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Valuing Intergenerational Transfers: What's Social Security Worth?

Calculating Social Security and Medicare's burden on current and future generations is an important aspect of determining the overall fiscal health of the federal government. The importance of valuing these social programs lies in their size—they accounted for over 30% of federal spending in 2007, and the spending level relative to GDP is expected to increase by 50% within the next two decades. As Social Security and Medicare grow in size, so too do their estimated funding deficits, making annual or short-term budget analyses insufficient assessments for the total cost of the programs. For example, the 2007 Trustees Report projects a surplus in Social Security funds for the next 10 years, but a 75 year projection of the imbalance of costs and tax revenues shows a $6.7 trillion deficit using a real discount rate of 2.9%. Over an infinite horizon, Social Security's projected deficit is $15.6 trillion, demonstrating the need for long-term analysis.

Because these forecasts are over such an extended time horizon, the discount rate plays a crucial role in determining the best estimate of future program burdens. The estimates are extremely sensitive to the choice of discount rate, with the 75 year projection decreasing by more than $1 trillion with just a 0.4 percentage point increase in the discount rate. In ***PERC*** Working Paper #0801, the issue of choosing the "right" discount rate to most accurately calculate the burden of these future government deficits is tackled by ***PERC*** researchers Liqun Liu, Andrew J. Rettenmaier, and Thomas R. Saving. This burden measures the net costs or benefits of inherited government programs. The 2.9% discount rate used by the Trustees is the long-term government borrowing rate determined by a method involving the weighted average of historical real bond returns. As logical as this discount rate choice sounds, it does not account for certain risks inherent in the programs' uncertain futures. One potential risk is political changes affecting both taxes paid into the systems and benefits received from the programs. Changing demographic and economic conditions can also cause the programs' revenues and costs to shift to varying degrees as well as move tax bases up or down. The performance of government insured pensions and loans are also susceptible to economic risks.

These risks affecting programs' revenues and costs are included in a model developed to analyze the welfare effects of long-horizon government programs on the ultimate bill-paying generation, assuming individuals maximize expected utility and are risk averse. The correct discount rate for calculating future uncertain expenditures is found by taking the ratio of the marginal decrease in individual welfare caused by an increase in expected future expenditures to the marginal decrease in individual welfare caused by an increase in the current program expenditure. A similar ratio can be calculated for future revenues. This ratio describes the discount rate at which an individual is willing to trade between the present and the future and indicates the right discount rate to use.

The authors conclude that uncertain future expenditures should actually be discounted at a lower rate than the risk-free government borrowing rate of 2.9% since future cost uncertainty increases the burden beyond the expected value with no uncertainty. In other words, when facing indeterminate future costs, risk-averse individuals would be willing to pay more than the expected value if they could be certain of the future liabilities. In a similar manner, future revenues should be discounted at a higher rate than the risk-free rate since uncertain future benefits are worth less than their expected value to a risk-averse taxpayer. When both of these effects are considered, a higher net burden on the

tax-paying generation is obtained than by using the risk-free government borrowing rate for both revenues and costs.

This risk-adjusted discount rate theory is applied to the Social Security program in several ways. The authors first measure the present value of the debt owed by the bill-paying generations to find a measure of the program's burden on future cohorts. This is accomplished using the Trustees' projected revenue and cost streams discounted at the risk-averse rates. Using three different levels of risk aversion of 2, 4 and 6, the size of Social Security's unfunded obligation increases by up to 140% compared to the risk-free estimate. A risk aversion level of 2 increases the burden from $5.9 trillion to $7.5 trillion. If the risk aversion level is 4, the burden increases to $10 trillion, and the highest level of risk aversion studied leads to an estimated burden of $13.9 trillion, more than doubling the Trustees' projected financial obligation. This burden could be viewed as the size of the bond issue that would be required to compensate the buyers for taking on the riskiness of the bond.

The second application involves calculating the value of the Social Security contract for individuals who have differing risk aversion parameters and projected earnings streams. Variability in the projected costs of the program reduces the value of Social Security by between 8%, for maximum earners, and 40%, for low earners, when moving from risk neutral individuals to individuals with a risk aversion parameter of 2.

A final application analyzes the likelihood of a Pareto transition away from the current pay-as-you-go Social Security financing arrangement. Social Security's present value to all current program participants is calculated and measured against the present value of revenues that could be generated by allowing individuals to buy out of the program. The current participants are defined as individuals who are 15 and older in 2007. For all birth cohorts born after 1992, buy-out tax rates are calculated for the various risk aversion parameters. Given the uncertainty in Social Security and the fact that the return is less than the government borrowing rate, tax rates can be calculated such that the cohort members are indifferent between opting out of the program or staying in it.

The probability that the tax revenues generated from those out of the system could pay off the expected value of the current system's closed group debt was calculated for individuals with varying risk aversions. The authors conclude that with a risk aversion parameter greater than 2 there is a .5 probability that a Pareto transition out of the current system is feasible. With a risk aversion level of 4, the probability of a Pareto move is better than 70%, and with a risk aversion level of 6, the probability of a Pareto transition is better than 90%.

The Conditional Nature of the Value of Corporate Governance

*A*gency conflicts arise in various business settings in which a manager is overseeing funds on behalf of shareholders. Some potential agency conflicts include managers stealing money outright from shareholders or using the money to buy perks for themselves or their close business associates. If a nation, such as the United States, has a strong legal system and stable financial markets, however, the agency conflicts are not usually so straightforward. Instead of simply taking money entrusted to them on the firm's behalf, managers more often over- or under-invest in projects to build their own net worth instead of the company's, which is much harder to detect.

PERC Research Fellow D. Scott Lee and Jianxin Chi of Arizona State University look at the relationship between corporate governance and firm value in light of the theory that governance is a function of the potential severity of agency conflicts in ***PERC*** Working Paper #0802. While the previous literature has not found an empirical relation between

governance and firm value when using large-sample cross-sectional analysis, no previous study has included the conditional nature of agency costs on corporate governance, reducing the explanatory power of the models. The authors use free cash flow, defined in the paper as operating income minus taxes, interest, and dividends scaled by book assets, as a proxy for agency costs. The higher the free cash flow amount, the greater the possibility for misallocation of resources by managers, which is the dominant agency concern in the U.S.

There are several governance mechanisms taken into account that could reduce a firm's free cash flow, thus diminishing the potential severity of agency conflicts in the firm. Each of the following mechanisms is expected to more effectively constrain the free cash flow problem. The most powerful external instrument is an active takeover market. This variable considers the number of anti-takeover positions a firm has in place, measuring how insulated the firm is from outside discipline. The most important internal governance mechanisms include the degree of block ownership, the level of managerial ownership, and the composition of the board of directors. Block ownership is defined as the percentage of shares held by owners with at least 5% ownership and identifies the overall concentration of ownership and the ability of shareholders to monitor managerial decisions. Managerial ownership is measured by the average of the dollar increase in the top five executives' portfolios when a firm's stock rises by one percent, scaled by the managers' annual compensations. Board composition is measured by the size of the board, the percentage of independent members, and whether the chairman of the board is also the CEO of the firm.

In the regression modeling the effects of governance on firm value, an interaction term between governance and free cash flow is included along with governance and control variables. The interaction term has not previously been considered in the literature, and it gauges the effect of the potential severity of agency conflicts on corporate governance. The regressions produce some instructive results. The coefficient estimates for takeover market activity show a negative relationship between insulation and firm value, with a larger and more significant coefficient the larger the free cash flow. Therefore, the value of the firm increases with takeover market monitoring, and the marginal benefit of that monitoring system is stronger with higher potential agency costs. The level of block ownership and managerial equity ownership both have a positive, significant effect on firm value when conditional on free cash flow.

As far as the board characteristics are concerned, neither board size nor the percentage of independent members has any significant effect on firm value. However, the consequence of the CEO acting as board chairman has differing effects depending on the free cash flow amount. If a firm has low free cash flow, the firm is more valuable when the CEO is also the board chairman. If a firm has high free cash flow, the firm is less valuable when the CEO chairs the board because there is a greater possibility of misallocation of the discretionary funds. In contrast to the above regression results that show a significant relationship between governance and firm value when free cash flow is high, the effects of the various governance mechanisms are low or even nonexistent when the free cash flow is low.

The governance effects are also economically significant in determining firm value. For example, increasing the number of anti-takeover provisions by one results in a decrease in firm value of $34 million with a low free cash flow, but the value decreases by $109 million when the free cash flow is high. Another example is the economic effect of block ownership on firm value. A one standard deviation increase in block ownership does not significantly affect firm value when free cash flow is low, but causes a $90 million increase in market value for the firm with high free cash flow. Therefore, ignoring the effect of potential agency costs on firm governance might create the misleading conclusion about its importance in affecting investment strategies and levels.