DEMOGRAPHICS AND THE POLITICAL SUSTAINABILITY OF PAY-AS-YOU-GO SOCIAL SECURITY

THEODORE C. BERGSTROM
JOHN L. HARTMAN

CESIFO WORKING PAPER NO. 1378
CATEGORY 2: PUBLIC CHOICE
JANUARY 2005

PRESENTED AT CESIFO/DELTA CONFERENCE ON STRATEGIES FOR REFORMING PENSION SCHEMES, NOVEMBER 2004

CESifo *Working Paper No. 1378*

DEMOGRAPHICS AND THE POLITICAL SUSTAINABILITY OF PAY-AS-YOU-GO SOCIAL SECURITY

Abstract

The net present value of costs and benefits from a pay-as-you-go social security system are negative for young people and positive for the elderly. If people all vote their financial self-interest, there will be a pivotal age such that those who are younger favor smaller social security benefits and those who are older will favor larger benefits. For persons of each age and sex, we estimate the expected present value gained or lost from a small permanent increase in the amount of benefits, where the cost of these benefits is divided equally among the population of working age. Assuming that everyone votes his or her long run financial self-interest, and calculating the number of voters in the population of each age and sex, we can determine whether there is majority support for an increase or a decrease in social security benefits. We use statistics on the age distribution and mortality rates for the United States to explore the sensitivity of political support for social security to alternative assumptions about the discount rate, excess burden in taxation, voter participation rates, and birth, death, and migration rates. We find that a once-and-for-all decrease in benefits would be defeated by a majority of selfish voters under a wide range of parameters. We also study the predicted majority outcomes of votes on changing the retirement age.

JEL Code: H53.

Theodore C. Bergstrom
Economics Department
University of California Santa Barbara
Santa Barbara, CA 93106
USA
tedb@econ.ucsb.edu

John L. Hartman
Economics Department
University of California Santa Barbara
Santa Barbara, CA 93106
USA
hartman@econ.ucsb.edu

1 Introduction

A permanent increase in social security benefits funded by taxes collected from working people will be financially beneficial to those sufficiently near retirement and harmful to those who are far from retirement. This paper investigates the political support for pay-as-you-go retirement plans in the United States, on the assumption that persons of each age vote in their selfish financial interest. For selfish voters, there will be a pivotal age such that those who are older favor increased benefits and those who are younger favor decreased benefits. We estimate the expected present value of benefits and costs to a U.S. citizen of each age and sex from a permanent $1 annual increase in retirement benefits, assuming that in every year, the cost of these benefits will be divided equally among the population of working age. We used U.S. census data on population by age, along with age-specific birth and death rates in an Excel spreadsheet to calculate the present value, positive or negative, of a tax-supported permanent increase in retirement benefits to a person of each age and sex. To make these calculations we need projections of the population by age and sex for the relevant future time. These projections are based on the current age distribution, current birth rates and a range of conjectures about future immigration rates. The Excel format allows us to vary parameters so that we can explore the sensitivity of political support for social security to alternative assumptions about the discount rate, the amount of excess burden in taxation, voter participation rates, changes in projected mortality and birth rates, among other parameters.

Social security benefits can be changed by altering the level of payments, but also by changing the age at which workers retire and become eligible for payments. Those who are older than the current retirement age have a strong financial interest in maintaining or increasing current benefit levels, but have no direct financial interest in a change in retirement age that does not affect their own retirement status. We study the likely outcome of majority voting by selfish individuals on a permanent change in the retirement age. Unlike preferences over the size of benefits, preferences over retirement age are not monotonic with age. For example, a proposal to increase the retirement age by one year will be favored by those who are much younger than retirement age and opposed by those who are close to retirement age, but those who are currently older than either of the alternatives considered will be indifferent about the change.

2 Related Literature

Browning [3] pointed out that if a single once-and-for-all election were held to determine the levels of pensions, then a coalition of persons of median age and higher would select an inefficient pension plan that benefits the current elderly at the expense of all future generations. If the issue of pension levels is frequently revisited by voters, the matter is less straightforward. In an economy inhabited by a sequence of overlapping generations of finitely-lived agents, when will expectations of current populations be maintained by voters of succeeding generations? Sjoblom [9] presents a model in which social security provides the only source of saving and where an efficient intertemporal transfer scheme can be maintained as a subgame perfect Nash equilibrium in a game played between generations. Casamatta, Cremer, and Pestieau [4] consider a voting model in which workers differ both by age and by wage rate. There are two age groups, the workers and the retired, and a constant rate of growth of population. Pay-as-you-go pensions redistribute income not only between generations but also between skill groups. Cooley and Soares [5] and Boldrin and Rustichini [2] study the interaction between capital accumulation and social security in general equilibrium models of a closed economy with constant population growth rates where levels of social security payments are determined periodically by majority voting. Razin, Sadka, and Swagel [6] and Razin and Sadka [7] examine the problems that arise in the social security systems in countries with increasing life expectancy and falling birth rates.

Sinn and Uebelmesser [8] investigate the age distribution of net present values of the Germany social security system. They draw two curves on a graph with time on the horizontal axis. One curve shows the median age of voters in each year from 2000 until 2030. The second curve shows the "indifference age" for each year. This is the pivotal age such that older voters gain and younger voters lose from an increase in benefits. A majority of voters will favor a decrease or an increase in benefits depending on whether the median age curve lies below or above the indifference age curve. With Germany's aging population, both curves slope upwards, but the median age curve is more steeply sloping. From the years 2000-2015, the median age curve lies below the indifference age curve, but for the years beyond 2015, the indifference age is higher. This suggests that currently, a majority of selfish voters who understood the benefits and costs will favor reductions of benefits, but after 2015, a majority will favor increases. Hence the paper is titled "Pensions and the path to gerontocracy in Germany."

Uebelmesser [10] extends the methods of the earlier 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 favor a permanent decrease and those who would favor a permanent increase in pay-as-you-go pensions. After 2006 in Italy and 2014 in France, a majority would favor increases.

Bohn [1] investigated the likely political sustainability of the U.S. social security and medicare systems. He poses the question "Is social security likely to maintain support as the population ages?" He estimated the net present value of a pay-as-you-go pension system to voters of each age, given the likely age distribution of the population over the next 30-50 years. Bohn concluded that the net present value of this system is likely to be positive for the majority of U.S. voters for the foreseeable future.

3 A Simplified Model of Social Security

We consider the following simplified pay-as-you-go social security plan. There is a predetermined retirement age S such that on reaching age S, people leave the work force and receive a constant social security payment for the remainder of their lives. All persons whose ages are between 18 years and the retirement age are assumed to work and to pay taxes to support the social security benefits of retirees. In each year, the total cost of social security payments is divided equally among all workers, who pay their share of this cost in the form of a head tax.

Let us consider a proposal to permanently increase social security benefits for each retiree by $1 per year starting in the current period. In every year, the current cost of this program will be paid for by taxation of the current labor force. For people currently in the labor force, this increase offers the benefits of greater anticipated payments when they retire but also imposes a cost in the form of higher taxes in every year until they retire. For selfish retired persons, the increase is an unambiguous benefit, since they receive additional benefits and pay no costs.

A worker's expected present value of benefits from social security payments must be discounted by the appropriate time rate of discount and also by the probability that he or she will be alive to receive them. Let r be the rate at which an individual discounts future benefits and costs, and let $L_t(a, x)$ be the probability that someone who is of age a at time t will still be alive at 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

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

At any time τ the tax cost to each current worker of increasing benefits for all retired persons by \$1 is the "dependency ratio" $D(\tau)$ where $D(\tau)$ is the ratio of the number of retired persons to the number of workers in year τ. For a working person of age a, the expected present value of a permanent \$1 increase in social security benefits is

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

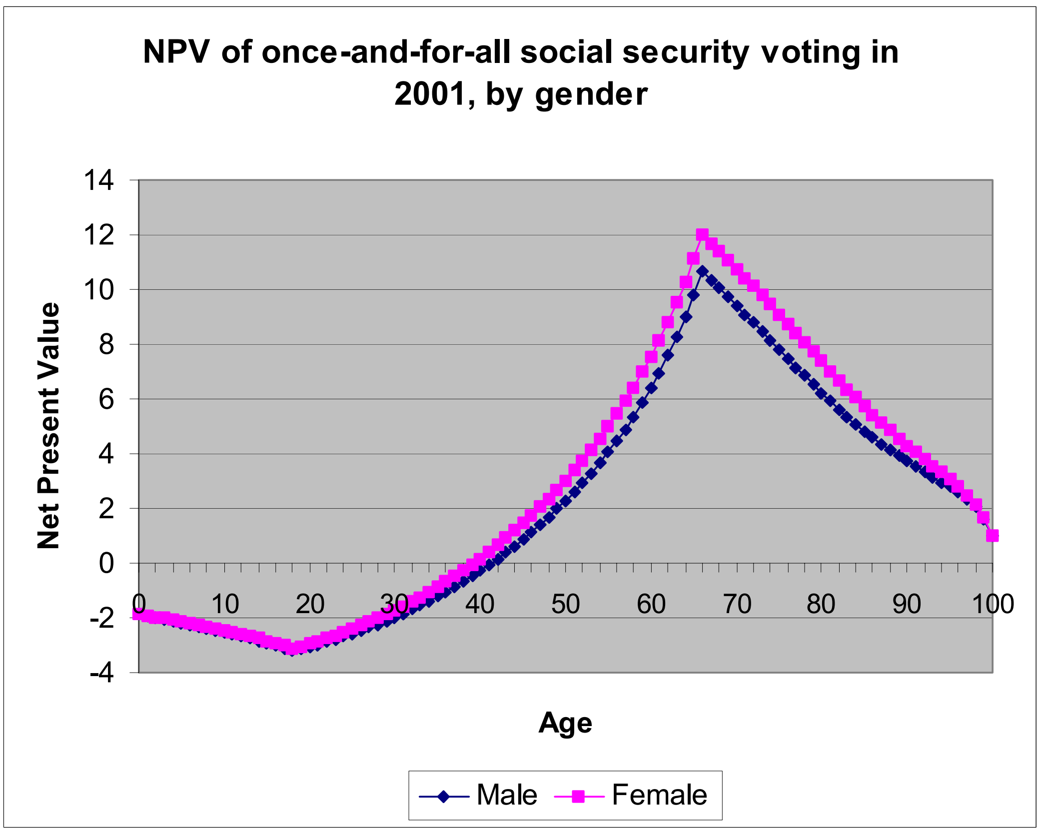
We use gender-specific survival rates to construct separate estimates of expected present values of benefits and costs for men and for women at each age between 18 and the retirement age. A worker of a given age and sex is assumed to be in support of increased social security benefits if for that person, $B(a) > C(a)$ and will otherwise oppose increased benefits. All persons older than retirement age are assumed to support increased benefits.

4 Voting on Benefit Levels

4.1 Self-interested Voting by the 2001 Population

Assuming a discount rate of 5% and that the retirement age is 66 years (the current US retirement age for persons born between 1943 and 1954) we calculated the expected net present value $B(a) - C(a)$ by age and sex. The graph of these present values is shown in Figure 1.

Figure 1: Net Present Values by Age and Gender



The pivotal age at which voters begin to favor increased social security is 42 for men and 40 for women. A once-and-for-all small increase in pay-as-you-go benefits would be of positive net present value for about 55% of the population older than age 18. But the proportion of *voters* who gain from such an increase is larger. In the United States, old people are much more likely to vote than the young. Taking account of age-specific voting rates, an increase in the size of benefits would result in a higher expected net present value for about 66% of actual voters.[1]

4.2 Excess Burden and Uncertainty About Benefits

If indeed 65% of voters would gain from an increase in pay-as-you-go social security benefits, we must wonder why benefits have not been increased beyond current levels. Perhaps this is evidence that voters are not so selfish as we have assumed. Parents who care about the welfare of their children should take into account the fact that their gains from increased social security benefits will be paid for, at least in part, by their own children.

Even voters who are entirely selfish may believe that an increase in current social security benefits would result in smaller expected gains and larger costs than those reflected in our calculations. Middle-aged voters may think it quite likely that social security increases approved today will not be sustained until their own generation reaches retirement age.

Voters may also believe that taxation that pays for social security benefits distorts private incentives in such a way that the total cost of raising funds by taxes exceeds the amount of revenue raised. This perception corresponds to the economic theory of excess burden of taxation.

We can make some simple calculations that quantify the notions of uncertain benefits and excess burden. Suppose that a voter believes that the

[1]In the Appendix, we show how this percentage responds to alternative assumptions about parameter values.

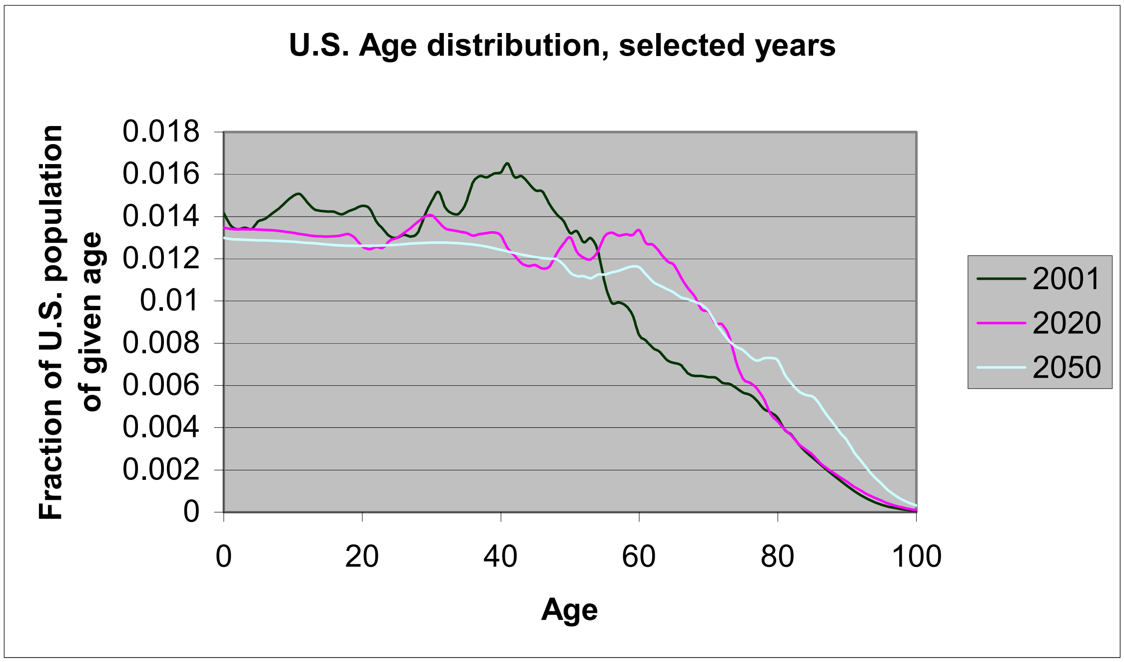
probability is π that a small increase in social security instituted today will persist until their own retirement. Suppose, further, that the degree of excess burden is such that for every dollar of tax revenue collected, the cost to taxpayers is $1+b$ dollars. Then expected returns from an increase in benefits would be reduced by a factor of π and expected costs would be increased by a factor of $1 + b$. A selfish voter of age a would favor an increase in benefits only if the ratio $C(a)/B(a) < \pi/(1 + b)$, where $C(a)$ and $B(a)$ are age specific expected costs and benefits as calculated in the previous section. We use our spreadsheet model to find a ratio $\pi/(1+b)$ such that for exactly half of the voting population, $C(a)/B(a) < \pi/(1 + b)$. This proportion is $\pi/(1 + b) = .6$. This ratio corresponds, for example, to a case where confidence in the durability of an increase in benefits is 75% and the cost to taxpayers of raising $1 in revenue is $1.25.

4.3 Self-interested Voting by Future Populations

In previous sections, we examined the net benefits of once-and-for-all marginal increments in pay-as-you-go social security to the current voting population. But how reasonable is it for voters to believe that an increment in today's benefits will be sustained until their own retirements? One way to address this question is to estimate the outcomes in future elections of proposals to change the amount of social security benefits.

As Figure 2 shows, the baby boom of the 1950's and the subsequent decline in the birth rate will result in a large increase in the proportion of retirees in the population over the next twenty to thirty years. In 2001, there were about 5.3 people of working age for every person aged 66 or higher. This number will not change much by 2010. By 2020, it will fall to about 4.15 and by 2030 to about 3.2. On this account, the cost of the social security system to workers will be about 29% higher in 2020 and 68% higher in 2030 than current costs.

Figure 2: U.S. Age Distribution



As a result, the fraction of workers who favor increased social security benefits will decline. But there is a countervailing force. The population will include a larger portion of retirees and workers who are close to retirement and for whom an increase in benefits represents a net gain in present value. Our calculations suggest that the net effect of these two forces will be a small decline in the fraction of voters whose self-interest favors increased benefits. With baseline assumptions and no excess burden, this fraction remains at roughly 65% in 2010 and falls to 63.3% by 2020 and 61.9% by 2030. These calculations suggest that, holding the retirement age constant, political support for maintaining the size of benefits will be little changed over the next 30 years, with a slight decrease in support.

5 Voting on Retirement Age

The scope of a retirement benefit program depends not only on the size of benefits, but on the age of retirement. Suppose that with benefits levels fixed, there is voting on the age at which retirement benefits begin. Workers who are close to retirement will gain from a reduction in the retirement age, while young workers will gain from an increase in the retirement age. But in contrast to the case of voting on benefit levels, voters who are older than either of the proposed retirement ages have no direct economic stake in the outcome.

Voting on retirement age introduces one more complication not seen in the case of benefit levels. Selfish voters do not in general have *single-peaked preferences* over retirement age. For example, in the context of our model, if the current retirement age is 66, a selfish 35-year old voter would oppose a reduction in the retirement age from 66 to 65 years, but would favor a reduction in the retirement age from 66 to 36 years.

5.1 Once-and-for-all changes in retirement age

Because voters' preferences are not single-peaked with respect to retirement age, there is the possibility of voting cycles and it may turn out that every possible retirement age can be defeated in majority voting by some other age. However, we find empirically that if voting is restricted to choices about "small changes" in the retirement age, then for the U.S. population, over the parameter values that we have observed, there is always at least one retirement age that can not be defeated either by a one year increase or a one year decrease.

In our calculations, we assume that retired voters whose retirement status will not be affected by the outcome will split their votes equally between these options. For the U.S. population in 2001, with our baseline assumptions about parameter values and assuming that there is no excess burden in taxation, the unique age that cannot be defeated in majority vote by either a one year increase or a one year decrease is 59.

If we assume that taxation to pay for social security imposes a deadweight loss of 20%, then for the 2001 population, the stable age under majority voting would be 66. With a 20% excess burden, voting by the 2010 population results in a stable retirement age of 70, and voting by the 2020 population would push the retirement age to 99 years.

Over the next thirty years, as the ratio of the retired to the working population grows and the cost of maintaining a given level of benefits rises, a growing proportion of workers will find that their self-interest favors a once-and-for-all increase in the retirement age. Since there is no countervailing force from the growing number of retired voters, there is a sharp increase over the next three decades in the retirement age that is stable against one year changes. With our baseline parameter values, assuming that there is no excess burden, if voters expect the chosen retirement age to remain in place forever, then our model predicts majority support for a retirement age of 59 in the year 2001. But if, under the same assumptions, voters revisit the issue of retirement age in future years, the stable age under majority voting will be 63 in 2010, 70 in 2020, and 79 in 2030.

Of course if actual retirement ages follow this trajectory, we would not expect voters to continue to believe that the retirement age will remain constant. We have calculated expected payoffs for voters who believe that retirement ages would be 59 in 2001, 63 in 2010, 70 in 2020 and 79 in 2030. We find that with these beliefs, support for the social security plan would diminish among current workers so that about half of the population favors a reduction in the amount of benefits.

5.2 Constant Rate of Change of Retirement Age

Suppose that instead of voting on a once-and-for-all change in retirement rates, voters select a constant rate of change for the retirement age. We will suppose that pairwise voting takes place between alternatives that are close. For example, voters are allowed to choose between an increase of one year in the retirement age every five year versus a one year change every six years. We find that with the 2001 population and baseline assumptions and a current retirement age of 66 years, there is stable majority support for an increase in the retirement age of one year for every eight years in the future. This majority-sustained rate does not change significantly when voted on by the projected populations of 2010, 2020, or 2030. Thus we would expect political support for gradual increases in the retirement age from a current age of 66 in 2001 to 67 in 2009, 68 in 2017 and 69 in 2025.

Suppose that voters vote on the size of retirement benefits while being aware that the retirement age will increase by one year at eight year intervals into the future. With baseline assumptions and no excess burden, our model suggests that the percentage of voters who would support an increase is about 58%, as compared to 65% if the age of retirement is held constant.

5.3 The Dependency Ratio and Retirement Age

In the 2004 U.S. presidential campaign, both major candidates promised not to increase taxes and not to reduce social security benefits. They also claimed that they would reduce the national debt. Not many thoughtful people are likely to believe that these three promises are simultaneously credible. But the fact that the candidates chose to make them, suggests that there is a great deal of popular resistance to each of these options.

If the retirement age is held constant at 66, there will be about 0.19 retirees per worker from 2004 until 2010. This number, known as the *dependency ratio*, will rise to about 0.24 by 2020 and to about 0.31 by 2030. This means that if current social security benefits are to be maintained on a pay-as-you-go basis, then the average social security tax revenue collected from each member of the working population would have to increase by 30% between 2010 and 2020 and by another 30% between 2020 and 2030. If the distortionary costs from taxes rise more rapidly than tax revenue, the required increase in tax *rates* would be larger than this.

Suppose that instead of increasing taxes or reducing benefit levels for the retired, the government chose to increase retirement ages just enough to support the current level of benefits at the current tax rates. This would mean that the retirement age would have to be increased just enough to maintain a constant dependency ratio. In 2001, when the retirement age was 65, the dependency ratio was about 0.20. To maintain this ratio, the retirement age would have to be increased to 66 in 2008, and 67 in 2014. In the subsequent years, the retirement age would have to rise more rapidly, with a one-year increase every three or four years until 2035, when the retirement age would be 73. After 2035, the increases could be more gradual, eventually reaching 75 in 2088.

Suppose that alternatively, the government chose to use increased taxes to allow the dependency ratio to increase from 0.20 to 0.25 and then maintain a constant dependency ratio by increasing the retirement age. Then no changes in retirement age would be needed until 2018. After that, the retirement age would have to increase by one year every three or four years, reaching 71 in 2035.

6 Conclusions

If voters are assumed to vote according to their selfish financial interest and if the age of retirement is fixed, then despite the aging of the U.S. population over the next thirty years, political support for maintaining at least current levels of social security benefits is likely to remain strong over this entire period.

However, with the aging population, it is possible that in the next two decades, majority support will be found for eroding the size of the social security system through increases in the retirement age. If voters were able to vote on changes in the retirement age which they believed (incorrectly) to be once-and-for-all, they would support a retirement age of 70 by the year 2020 and a retirement age close to 80 by 2030. Furthermore, if current voters believe that such drastic increases in the retirement age are in store, there would be majority support for once-and-for-all decreases in the size of social security benefits.

If voting on the retirement age is confined to votes about a constant rate of change in this age, the results are much more stable. The unique rate of change that survives challenges from small accelerations or decelerations is an increase of about one year over the course of each eight years. This rate of change would be supported not only by the current population, but also by the projected populations for the years 2010, 2020, and 2030. If voters are selfish and believe that retirement age will increase at this rate, then with our benchmark parameter values, about 58% of voters would favor maintaining at least the current level of benefits.

7 Appendix–Sensitivity Checks

This table shows the percentage of voters who favor increased benefits with various alternative assumptions.

Percentage of people voting yes (i.e. having positive NPV), baseline numbers and sensitivity checks

discount rate	**ret. age**	**% yes**	**comments**
5%	66	65.1%	Baseline case; 66 is retirement age for those born 1943-1954
5%	65	66.2%	65 is retirement age for those born 1937 or earlier
5%	67	65.1%	67 is retirement age for those born 1960 or later
7%	66	55.1%	Higher discount rate increases minimum age voting yes by ~5 yrs. (vs. baseline)
3%	66	81.0%	Lower discount rate decreases minimum age voting yes by ~8 yrs. (vs. baseline)
8.25%	66	50.6%	Men age 48+ & women age 47+ vote yes
8.26%	66	49.6%	Men age 48 now vote no ➔ Given retirement age 66, 48 yr-old man is median voter
5%	70	63.0%	Assuming discount rate is 5%, support remains high even with increased retirement age
5%	75	58.6%	Even at age 75, support remains high
7%	69	51.8%	Higher discount rate & retirement age; men age 48+ & women age 46+ vote yes
7%	70	49.6%	Men age 48 & women age 46 now vote no
5%	*66*	*67.3%*	*Immigration numbers are double the baseline case*
5%	*66*	*65.1%*	*Immigration numbers are half the baseline case*
5%	*66*	*55.6%*	*100% of people age 18 and older vote*
5%	*66*	*63.3%*	*Projected population for 2050 used; death tables and other appropriate adjustments made*
5%	*66*	*65.1%*	*Birth rates are 20% lower than baseline*
5%	*66*	*65.1%*	*Birth rates are 20% higher than baseline*
5%	*66*	*63.0%*	*Uses 2000 death rates every year*

References

[1] Henning Bohn. Will social security and medicare remain viable as the U.S. population is aging? An update. Technical report, University of California Santa Barbara, 2003.

[2] Michele Boldrin and Aldo Rustichini. Political equilibria and social security. *Review of Economic Dynamics*, 3(1):41–78, 2000.

[3] Edgar Browning. Why the social insurance budget is too large in a democracy. *Economic Inquiry*, 13:373–388, September 1975.

[4] Georges Casamatta, Helmut Cremer, and Pierre Pestieau. The political economy of social security. *Scandinavian Journal of Economics*, 102(3):503–522, 2000.

[5] Thomas Cooley and Jorge Soares. A positive theory of social security based on reputation. *Journal of Political Economy*, 107(1):135–160, 1999.

[6] Assaf Razin, Efraim Sadka, and Philip Swagel. The aging population and the size of the welfare state. *Journal of Political Economy*, 110(4):900–918, 2002.

[7] Assaf Razin and Efraim Sadka. Privatizing social security under balanced-budget constraints: a political economy approach. Technical report, Tel-Aviv University, 2003.

[8] Hans-Werner Sinn and Silke Uebelmesser. Pensions and the path to gerontocracy in Germany. *European Journal of Political Economy*, 19:153–158, 2002.

[9] Kriss Sjoblom. Voting for social security. *Journal of Political Economy*, 45(3):225–240, 1985.

[10] Silke Uebelmesser. Political feasibility of pension reforms. *Topics in Economic Analysis and Policy*, 4(1):1–21, 2004.

CESifo Working Paper Series

(for full list see www.cesifo.de)

1313 Kurt Schmidheiny, Income Segregation and Local Progressive Taxation: Empirical Evidence from Switzerland, October 2004

1314 David S. Evans, Andrei Hagiu and Richard Schmalensee, A Survey of the Economic Role of Software Platforms in Computer-Based Industries, October 2004

1315 Frank Riedel and Elmar Wolfstetter, Immediate Demand Reduction in Simultaneous Ascending Bid Auctions, October 2004

1316 Patricia Crifo and Jean-Louis Rullière, Incentives and Anonymity Principle: Crowding Out Toward Users, October 2004

1317 Attila Ambrus and Rossella Argenziano, Network Markets and Consumers Coordination, October 2004

1318 Margarita Katsimi and Thomas Moutos, Monopoly, Inequality and Redistribution Via the Public Provision of Private Goods, October 2004

1319 Jens Josephson and Karl Wärneryd, Long-Run Selection and the Work Ethic, October 2004

1320 Jan K. Brueckner and Oleg Smirnov, Workings of the Melting Pot: Social Networks and the Evolution of Population Attributes, October 2004

1321 Thomas Fuchs and Ludger Wößmann, Computers and Student Learning: Bivariate and Multivariate Evidence on the Availability and Use of Computers at Home and at School, November 2004

1322 Alberto Bisin, Piero Gottardi and Adriano A. Rampini, Managerial Hedging and Portfolio Monitoring, November 2004

1323 Cecilia García-Peñalosa and Jean-François Wen, Redistribution and Occupational Choice in a Schumpeterian Growth Model, November 2004

1324 William Martin and Robert Rowthorn, Will Stability Last?, November 2004

1325 Jianpei Li and Elmar Wolfstetter, Partnership Dissolution, Complementarity, and Investment Incentives, November 2004

1326 Hans Fehr, Sabine Jokisch and Laurence J. Kotlikoff, Fertility, Mortality, and the Developed World's Demographic Transition, November 2004

1327 Adam Elbourne and Jakob de Haan, Asymmetric Monetary Transmission in EMU: The Robustness of VAR Conclusions and Cecchetti's Legal Family Theory, November 2004

1328 Karel-Jan Alsem, Steven Brakman, Lex Hoogduin and Gerard Kuper, The Impact of Newspapers on Consumer Confidence: Does Spin Bias Exist?, November 2004

1329 Chiona Balfoussia and Mike Wickens, Macroeconomic Sources of Risk in the Term Structure, November 2004

1330 Ludger Wößmann, The Effect Heterogeneity of Central Exams: Evidence from TIMSS, TIMSS-Repeat and PISA, November 2004

1331 M. Hashem Pesaran, Estimation and Inference in Large Heterogeneous Panels with a Multifactor Error Structure, November 2004

1332 Maarten C. W. Janssen, José Luis Moraga-González and Matthijs R. Wildenbeest, A Note on Costly Sequential Search and Oligopoly Pricing, November 2004

1333 Martin Peitz and Patrick Waelbroeck, An Economist's Guide to Digital Music, November 2004

1335 Lutz Hendricks, Why Does Educational Attainment Differ Across U.S. States?, November 2004

1336 Jay Pil Choi, Antitrust Analysis of Tying Arrangements, November 2004

1337 Rafael Lalive, Jan C. van Ours and Josef Zweimueller, How Changes in Financial Incentives Affect the Duration of Unemployment, November 2004

1338 Robert Woods, Fiscal Stabilisation and EMU, November 2004

1339 Rainald Borck and Matthias Wrede, Political Economy of Commuting Subsidies, November 2004

1340 Marcel Gérard, Combining Dutch Presumptive Capital Income Tax and US Qualified Intermediaries to Set Forth a New System of International Savings Taxation, November 2004

1341 Bruno S. Frey, Simon Luechinger and Alois Stutzer, Calculating Tragedy: Assessing the Costs of Terrorism, November 2004

1342 Johannes Becker and Clemens Fuest, A Backward Looking Measure of the Effective Marginal Tax Burden on Investment, November 2004

1343 Heikki Kauppi, Erkki Koskela and Rune Stenbacka, Equilibrium Unemployment and Capital Intensity Under Product and Labor Market Imperfections, November 2004

1344 Helge Berger and Till Müller, How Should Large and Small Countries Be Represented in a Currency Union?, November 2004

1345 Bruno Jullien, Two-Sided Markets and Electronic Intermediaries, November 2004

1346 Wolfgang Eggert and Martin Kolmar, Contests with Size Effects, December 2004

1347 Stefan Napel and Mika Widgrén, The Inter-Institutional Distribution of Power in EU Codecision, December 2004

1348 Yin-Wong Cheung and Ulf G. Erlandsson, Exchange Rates and Markov Switching Dynamics, December 2004

1349 Hartmut Egger and Peter Egger, Outsourcing and Trade in a Spatial World, December 2004

1350 Paul Belleflamme and Pierre M. Picard, Piracy and Competition, December 2004

1351 Jon Strand, Public-Good Valuation and Intrafamily Allocation, December 2004

1352 Michael Berlemann, Marcus Dittrich and Gunther Markwardt, The Value of Non-Binding Announcements in Public Goods Experiments: Some Theory and Experimental Evidence, December 2004

1353 Camille Cornand and Frank Heinemann, Optimal Degree of Public Information Dissemination, December 2004

1354 Matteo Governatori and Sylvester Eijffinger, Fiscal and Monetary Interaction: The Role of Asymmetries of the Stability and Growth Pact in EMU, December 2004

1355 Fred Ramb and Alfons J. Weichenrieder, Taxes and the Financial Structure of German Inward FDI, December 2004

1356 José Luis Moraga-González and Jean-Marie Viaene, Dumping in Developing and Transition Economies, December 2004

1357 Peter Friedrich, Anita Kaltschütz and Chang Woon Nam, Significance and Determination of Fees for Municipal Finance, December 2004

1358 M. Hashem Pesaran and Paolo Zaffaroni, Model Averaging and Value-at-Risk Based Evaluation of Large Multi Asset Volatility Models for Risk Management, December 2004

1359 Fwu-Ranq Chang, Optimal Growth and Impatience: A Phase Diagram Analysis, December 2004

1360 Elise S. Brezis and François Crouzet, The Role of Higher Education Institutions: Recruitment of Elites and Economic Growth, December 2004

1361 B. Gabriela Mundaca and Jon Strand, A Risk Allocation Approach to Optimal Exchange Rate Policy, December 2004

1362 Christa Hainz, Quality of Institutions, Credit Markets and Bankruptcy, December 2004

1363 Jerome L. Stein, Optimal Debt and Equilibrium Exchange Rates in a Stochastic Environment: an Overview, December 2004

1364 Frank Heinemann, Rosemarie Nagel and Peter Ockenfels, Measuring Strategic Uncertainty in Coordination Games, December 2004

1365 José Luis Moraga-González and Jean-Marie Viaene, Anti-Dumping, Intra-Industry Trade and Quality Reversals, December 2004

1366 Harry Grubert, Tax Credits, Source Rules, Trade and Electronic Commerce: Behavioral Margins and the Design of International Tax Systems, December 2004

1367 Hans-Werner Sinn, EU Enlargement, Migration and the New Constitution, December 2004

1368 Josef Falkinger, Noncooperative Support of Public Norm Enforcement in Large Societies, December 2004

1369 Panu Poutvaara, Public Education in an Integrated Europe: Studying to Migrate and Teaching to Stay?, December 2004

1370 András Simonovits, Designing Benefit Rules for Flexible Retirement with or without Redistribution, December 2004

1371 Antonis Adam, Macroeconomic Effects of Social Security Privatization in a Small Unionized Economy, December 2004

1372 Andrew Hughes Hallett, Post-Thatcher Fiscal Strategies in the U.K.: An Interpretation, December 2004

1373 Hendrik Hakenes and Martin Peitz, Umbrella Branding and the Provision of Quality, December 2004

1374 Sascha O. Becker, Karolina Ekholm, Robert Jäckle and Marc-Andreas Mündler, Location Choice and Employment Decisions: A Comparison of German and Swedish Multinationals, January 2005

1375 Christian Gollier, The Consumption-Based Determinants of the Term Structure of Discount Rates, January 2005

1376 Giovanni Di Bartolomeo, Jacob Engwerda, Joseph Plasmans, Bas van Aarle and Tomasz Michalak, Macroeconomic Stabilization Policies in the EMU: Spillovers, Asymmetries, and Institutions, January 2005

1377 Luis H. R. Alvarez and Erkki Koskela, Progressive Taxation and Irreversible Investment under Uncertainty, January 2005

1378 Theodore C. Bergstrom and John L. Hartman, Demographics and the Political Sustainability of Pay-as-you-go Social Security, January 2005