

Exemplary Team Prize—\$5,000

Manalapan High School—Team #113, Manalapan, New Jersey

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Solving the Age-Old Age

Debate:

Keeping Social Security Alive

Team: 113

Summary

In the current system of Social Security, retirees have a monthly check sent to them based on their earnings throughout their working career. This calculation of their benefit is based on their average income, adjusted for inflation. These checks are funded by the younger, working generation. On the surface, this appears to be a good, self-sustaining system. However, problems arise when the retired population greatly exceeds the working population. In this scenario, the retirees do not have enough funds to pay for their benefits. This hypothetical situation is quickly becoming a reality, as the post-WWII baby-boomer generation is reaching retirement age. The subsequent generations are not nearly as large, and the surplus in the Social Security trust fund is not enough to cover the difference.

In the alternative system proposed within this report, this “pay-as-you-go” system is slowly replaced by a system in which the generation pays for their own retirement benefits. They contribute to a pool that is unique to their own five-year age bracket. For example, an age bracket could consist of people born from January 1, 1985 to December 31, 1989. Since people will contribute to their own retirement, there will be no problem regarding a change in population size. Still, there will be a Safety Net Fund, encompassing all age brackets. This Fund will be separate from all age-bracket funds and will only need to be accessed in times when the age-bracket fund is not sufficient to supply for a generation’s retirement.

In this plan, a varying proportion of the Social Security taxes paid by the citizen will be available for them to make their own investments if they choose. As the citizens grow older, they will not have as much of their money to invest as they choose because their retirement will be approaching quickly and they will need to make conservative investment decisions so as to not lose all their money and put undue strain on the system.

Transitioning to this new, improved system will not be easy. It will take a period of over 30 years, starting in 2015, to change over to the new system. This will be a three-phase process. In the first phase, instead of paying for retirees, each age bracket will pay for the citizens in the bracket 30 years ahead of them. Ten years later, each bracket will pay for citizens 20 years older than them. Then, they will pay for those ten years older than them. Finally, after the transition period, the country will be totally under the new system.

The viability of this system will be tested by analyzing the cash-flow during this time period, making sure it always has a net flow in. Also, the amount of times the Safety Net has been accessed will need to be monitored, since a sound system should not have the Net accessed too many times. Finally, the money in the citizen-controlled portion of their account will be monitored to check to see if sound investment decisions are made.

Assumptions

1. All Social Security cardholders (hereafter to be denoted as “citizens”) expect to be able to support themselves in retirement.
2. On average, citizens over 65 depend on Social Security for 64% of their income.
3. Differences in the cost of living around the U.S. will be compensated by one’s contributions into the Social Security fund.
4. Citizens are required to put a part of their salary toward the Social Security fund.
5. The population of the U.S. grows at a relatively constant rate.
6. There will be no drastic change in population due to extreme circumstances—famine, epidemic, world war, etc.
7. Personal wealth has an inverse correlation to one’s dependence on Social Security as a part of his or her total income.
8. Everyone starts working under the age of 20.

Analysis of the Current Social Security Situation

Overview

In the current system used by the United States of America for Social Security, the working population pays a Social Security tax on their salaries. This tax goes to pay the benefits of the retired population. On the surface, this appears to be a self-sustaining system which could endure. However, on further analysis, one encounters several inherent flaws.

The most major defect in the system arises when the retired population severely outnumbers the working population. This is a serious concern in modern times, because the post-World War II “baby-boomers” are all approaching retirement age, while the generation following them is much smaller. The problem is that the number of SS taxpayers will soon be outnumbered by their beneficiaries. The chart below, by Geoffrey Kollmann of the Domestic Social Policy Commission, shows this trend.

Year	Taxpayers per Beneficiary
1950	16.5
2002 (estimated)	3.3
2030 (projected)	2.2
2075 (projected)	1.8

Figure 1

This places an unnecessary burden on an already overextended working class. It is clear that the system needs to be reformed. If not, the Social Security trust fund is on track to be depleted in the year 2041.

The Current System

The Old Age, Survivors and Disability Insurance program (OASDI) is the official name of the Social Security program of the United States. OASDI includes four major programs: retirement benefits, spouse’s benefits, disability benefits, and survivors’ benefits. The OASDI is funded by the taxes imposed on incomes of citizens in the country. Surplus revenue is invested in nonmarketable U.S. Treasury bonds which yield interest over time.

The largest of these programs is the retirement benefits program. The earliest age at which any retirement benefits can be claimed is 62. The normal retirement age of those born before 1938 is 65. Then the normal retirement age increases by two months for each year after 1938 until the year 1943. The normal retirement age then stays at 66 until 1954, when the normal retirement age will continue to increase by two months each year until 1960, where the normal retirement age will remain at 67 for all born after this year.

The amount that a person receives from Social Security when at normal retirement age, the primary insurance amount (PIA), is calculated based on the mean monthly income of his thirty-five years of highest income. When calculating PIA, adjustments are first made to the worker's wage values to accommodate inflation. The average of the highest adjusted earnings gives the average indexed monthly earnings (AIME). The PIA is the sum of three separate percentages of portions of the AIME. The amount of money a person receives from Social Security is determined by how much money he or she made while working.

The graph below shows the function for PIA with varying AIME values.

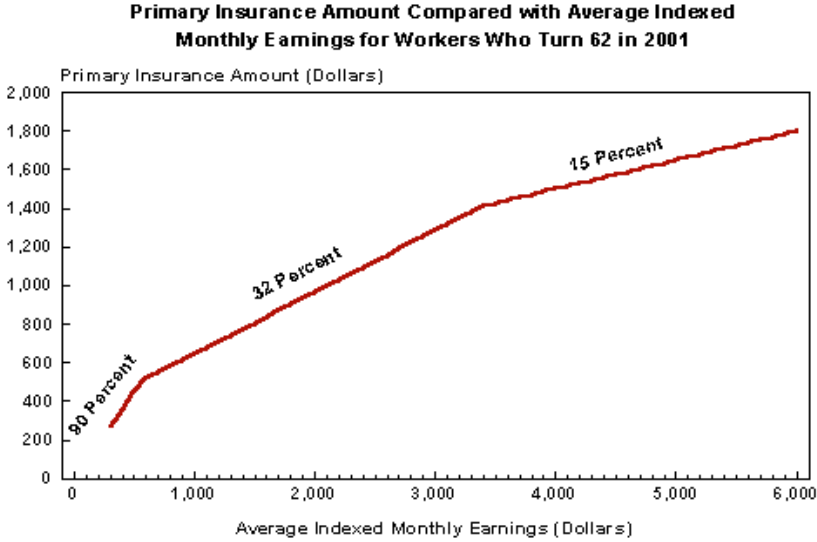


Figure 2

As you can see, there are two points where the graph “bends.” These “bend-points” are where the function for the PIA changes. This function is

$$PIA = 0.90(\text{first } \$656) + 0.32(\text{part between } \$656 \text{ and } \$3,955) + 0.15(\text{part over } \$3,955).$$

The bend-points are calculated based on the bend-points from 1979. Those bend points are multiplied by the ratio of the average wage for 2 years before the current year to the average wage for 1977. An example follows:

$$\text{Bend-Point for Year X} = \text{Bend-Point for Year 1979} * \frac{\text{Average Wage in (X-2)}}{\text{Average Wage in 1977}}$$

An example of this calculation for an individual having an AIME of \$2,500 is below:

$$PIA (2006) = 0.90(\$656) + 0.32(\$2500 - \$656) + 0.15(\$0) = \$1180.$$

Therefore, if this worker collects Social Security at the set retirement age, he will receive \$1180 a month.

Additionally, there is a benefit program for disabled persons and their families. The program taking care of this is called the Disabled Adult Child Insurance Benefits (DACIB) program. There also is a program for the families of deceased persons. The earliest age at which the spouse of the deceased can claim benefits is 60. The full survivor's benefit is equal to the working citizen's full retirement benefits as long as the spouse's age is equal to or greater than that of the deceased. Otherwise, there is a reduction of the survivor's benefit.

The Problem

There are several aspects of the current Social Security system that need to be improved. The most important change that must be addressed is the program's susceptibility to population fluctuation. Over the years, the number of people benefiting from Social Security has increased relative to the number of people paying Social Security. This trend is expected to continue, and eventually, there will be more beneficiaries than taxpayers, resulting in a deficit in funds. For example, the baby-boom population is much larger than the subsequent generation, who under the current system will pay for the baby-boomers' Social Security fund.

The retirement age also needs to be adjusted. This is necessary to increase the available funds at retirement for beneficiaries. As time goes on, life expectancy is expected to increase, which in turn will increase the time one will be collecting Social Security, depleting the Social Security trust fund further.

Our Alternative Plan for Social Security

Overview

- Problem: A smaller generation pays for a much larger one's retirement, depleting the Social Security trust fund.
 - Solution: Create a system of age brackets in which the people within that bracket pay for their own retirement.
- Problem: Life expectancy is expected to increase, meaning people will need to be paid their benefits for a longer period of time.
 - Solution: Equate the retirement age to the difference between the average life expectancy and a constant, keeping the period of retirement approximately constant.
- Problem: Disheartened citizens feeling they have no control over their retirement.
 - Solution: Give them more control—allow them to invest a portion of their Social Security taxes in proportion to their age (younger citizens can invest more).
- Problem: Unforeseen fluctuations in population and economy or events preventing a large portion of citizens from working.
 - Solution: Create a Safety Net Fund which will always be available to handle such occurrences.
- Problem: Lack of funds to jumpstart this program.
 - Solution: Entice companies to match or exceed their employees' contributions, along with encouraging citizens to invest more in the program.
- Problem: Tackle the immediate needs of the baby-boomer generation.

- Solution: Institute a 30-year transition period in which their retirement will be paid for and will introduce the new system for Social Security.

The Program

The flowchart below outlines the new Social Security plan:

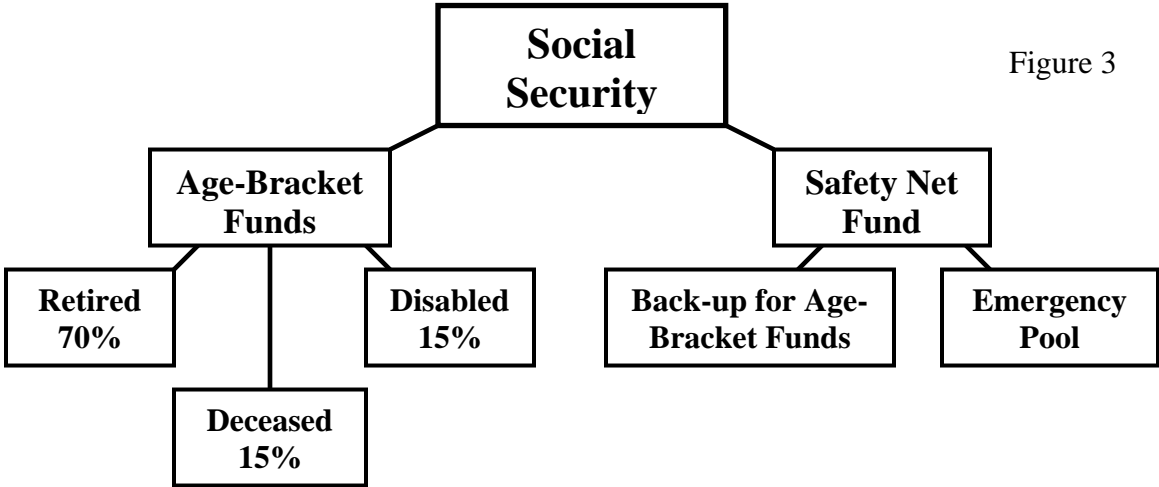
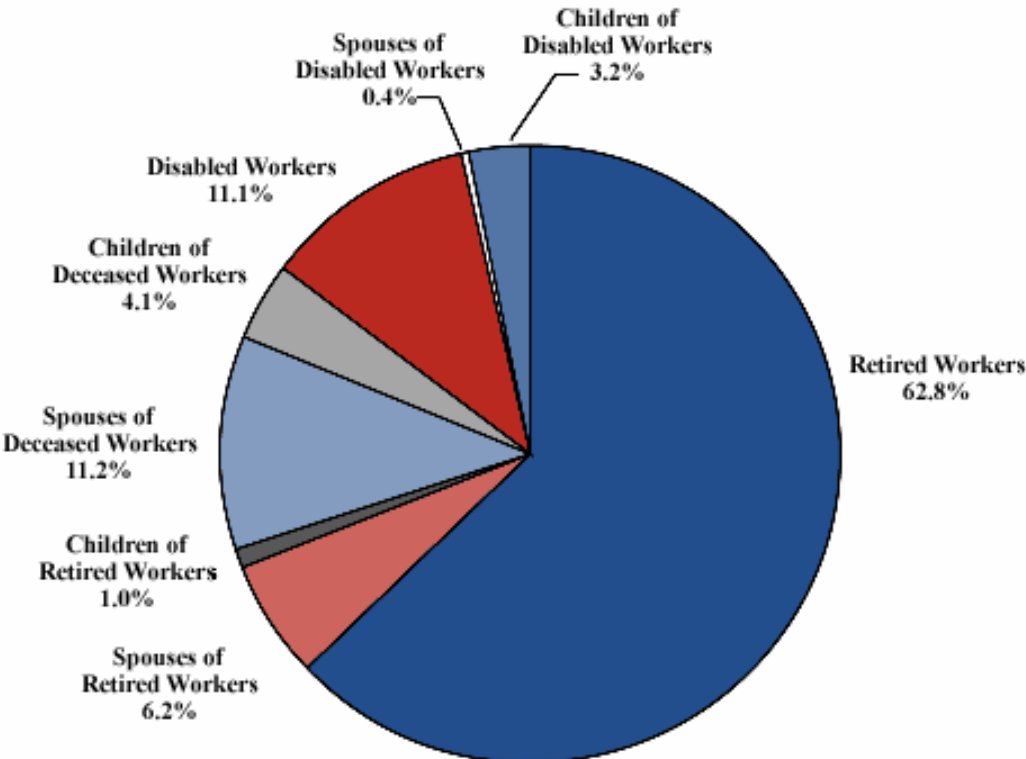


Figure 3

How Money Goes In

Each age-bracket fund will encompass five years of time. So, for example, one bracket would include all citizens born between January 1, 1985 and December 31, 1989. The funds are sustained by the Social Security taxes paid by citizens (7.65% of income) as they were in the past. The tax is directly deposited into the citizen’s corresponding age-bracket fund. Automatically 15% of this fund will go toward the families of the deceased in this bracket, while another 15% will go toward the families of the disabled in this bracket.

These numbers were decided upon based on the graph below, showing how the money in



the current Social Security system is distributed. It was settled that these ratios will be preserved in the new system.

Figure 4

What Happens with the Money

Of the remaining 70%, a portion will be set aside in a Treasury Bond, which will give a conservative, but steady, growth. The remaining money will be invested or placed in a savings account according to the wishes of the citizen. This will be done by an annual survey of the citizenry in which they express their desires. The table below shows the portion controlled by the government and the citizen for each age bracket.

Bracket	Controlled by Government (%)	Controlled by Citizen (%)
Under 20	50	50
21-25	56	44
26-30	61	39
31-35	67	33
36-40	72	28
41-45	78	22
46-50	83	17
51-55	89	11
56-60	94	6
61-65	100	0

Figure 5

Therefore, the average amount of one's money controlled by the government is 75%. This result was obtained through the following process. First, it was decided that the government would control 75% of the citizens' funds and that the citizens would control 25% of them. This proportion was chosen because it allowed freedom for the citizens to invest while guaranteeing a substantial retirement fund even if their investments were not profitable.

Additionally, as the citizen approached his or her retirement age, it was desired that the funds would be less controlled by the citizen and more controlled by the government, thus simulating an aggressive to conservative investment strategy. This would assure the citizen of his or her retirement fund as the time approached. In line with this desire, a function needed to be created modeling the government-controlled portion of the tax through the age bracket. It needed

to have a positive slope, since that portion was increasing, and needed to end up in the final bracket at 100%, since that is what was decided upon. Also, the line needed to cross the value of 75% midway through the age brackets so that the average government-controlled portion is 75%.

The points on the x-axis were defined to be the age of the beginning of the bracket. The y-axis represented the proportion of government-controlled funds. The graph showing this line with our equation is below.

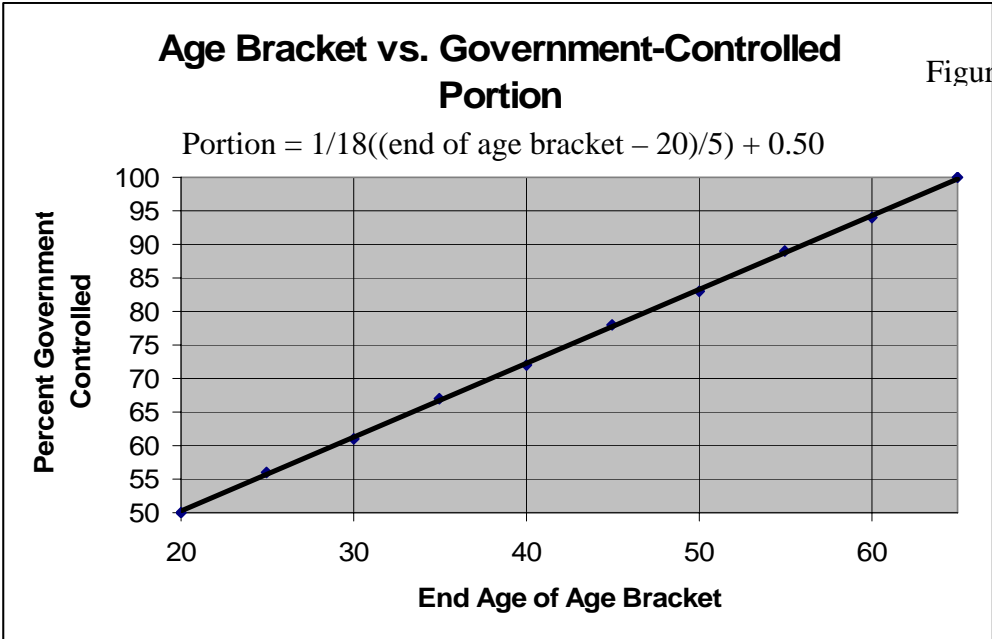


Figure 6

How the Money is Distributed

To distribute the money to beneficiaries, the distinction between the government-controlled and citizen-controlled portions of the money must be made. For the government-controlled portion of the fund, the system will mirror its predecessor. The calculation of monthly payment will be exactly the same, but the citizen will receive 75% of the PIA.

How the beneficiary will obtain the money from their personal account is a completely different story. He or she cannot withdraw it as a lump sum. This will ensure that they will not be a strain on the system later because the government-controlled fund is not meant to completely cover their expenses. So, they will be able to withdraw from their fund a certain amount up to a limit, which makes sure that, on average, the citizen will use most or all of the money they saved by this method.

The standard deviation for the life expectancy of males was found to be 2.19, while for females it was found to be 1.52. Since that for males was larger, it was decided to use that number in the future calculations so a higher percentage of citizens will be accounted for. First, it was necessary to convert the years to months, since the withdrawals are made on a monthly basis. 2.19 years is 26.28 months, which can be rounded down to 26 months. Since life expectancy is 78 years and retirement is 67, this leaves 11 years, or 132 months, between retirement and life expectancy. Therefore, the total time between retirement and one standard deviation above the mean is 158 months, so the total amount out of one's personal account is divided by 158 to obtain the maximum amount of money he or she can withdraw monthly.

Therefore, the person would have money to survive based on the amount they saved themselves. If they made good investments, they will have a lot of money for their retirement. If their government-controlled portion falls below the poverty line, which is \$8,980 a year, or \$748 a month, the excess money from the bracket (from the citizens who died), or, if that is not sufficient, money from the Safety Net Fund, will be used to put them at or above the poverty line.

The Safety Net

The initial funding for the Safety Net Fund will be provided by the current surplus in the Social Security trust fund. It will be supplemented by corporations’ contributions to Social Security. It will be required that all companies match their employees’ contributions (unlike the current system, self-employed persons will be exempt). This whole Fund, like it is today, will be invested in Treasury Bonds so it will have conservative growth and keep up with inflation. This money would be used, as stated previously, in the event that a bracket runs out of funds (from an unexpected situation). Lastly, any excess from a pool that has limited or no membership (such as one for people who are 95-100) will be placed into the Safety Net.

The Transition Period

As with any new program, this new Social Security plan cannot be instituted overnight. Since the baby-boomers will not begin reaching retirement age until about the year 2015, this transition period will not begin until that year. The transition will be a three-step process. Since, effectively, the average member of the working class (about age 40) pays for the retirement of those 30 years older than them, this period will simply involve “moving up” whose retirement one pays for, until that person is paying for his or her own retirement. The chart below shows this progression, which will take place over a 30-year period.

Age Bracket of Taxpayers	Age Bracket of Beneficiaries They Pay for
Under 20	46-50
21-25	51-55
26-30	56-60
31-35	61-65
36-40	Retired
41-45	
45-50	
51-55	
56-60	
61-65	

*Phase 1:
2015-2024*

Age Bracket of Taxpayers	Age Bracket of Beneficiaries They Pay for
Under 20	36-40
21-25	41-45
26-30	46-50
31-35	51-55
36-40	56-60
41-45	61-65
45-50	Retired
51-55	
56-60	

*Phase 2:
2025-2034*

61-65	
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Figure 7

Age Bracket of Taxpayers	Age Bracket of Beneficiaries They Pay for
Under 20	26-30
21-25	31-35
26-30	36-40
31-35	41-45
36-40	46-50
41-45	51-55
45-50	56-60
51-55	61-65
56-60	Retired
61-65	

**Phase 3:
2035-2044**

<u>New System</u>

**Phase 4:
2045 On...**

Note: Red denotes an age group in which baby-boomers are present.

This transition is effective since no one age group bears the burden of the whole baby-boom generation. Instead it is spread out among a number of age brackets, and the most burden any one bracket must bear is half of the generation. Any deficiency in the ability of the retirees to be supported by their corresponding age brackets will be made up for by the Safety Net. This will be supplemented by an extra tax incentive for both workers and their employers to contribute extra to the pool during this 30-year period.

Retirement Age

As medicine improves, life expectancy will increase, until it may not be uncommon for someone to live past 100 years old. If the current retirement age of 65-67 is kept, this will place an unnecessary burden on Social Security, because people could collect Social Security for 40 years or more. Therefore, the retirement age will need to be updated along with new life expectancy data every five years. The difference between the retirement age and average life expectancy will remain a constant, so people can remain retired for the same number of years (if they are healthier, they can retire later). This constant number of years will be the current amount of time between retirement and life expectancy (the current life expectancy is 78 years). Since the retirement age is 67 (for those born after 1960), the constant difference between life expectancy and retirement age will remain 11 years. For example, if the life expectancy increases to 95 years, the retirement age will be 84, and since people will be collecting Social Security benefits for the same amount of time as before, there will be no added strain on the system over time.

Testing the System

There are a variety of factors contributing to the success of a government program such as Social Security. To measure its success, a multitude of variables need to be collected. Most importantly, the cash-flow needs to be measured. The amount of money contributed by citizens and the amount of money used by beneficiaries both need to be tracked during the transition period. The net cash-flow should be into the system. Also during the transition period the number of times the Safety Net needs to be accessed to pay beneficiaries must be tallied so that appropriate adjustments to the system can be made. This estimates the effectiveness of the system by which people pay for their own retirements. The more times the Safety Net is accessed, the weaker the system is, and this may call for an increase in the Social Security tax.

The amount of money being added to the Safety Net needs to be monitored, especially the amounts contributed by companies. It is interesting to see how tax incentives affected the companies' decisions to add money to the pool.

After the transition period, it will still be necessary to check how many times the Safety Net was accessed to make sure the amount of money in each age-bracket pool remains enough for retirement and that no adjustments to the brackets or to the amount controlled by the government and citizens change this. Additionally, the citizen-controlled funds need to be checked to see if the citizens make positive investment decisions. If it appears that many citizens make poor decisions, it may be necessary to increase the government-controlled proportion or to have the government make investment decisions.

Works Cited

"2003 Federal Poverty Guidelines." US Department of Health and Human Services. 3 Mar. 2006

<<http://aspe.hhs.gov/poverty/03poverty.htm>>.

"American Baby Boomers." Demographic Profile. MetLife. 3 Mar. 2006

<<http://www.metlife.com/WPSAssets/19506845461045242298V1FBoomer%20Profile%202003.pdf>>.

"Benefit Formula Bend Points." Social Security Bend Points. 3 Mar. 2006

<<http://www.ssa.gov/OACT/COLA/bendpoints.html>>.

Kollmann, Geoffrey. "Social Security: Brief Facts and Statistics." Domestic Social Policy

Division. 3 Mar. 2006 <<http://joewilson.house.gov/UploadedFiles/RETIRE%20-%20Social%20Security%20Brief%20Facts%20and%20Statistics.pdf>>.

"Life Expectancy for Social Security." Social Security Online. 3 Mar. 2006

<<http://www.ssa.gov/history/lifeexpect.html>>.

"NCPSSM: Senior Citizen Income Statistics." NCPSSM. 3 Mar. 2006

<<http://www.ncpssm.org/socialsecurity/seniorincomestats/>>.

"Primary Insurance Amounts." Social Security Online. 3 Mar. 2006

<<http://www.ssa.gov/OACT/COLA/piaformula.html>>.

"Social Security (United States)." Wikipedia. 3 Mar. 2006

<[http://en.wikipedia.org/wiki/Social_Security_\(United_States\)](http://en.wikipedia.org/wiki/Social_Security_(United_States))>.

"Social Security and Medicare's Hospital's Insurance Trust Funds Face Cash Deficits." GAO. 3

Mar. 2006 <<http://www.gao.gov/cghome/hrfn20050210/img6.html>>.

"Social Security debate (United States)." Wikipedia. 3 Mar. 2006

<http://en.wikipedia.org/wiki/Social_Security_debate_%28United_States%29>.

"Social Security Online." 3 Mar. 2006 <ssa.gov>.

"The Social Security Benefit Formula." AARP. 3 Mar. 2006

<<http://www.aarp.org/research/socialsecurity/benefits/aresearch-import-354-FS59R.html>>.

"United States Age Groups and Sex." US Census Bureau. 3 Mar. 2006

<http://factfinder.census.gov/servlet/QTTTable?_bm=y&-geo_id=01000US&-qr_name=DEC_2000_SF1_U_QTP1&-ds_name=DEC_2000_SF1_U>.

"US Patterns of Mortality by County and Race: 1965-1994." 1998. Harvard University. 3 Mar.

2006 <<http://www.hsph.harvard.edu/organizations/bdu/images/usbodi/index.html>>.