benefits under  $x$ , but she will also pay more taxes since the earlier retirement age implies a larger retired population. Suppose that  $A = 35$ ,  $x = 65$  and  $y = 100$ . The most-preferred benefits age for a 35-year-old worker is 35 years. Our earlier calculations show that in the US, the expected present value of future social security taxes and benefits for a 35 year-old worker is negative. If the benefits age were 100, then the expected present value of social security taxes and benefits would both be approximately zero for a 35-year-old worker. Thus the 35-year old would prefer benefits age  $A$  to age  $x$  and also prefer benefits age  $y$  to age  $x$ . This is inconsistent with single-peaked preferences.

In general, without single-peaked preferences, it may be that there is no Condorcet winner, so that repeated majority voting contests would lead to a cyclical outcome. Whether or not there is a Condorcet winner, it is interesting to determine whether now and in the future, majority voting by selfish voters is likely to favor small increases or decreases in the retirement age.

Table 6 shows the percentage distributions of voters who would gain, lose or be indifferent about a one-year increase in the benefits age. Esti-

mates are constructed for elections held in the years 2001, 2010, 2020 and 2030. (The benefits age in 2001 was 65 and is currently mandated to be 66 in 2010 and 2020, and 67 in 2030.) In each year, self-interest will divide voters into three groups, the young, the middle-aged and those old enough to collect benefits even after the proposed increase. There will be a pivotal age such that those voters younger than this age will gain from an increased retirement age and those who are older than this age but not yet old enough to collect benefits will lose. Those who are old enough to receive benefits despite the proposed change will be indifferent about the change if they are retired, but will gain if they are still in the labor force and paying taxes on earnings. In 2001, the pivotal age for this issue was 35.5. The pivotal age will be 39 in 2010, and 40.5 in 2020 and 2030.

Table 6 shows the fraction of all voters, weighted by age-specific voter-participation rates, who fall into each of the relevant groups.

Table 6: Voting Blocks For and Against Increased Benefits Age

Year and change in benefits age	2001 65 → 66	2010 66 → 67	2020 66 → 67	2030 67 → 68
Young and in Favor	25%	30%	31%	30%
Old and in Favor	3%	2%	3%	3%
Old and Indifferent	16%	16%	19%	22%
Middle-aged and Opposed	55%	52%	47%	45%

In Table 6 we see that if old voters who are not in the labor force abstain or split their votes equally, then the selfish voter model predicts that a proposal to increase the retirement age would be defeated by approximately a two-to-one majority in 2001 and by about a four-to-three majority in 2030.

It is possible, however, that a substantial fraction of retired individuals who have no direct stake in changing the benefits age could be persuaded that the alternative to an increase the benefits age would be reduced benefits. If so, their self-interest would favor an increased benefits age. By the year 2020, the group of middle-aged voters opposing an increase falls short of a majority. After 2020 a reduction in retirement age could pass if it were able to attract a sufficiently large proportion of retired pensioners, who have no direct stake in the outcome.

Public opinion polls suggest that increases in the benefits age are not politically attractive. In a large number of polls over the past decade, when people are asked whether they favor or oppose an increased benefits age, about twice as many people are opposed as are in favor [6], [4], and [16]. The way that this question is usually asked, however, does not make it clear to voters that an increase in the retirement age might be an alternative to higher taxes or lower benefit levels. A result more favorable to increasing the benefits age comes from a 2004 poll [4] that posed a more pointed question. Respondents were asked to choose between two alternatives for maintaining the Social Security system: an increase in taxes, or an increase in the benefits age. By a narrow margin, respondents preferred increasing the benefits age.

There is historical precedent for increasing the benefits age. In 1983, Congress mandated a gradual increase that would only begin to take effect 20 years later, in 2003. Under this legislation, the benefits age is scheduled to rise gradually from 65 in 2002 to 67 in 2027.

It is interesting to consider whether this legislation would have been approved by a majority of fully-informed, selfish voters. The change had no effect on the benefits age of voters born before 1937. These voters were

46 years or older in 1983, and constituted about half of the voting population. Under our pay-as-you-go assumptions, voters born before 1937 who remain in the labor force after 2002 will be net gainers, since their benefits are unchanged and their tax burden reduced. Those voters born before 1937 who retire by 2002 will be neither gainers nor losers, since both their benefits and their taxes are unaffected.

Voters between ages 18 and 46 in 1983, all suffer a postponement of the beginning of their own benefits. Despite this loss, they must continue to pay taxes to support full benefits from age 65 for all cohorts born before 1937. Calculations show that the expected present value of this change is negative for everyone between ages 10 and 46.

If voters older than 46 favored and voters younger than 46 opposed the change, the population would be about equally split between supporters and opponents. But a large fraction of the older group would have had no expectation of being in the labor force after 2002.<sup>13</sup> Voters who expect to be retired after 2002 have no selfish motive for favoring or opposing the change. If retired voters were to abstain or split their vote, the 1983 legislation would have been rejected by a majority of fully-informed, selfish voters. But given the gradual and deferred nature of this proposal, the expected gains or losses for most voters are small in absolute terms. Where direct self-interest is weak, other considerations may prevail. For example, older voters who plan to be retired after 2002 might have been persuaded that increasing the retirement age for those younger than themselves will help to ensure that benefit levels will not be reduced during their retire-

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<sup>13</sup>In 1982, about 15 per cent of the voting population was aged 65 or higher. These people, if they survived until 2002, would be at least 84 years old. Labor force participation rates for persons older than 80 are less than 6 per cent.

ment. Younger voters may not have vigorously opposed the change, since its negative impact is experienced 20-50 years in the future.

Would selfish voters today support a proposal to extend these increases gradually to 70 years, with a two month increase each year, starting in 2027, reaching 68 in 2033, 69 in 2039, and 70 in 2045? The age distribution of self-interest for this proposal is quite similar to the distribution of gainers and losers from the 1983 legislation. The benefits age would not change for voters who will be at least 67 years old in 2027. These voters are currently 45 or older and constitute 51 per cent of the voting-age population and 58.5 per cent of those who actually vote. Members of this group who expect to be in the labor force after 2027 would gain from the proposal, while those who expect to be retired have no personal stake in the outcome.

Much as we found in the case of the 1983 legislation, this gradual increase in retirement age would adversely affect all voters currently aged 18-45. If voting is selfish, support for the change would have to come from voters who are currently older than 45. For those older voters who plan to be retired by 2027, this gradual increase would have no direct financial impact. However, they might be persuaded to support such legislation if they were convinced that the alternative to increased retirement ages was a reduction in benefit levels.

## **4 Discussion**

### **4.1 Related Research**

We are not the first to use a median-voter model to investigate the political stability of the US Social Security system. Galasso [11] studied the effect

of a slowdown in the US population growth rate on the median voter's demand for social security benefits. He constructed a computable general equilibrium growth model of the US economy. This model includes a pay-as-you-go social security system and assumes that the size and productivity of the labor force grow at constant rates. It also assumes that capital accumulation comes only from domestic saving. In the model, the level of social security benefits uniquely determines steady state stationary equilibrium consumption paths for individuals of each age. Galasso calibrates parameters of his model so that existing social security benefits are at the level that would be preferred by a voter of median age. In his baseline economy, population grows at a constant rate of 1.2 per cent (a historical average growth rate). He then examines an alternative economy in which a constant population growth rate of 0.78 per cent is assumed. (This is the average annual growth rate predicted by the Social Security Administration for the US population over the next 50 years.) He notes that a reduction in the growth rate of population introduces the same two opposing forces that we have observed. The lower population growth rate implies a higher dependency ratio and hence a higher social security tax burden for workers. On this account, for a person of a given age, the preferred social security benefit level will be lower with slower population growth. However, with the slower population growth, the median voter age rises. Since a voter's preferred level of benefits (and taxes) is an increasing function of her age, this effect tends to increase the equilibrium benefit level. In Galasso's simulations, the latter effect is stronger, and the equilibrium benefit level rises by about 4 per cent.

An attractive feature of Galasso's model is that it makes explicit predictions about future levels of social security, while our own model simply

predicts the likely direction of such changes. To obtain these quantitative estimates, Galasso had to make several extremely strong and somewhat arbitrary assumptions about preferences, production, and the macroeconomy. For his method to work, he also must confine his attention to a comparison of two long run steady state growth paths, one of which has reached equilibrium with a constant higher growth rate of population growth and the other with a constant lower rate of population growth. This procedure does not seem to be well-suited to the actual demographic trajectories for the US and Europe over the next fifty years. Instead, the demographics of the first half of this century are dominated by the aging of a large baby-boom generation which had been preceded and will be followed by much smaller age cohorts.

An earlier study by Bohn [2] estimates support for social security benefits in the US, using an approach that is similar to ours. Bohn's approach, like ours, is to use a partial equilibrium model with a constant discount rate. As did we, Bohn used census data for cohorts that have already been born, and official projections of birth and death rates to estimate the demographic make-up of future populations. He calculated the expected present value of the current social security program for persons of each age, using a 3 per cent discount rate. His qualitative conclusions are similar to ours, though by his calculations, social security is a somewhat less attractive investment than we find it to be. Bohn concludes that political support for maintaining Social Security benefits is strong and likely to remain so.<sup>14</sup>

Major European countries have experienced larger demographic shifts than the US, with falling birthrates and an aging population. According to

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<sup>14</sup>Bohn's paper also includes an interesting analysis of medicare and health insurance. He is somewhat less sanguine about the future of medicare.

the OECD Factbook [15], in the U.S, the ratio of persons older than 65 years to those in the labor force will rise from 0.24 in 2005 to 0.34 in 2020. Over the same period in Germany, this ratio will rise from 0.37 to 0.45, in France, from 0.38 to 0.50 and in Italy, from 0.46 to 0.56.

We are aware of three interesting studies that indicate that in Europe, the aging of the population is likely to lead to increased rather than decreased political support for social security. In a paper entitled “Pensions and the path to gerontocracy in Germany,” Sinn and Uebelmesser [17] investigate the net present values of the Germany social security system to persons of each age. By their calculation, in the current population, a majority of selfish voters would gain from a *reduction* of benefits. Over the next three decades, as Germany’s population ages, the pivotal age at which voters begin to favor social security will increase. But the median age of voters will increase more rapidly. In consequence, after about 2015, a majority of German voters would gain from increases rather than decreases in social security benefits.

Uebelmesser [20] applies the methods of the Sinn-Uebelmesser study to France and Italy. She finds that in Italy until 2006 and in France until 2014, the population will be quite evenly divided between voters who would gain from a permanent decrease and those who would gain from a permanent increase in pay-as-you-go pensions. After 2006 in Italy and 2014 in France, a majority would favor increases.

A recent study by Galasso and Profeta [10] applies the methods used in Galasso’s earlier study<sup>15</sup> of US [11] social security to the same questions for

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<sup>15</sup>Each country is assumed to be a closed economy. All capital investment is assumed to be financed by domestic savings and all domestic savings are invested in the home country. The realism of this assumption seems questionable for the US and much more so for

France, Germany, Italy, Spain, and the UK. This paper also offers a useful description of social security benefits and taxes in these countries. For each country, the authors conclude that although the burden of social security will rise for younger taxpayers, the increased median age will result in a net increase in the level of benefits supported by the median-aged voter. The predicted percentage increase in politically sustainable benefit levels is especially large for Germany (33%), Spain (52%), and the UK (42%) and more modest for France (10%), Italy (15%) and the US (15%).

## 4.2 Further Issues

### How well-informed are voters?

Any study based on models of rational voters must confront the issue of how informed and sophisticated the voters can be assumed to be. This paper evaluates the self-interest of voters by comparing estimates of the expected present value of the social security taxes that they will pay with the expected present value of benefits that they will receive. These costs and benefits are calculated using actuarial probabilities of the length of life and demographic projections of the age distribution of the population.

Unlike Galasso [11], Cooley and Soares[7], and Galasso and Profeta [10], we do not go so far as to assume that voters take into account the general equilibrium consequences of their actions in a long run equilibrium growth model. While it might be reasonable to assume that voters pay attention to expert advice on these highly technical matters, we believe that even among economists there is little consensus about the size and direction of general equilibrium effects of social security on such variables as interest

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individual countries in Europe.

rates, capital stocks and real wages. We think it is more reasonable to follow the tradition of private-sector general equilibrium analysis, where consumers are assumed to know their own preferences and to optimize subject to parametric prices.

Though our calculations do not require that voters foresee the general equilibrium effects of changes in social security on prices and wages, they do require voters to make demographic projections that few individuals are likely to make on their own. The statistics on which we base our estimates are available to everyone and similar conclusions are likely to be reached by most analysts who study them. To the extent that voters are selfish and guided by the advice of opinion leaders who share their self-interest, the predictions of our model are likely to be reasonable approximations.

We believe that it is useful to know how well-informed selfish voters would vote on social security issues, but are acutely aware that most voters are neither well-informed nor thoroughly selfish. There is room for much more systematic exploration of voters who are guided by simpler and perhaps systematically incorrect heuristics for decisions.

### **Equilibrium and Beliefs**

We have calculated expected returns for voters who believe that contemplated changes in pension benefits will be once-and-for-all. In this, we follow Browning [5] who observed that in a once-and-for-all election, persons of median age and higher would prevail in selecting a pension plan that benefits the current elderly at the expense of all future generations. In actuality, Social Security policy is not set on a once-and-for-all basis. The issue of benefit levels and methods of finance can be and is frequently revisited

by Congress and by voters.<sup>16</sup>

Polls report [16] that about one fourth of all voters are “not at all confident” that current levels of benefits will be available for them when they retire. Voters who believe that current benefit levels will not be available for their own retirement are likely to favor reducing benefit levels. But suppose that voters believe that if benefits are maintained today, they will be maintained for their entire lifetimes and if they are cut today, they will not be restored. As our calculations have shown, for the foreseeable future, with these beliefs, a majority of selfish voters would support maintaining current benefit levels. Thus the belief that current decisions about benefit levels are once-and-for-all would not be refuted by the course of events.<sup>17</sup>

Is it also reasonable for voters to believe that cuts in current social security benefits are not likely to be restored? To address this question, let us note that there are two distinct possible equilibria for the Social Security system. Each is sustained by a different set of self-confirming beliefs. In one self-confirming equilibrium, voters believe that current benefit levels will be sustained. In the other equilibrium, people believe that social security benefits will disappear in the future. If voters believe this, then every voter

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<sup>16</sup>Sjoblom [18] seems to have been the first to point this out. Sjoblom presents a simplified model of old-age benefits in which an intertemporal transfer scheme is maintained as a subgame perfect Nash equilibrium in an intergenerational game. Cooley and Soares [7] and Boldrin and Rustichini [3] extend Sjoblom’s analysis and study the interaction between capital accumulation and social security in general equilibrium models of a closed economy with constant population growth rates.

<sup>17</sup>It would not have to be true that belief in the survival of Social Security is self-confirming. It could have been that impending demographic changes would result in a majority of self-interested voters voting to reduce benefit levels at some future time, even if they did not expect reductions to occur.

who is younger than the current benefits age would gain from a reduction of benefit levels. Selfish voting would result in the elimination Social Security benefits, thus confirming the workers' pessimistic beliefs about the future of Social Security. Given the existence of this alternative equilibrium, it is reasonable for voters to believe that if benefit levels are reduced today, they are unlikely to be restored in the future.

### **Concern for Family**

Our estimates of political support for Social Security benefits have been based on the assumption that people vote in their own self-interest as measured by expected present values. While this assumption is an interesting starting point, it is not an adequate representation of voters' incentives.

We believe that the most important effect missed by the selfish-voting assumption is that people care strongly about the economic welfare of their own parents and their own children. Young people whose parents receive Social Security are indirect beneficiaries of these payments. Old people who are not in the labor force may care about the tax burdens that their children or grandchildren bear. It would be instructive to conduct a disaggregated analysis of individuals' valuations of payments received by and taxes collected from their children and surviving parents. It would also be interesting to see the results of public opinion polls on attitudes towards social security in which respondents were asked whether they had children, grandchildren, and/or surviving parents. As far as we know, such survey results are not currently available.

### **Forced savings, insurance, and charity**

Social Security is not simply a redistribution between age cohorts. It provides insurance against misfortune in the labor market and it functions as a mechanism for reducing poverty among the aged. The social security system works as a form of lifetime earnings insurance, by offering a higher ratio of benefits to taxes for those with low lifetime earnings.<sup>18</sup> Social security also reduces old-age poverty by operating as an instrument of forced saving. As Lindbeck and Weibull [12] explain, rational voters with altruistic motives may favor a forced saving plan as an alternative to providing direct relief for the impoverished elderly. In this paper, we have made no allowances for the value that voters put on the forced savings and social insurance functions of Social Security. Accounting for these would imply stronger support for benefits.

### **4.3 Conclusions**

In an economy with falling birth rates, pay-as-you-go social security offers an extremely low rate of return on taxes paid over the course of a worker's life. Young people, voting their self-interest would choose to eliminate all benefits. But in a democracy, the middle-aged and the old are also allowed to vote. While workers who are in their mid-forties would have benefited from elimination of social security when they were younger, they now find that the expected present value of future benefits exceeds that of future costs from social security. By our estimates, workers begin to be net beneficiaries from the future benefits and costs of social security while in their early forties. At present, the median age of those who vote in elections is

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<sup>18</sup>See Footnote 9.

in the late forties. Accordingly, almost two-thirds of those who vote would benefit from maintaining or increasing current benefits. Over the next four decades, as the population ages, the tax cost of providing social security benefits will increase. As a result, middle-aged workers will find social security less attractive, and the age at which voters begin to favor social security will rise to the mid-forties. But at the same time, the median age of voters will rise to the low fifties. Throughout this entire period, a majority of selfish voters will prefer maintaining the current level of benefits to a once-and-for-all reduction in benefits.

Public opinion polls in the US confirm that there is strong majority support for maintaining social security benefits at current levels. An indication that this support will persist as the population ages comes from the European experience. In France, Germany, and Spain, the ratio of pensioners to workers is much higher than in the US and similar to the ratio that expected in the US in 2030. In these countries, despite social security tax rates that are much higher than those in the US, public opinion polls show clear majority support for maintaining at least the current level of benefits.

On the issue of the age at which benefits should begin, self-interest does not simply align the old against the young. Increases in the benefit age would benefit young voters and some older voters. Voters currently old enough to receive benefits and are still earning wages would gain from a small increase in the retirement age, while those who are retired will neither gain nor lose. Those who would lose from an increased benefit age are the middle-aged voters who lose more in benefits than they save in reduced taxes. Through the year 2010, a majority of the voting population will belong to the middle-aged group opposed to an increase. By 2020, this group will fall to slightly less than half the population. Assuming current

labor force participation rates for those older than the benefits age, about one-third of voters will gain from an increased benefits age, and about 20 per cent will be indifferent.

We do not believe that voting is entirely governed by selfish motives nor do we believe that most voters are well informed about the expected costs and benefits of social security. This simple model of selfish, informed voters can at best be considered a crude approximation. Its predictions, however, seem to be broadly consistent with voting outcomes and opinion polls, both in the US and in Europe.

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