

# **Sources and Measurement of Risk in Defined Benefit Pension Plans**

**Eric Klieber, FSA, MAAA, EA**

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In a world without risk, it would be easy to place a value on any item, namely its current price. This price would take into account the future utility of the item and changes in price with time and use, which would all be known with certainty. Risk complicates matters immensely by making future utility and price changes unknown. Capitalist economies use the market to set prices, based on the tacit consensus of market participants regarding what the future holds and how that future will affect an item's current value. Individuals are free to place their own value on any item in the marketplace and to make buy/sell decisions based on any difference between the value they set and the market value. Skill in setting value determines an individual's success in the market.

Setting a value on any item involves identifying the sources of risk regarding the future utility and price changes of that item, determining the probability of various scenarios based on this risk assessment and measuring the effect of each scenario on current value. Historically, actuaries have performed these tasks for insurance and pension products. More recently, actuaries have begun applying their skills to a broader array of financial products. In the process, they have come into contact with other practitioners with different methods for measuring value, collectively known as "financial economics."

Some actuaries have begun applying the principles of financial economics to traditional areas of actuarial practice. The validity of this approach depends on whether the sources of risk inherent in insurance and pension products are similar to those for other financial products. The purpose of this paper is to examine the sources of risk in defined benefit (DB) pension plans to determine the extent to which the principles of financial economics can be applied to provide new methods for measuring the cost and value of such plans.

## **Sources of Risk in Social Security**

As a first step in this analysis, let us first take a detour into the US Social Security System. Social Security provides benefits to retired and disabled workers and to the spouses and dependents of retired, disabled and deceased workers. These benefits are paid from two trust funds (one for retired workers

and survivors and one for disabled workers) financed by a payroll tax paid equally by active workers and their employers. Until 1983, Social Security operated on close to pay-as-you-go financing. At that time, recognizing the impracticality of continuing pay-as-you-go financing indefinitely in the face of the upcoming surge in retirements due to the aging of the baby-boom generation, Congress adopted a long-term level tax rate which was expected to adequately fund the system for the next 75 years. Inevitably, a large temporary surplus has accumulated in the trust funds, because payroll taxes have exceeded benefit payments all years since 1983. The trust funds are expected to continue growing until some time in the third decade of this century, at which time they will be drawn down to fund benefits to retired baby-boomers that cannot be financed by contemporary workers.

Two sources of financial risk are commonly associated with Social Security. Each year, as stipulated by Congress, the Office of the Actuary at the Social Security Administration performs a 75-year valuation of the System using assumptions selected by the Social Security trustees. In 1983 this valuation showed that expected tax income could support the program over the 75-year valuation period, ending in 2058, using the trustees' best-estimate assumptions. Every valuation since then has shown that expected tax revenue would be insufficient on this basis to support the system for the entire 75-year period, that is, the trust funds would be depleted before the end of that period. The valuation for the federal government's 2002 fiscal year predicts the trust funds will run out of money in 2041. Depletion of the trusts funds and the consequent inability to pay benefits when due is one source of financial risk associated with Social Security.

Trust fund assets are mostly invested in special issue government bonds. In other words, the federal government is borrowing the trust fund assets to meet its general revenue needs. This reduces the amount of bonds the government has to issue to the public to fund its cumulative general revenue budget deficit. Long before the trust funds are depleted, during the draw-down period, this process will be reversed - the federal government will need to redeem the bonds in the trust funds by applying any general revenue surplus or by issuing additional bonds to the public. Many financial analysts fear the resulting financial needs will exceed the federal government's

borrowing power. These analysts often claim the trust fund assets are not "real" in the sense that they can never be converted back into the cash required to pay benefits, at least not without triggering rampant inflation. This is the second source of financial risk commonly associated with Social Security.

When Social Security began in 1936, the combined employer-employee tax rate was 2 percent. In the intervening years the tax rate has increased gradually to its current level of 12.4 percent. Despite the greater bite the Social Security payroll tax takes out of their paychecks, today's workers enjoy a much higher living standard with the remainder than their forebears in 1936, because the total value of wages has risen by far more than the payroll tax increase. Likewise, only a small portion of the expected future increase in the value of wages need be tapped to eliminate Social Security's actuarial deficit. For example, using just 20 percent of the expected 1.1 percent per year increase in real wages for 10 years would eliminate the actuarial deficit, currently 1.87 percent of covered payroll. While there is no guarantee Congress will adjust the tax rate to cover the deficit, the political clout of the elderly, which will only increase as the baby-boomers retire, make such an adjustment highly probable. Further, the risk that Congress will not act is essentially a political risk, not a financial risk. Therefore, the financial risk associated with premature depletion of trust fund assets really does not exist.

The gross domestic product (GDP) can be divided into two parts, the part paid out as Social Security benefits and all the rest. The former currently comprises only a portion of the Social Security payroll tax, since not all the tax is required to pay benefits. When the payroll tax is no longer sufficient to pay benefits and the trust funds must be tapped, the portion of the GDP paid out as Social Security benefits will comprise the entire payroll tax plus money used to retire or purchase government bonds redeemed by the trust funds. There will remain two parts of the GDP, the part paid out as Social Security benefits and all the rest. As long as the GDP, on a per capita basis, grows more rapidly than the part paid out as Social Security benefits, the non-Social Security part of the per capita GDP will grow. Therefore, the workers' ability to support Social Security payments depends on their ability to increase per capita GDP faster than the increase in Social Security payments. This ability is what will make the trust fund assets real. The mechanism by which Social Security payments

are financed - whether a payroll tax increase, an increase in general revenue taxes or greater borrowing - is immaterial. If the workers produce enough to cover Social Security payments and increase the per capita value of rest of the GDP, Social Security faces no financial risk. Of course, there is no guarantee this will happen. It would require some combination of increases in productivity and labor force participation greater than the trustees are predicting. This is the real financial risk facing Social Security.

## **Sources of Risk in Defined Benefit Pension Plans**

DB pension plans resemble Social Security in several ways. They pay benefits to retired and disabled workers and to the spouses of retired, disabled and deceased workers. These benefits are paid from assets held in a trust fund. However, the trust fund is usually financed entirely by the employer, and each employer maintains a separate trust fund for each plan it sponsors. By law, pension plans covered by ERISA - most plans not sponsored by a governmental or religious organization - must meet a minimum funding standard under which the assets to pay benefits accumulate during the working lifetimes of participants. Most non-ERISA plans also fund all or most benefits in advance of payment. As a result, situations where ongoing plans of employers who have met their funding obligations are unable to pay benefits when due are extremely rare and usually involve fraud or embezzlement. Therefore, as with Social Security, the financial risk associated with premature depletion of trust fund assets really does not exist.

Unlike Social Security, most DB pension plan assets are invested in stocks and bonds issued by public corporations, which invest the proceeds from the stock and bond sales in their businesses. DB pension plans are an important source of capital investment and loans for US public corporations. When the baby-boomers begin retiring around 2015, DB pension plans will face many of the same pressures as Social Security - an increased rate of retirement, higher benefit payments but fewer new workers to replace those retiring. Unlike Social Security, which relies primarily on the contributions of contemporary workers to fund benefit payments, advance-funded private plans should already have accumulated the assets to pay benefits to the wave of baby-boom retirees.

This rosy picture fails to look below the surface to the source of the value of those accumulated assets. Bonds derive their value from the production of the workers of the issuing companies, which enable the companies to pay interest on the bonds and ultimately repay the bond principle. Stocks also derive their value from the production of workers, which generates the profits necessary to support stock prices. Even if DB plans have accumulated the necessary assets to pay benefits, those assets will not retain the value necessary to pay benefits unless the workers can produce enough to support the prices of the stocks and bonds which comprise those assets.

Let us again divide the GDP into two parts, this time the part comprising benefits paid from Social Security and employer-sponsored plans and all the rest. As above, as long as the GDP, on a per capita basis, grows more rapidly than the part paid out as retirement benefits, the non-retirement part of the per capita GDP will grow. Therefore, the workers' ability to support retirement payments depends on their ability to increase the per capita GDP faster than retirement payments. The assets underlying DB pension plans are no more nor less real than the assets in the Social Security trust funds. Both derive their value from the productive capacity of the workers; and since both will pass through the wave of baby-boomer retirements together, both will face the prospect that the workers will not be able to produce enough to maintain their own living standard and that of retirees. Thus, the primary financial risk facing Social Security faces employer-sponsored plans as well.

However, as noted above, there is one important difference between Social Security and employer-sponsored plans: with Social Security the risk is concentrated in one program covering nearly all workers in the US, while the risk for DB plans is spread among thousands of plans sponsored by employers which vary widely in size and financial stability. Thus, DB pension plans face two risks: (1) that the economy will be unable to support promised benefit payments to DB plan retirees while maintain or enhancing the standard of living of workers; and (2) that the employer sponsoring a plan will be unable to support promised benefit payments to participants of that plan.

## Separating the Risks

Actuaries and their clients can do little about the first risk. Economists hold a broad range of views concerning the future of the US economy. However, we can observe that in the past the US economy has always responded to major demographic shifts, such as large-scale immigration and the movement of the population from rural to urban areas, so as to maintain and enhance the prosperity of most people, at least over the long term. There is no reason to believe the economy will not respond similarly to the aging of the population. For the purposes of this paper, we will assume this is so. If it does not, the financial pressures on Social Security and pension plans will be only a small part of the serious economic problems facing the country. Therefore, if the second risk can be isolated and addressed by a mechanism targeted specifically at that risk, the remaining task of plan funding can be accomplished without addressing the problem of risk.

A possible model for such a mechanism is currently being developed in the casualty field. Casualty reinsurers accumulate large reserves to cover damages due to major natural catastrophes such as hurricanes and earthquakes. Because natural catastrophes occur essentially at random, these reserves have been kept in low-yielding liquid assets, ready to be disbursed at any time. More recently, reinsurers have found a way to deploy reinsurance premiums to greater advantage by issuing so-called "catastrophe bonds" covering specified risks arising from natural disasters. Proceeds from sale of the bonds are placed in a trust fund, whose income includes not only interest on trust fund investments, but also a portion of the reinsurance premium. If no catastrophe occurs, investors earn a significant premium over market interest rates; but if an insured catastrophe occurs, a portion (or all) of the trust fund assets is used to pay claims, and a corresponding portion of the bonds goes into default. The bonds are priced the same as conventional bonds, based on interest rate and probability of default. Catastrophe bonds have a potentially important place in the securities market because the random nature of catastrophic events means bond performance has a low correlation with other securities.

A similar mechanism could be developed to backstop employer-sponsored

pension plans, combining private reinsurance with bonds issued to cover unfunded pension liabilities in the event of the sponsor's bankruptcy. The reinsurance policy would require underwriting of both the employer's financial stability and the plan's potential unfunded liabilities, including risks inherent in the sponsor's investment policy. Indeed, the reinsurance policy would probably incorporate, at least by reference, the sponsor's investment policy, which could not be changed without approval from the reinsurer. Further, since benefit increases would increase unfunded liabilities, they would need to be submitted to the reinsurer for a quote on increased reinsurance premiums, which would comprise a part of the cost of the benefit increase, along with increased funding requirements. Since bankruptcies tend to occur during slow economic periods, when unfunded pension liabilities are likely to increase and competing securities are likely to perform poorly, pension underfunding bonds would lack the advantage of catastrophe bonds in not correlating with the performance of other securities. This problem could be mitigated by combining the pension underfunding risk with other catastrophe risks in one bond issue, thereby diversifying the risk to the bond purchasers.

A form of insurance already exists for DB pension plans in the US, the benefit insurance program operated by the government-owned Pension Benefit Guaranty Corporation (PBGC). PBGC's insurance program differs in two respects from true reinsurance. First, PBGC's insurance does not cover pension plans or their sponsors, but rather the benefits of participants. When PBGC becomes trustee of an underfunded plan, the sponsor's benefit liability under the plan is not extinguished, but becomes a liability to PBGC rather than directly to the participants. (In practice, PBGC rarely recovers more than a small portion of this liability in bankruptcy proceedings.) True reinsurance would extinguish the sponsor's liability by providing sufficient funds to the sponsor to purchase annuities to cover the liability.

More important, the insurance provided by PBGC is not underwritten in any meaningful way. The premium is based to some degree on the amount at risk - a fixed premium per participant plus a variable premium that is a percentage of a plan's unfunded vested liability - but does not in any way reflect the probability a plan will actually terminate. As a result, the PBGC



insurance program has become effectively a subsidy paid to financially weak companies from the financially strong, thereby discouraging sponsorship of DB plans among companies that can afford them, and encouraging their continuation among companies that cannot afford them. In this manner, the PBGC insurance program, while it provides important protections for plan participants, actually increases rather than decreases the company-specific risk associated with DB pension plans.

## **Minimum Funding Standards**

ERISA includes a formula for computing the minimum amount a DB plan sponsor must contribute annually to fund the plan. The original purpose of this minimum funding standard, when ERISA was passed in 1974, was to ensure DB plan sponsors contributed enough to their plans to pre-fund benefits in an orderly manner. The original minimum funding standard ignored the company-specific risk associated with DB pension plans.

ERISA also limited the amount of plan contributions a sponsor could deduct from income in any year for tax purposes, to prevent a sponsor from using its plan as a sink for taxable profits in years of high profitability. The limits took two forms: a maximum rate of amortization for unfunded actuarial liabilities, and a "full funding limitation," which cut off deductible contributions when actuarial gains put a plan significantly ahead of its nominal funding schedule. Thus, the first limit applied to long-range funding policy, the second to short-term economic effects on funding.

Due to large losses experienced by the PBGC in the late 1980s and early 1990s, Congress later modified the funding standards to place greater emphasis on maintaining assets sufficient to pay vested accrued benefits. Except for small employers, these additional minimum funding requirements apply to all plans whose assets cover less than 90 percent (80 percent in limited circumstances) of benefit liabilities on a plan termination basis regardless of the risk of plan termination. At around the same time, concerned that sponsors and their actuarial advisors were manipulating actuarial calculations to increase tax deductible contributions beyond the intended level, Congress imposed stricter full funding limits. The effect of these changes was to severely

limit sponsors' flexibility in determining their plan contributions. Further, the effect was counter-cyclical, limiting tax-deductible contributions during peaks in the economic cycle, when market interest rates are generally higher and liabilities calculated using those rates lower, and boosting minimum required contributions during recessions, when interest rates generally decline and liabilities increase.

The result has verged on disaster. Sponsors with underfunded plans have faced minimum contribution requirements which have fluctuated unpredictably as market interest rates rose and fell. This caused many of these sponsors to freeze or terminate their plans. Meanwhile, sponsors with well-funded plans experienced long "contribution holidays" during the 1990s bull market, when abundant profits could easily have been diverted to plan funding, only to be faced with large contribution requirements in recent years due to plummeting equity values, just when economic recession has made profits scarce. Ironically, PBGC, whom the new minimum funding requirements were in part designed to protect, now faces the greatest losses since its founding.

In retrospect, it is easy to see that allowing sponsors to fund their plans in an orderly manner during the 1990s could have prevented some of these problems by providing a greater financial cushion against declining stock prices. The history of ERISA since 1974 has included a wide spectrum of conditions in the financial markets, yet regular contributions under a reasonable policy for funding unfunded actuarial liabilities would have achieved excellent results for most plans not subject to company-specific contingencies.

Thus, I conclude that the minimum funding standard should be returned to its original ERISA formulation, with perhaps even a loosening of the original constraints on tax-deductible contributions. However, some mechanism must be included to take into account the company-specific risk. One way to accomplish the latter goal would be mandatory reinsurance for DB plan sponsors. Government-mandated reinsurance would create an immediate market for this coverage, much as the ERISA bond requirement created a market for fiduciary bonding. The government might even encourage

establishment of a market for pension underfunding bonds, as suggested above. PBGC could serve as "insurer of last resort" for sponsors unable to purchase commercial reinsurance during a transition period to the new regime.

One other possible improvement to the minimum funding standard concerns plans whose benefits are not related to participants' compensation. Under current law, plans whose benefits are based on salary must take into account expected future benefit increases due to increases in salaries when computing minimum funding amounts, but plans whose benefits are defined by fixed dollar amounts are forbidden to take expected future benefit increases into account. The reason is that the calculation must follow the plan as currently written; and benefit increases due to salary increases do not require the plan to be amended, while increases in fixed dollar benefits do. The result of this theoretical nicety is that plans that defined benefits in terms of fixed dollars are chronically underfunded relative to plans with salary-related formulas. Fixing this problem would go a long way toward improving the funding of negotiated plans in old-line industries such as steel and automobiles.

## **Financial Reporting**

Treatment of DB pension plans on sponsors' audited financial statements has been a subject of great controversy of late. In the US, pension plan disclosures are governed by Financial Accounting Standards Board Statement No. 87 (FAS87). Before FAS87 became effective in 1986, sponsors were required to show only actual plan contributions as expenses and only due but unpaid contributions as liabilities. FAS87 calculates pension expense without regard to actual contributions and in certain circumstances requires that additional unfunded plan liability be included as a company liability.

Perhaps the most important difference between FAS87 and previous financial reporting requirements is that FAS87 requires that liabilities be calculated using current market interest rates. Due to the long-term nature of pension liabilities, periodic fluctuations in market interest rates cause pension expense and liability to fluctuate as well. As a result, corporate CFOs have come to view DB plans as loose cannons on their financial statements, causing

significant changes to financial results totally beyond their control. Traditional actuarial practitioners have not seen any basis for these fluctuations in their experience working with plans over time. They view their task as smoothing out cyclical fluctuations so that sponsors can make contributions in an orderly manner to fund the plan's long-term liabilities.

Actuaries applying the principles of financial economics have developed a mathematically consistent model for determining the unfunded liability and expense associated with defined benefit pension plans, a model which in some respects goes beyond FAS87 in eliminating smoothing and enhancing fluctuations in these quantities over time. The guiding principle behind this model is "mark to market" - that is, each component of a plan's assets and liability has a market value, the plan's unfunded liability is the net sum of these market values, and the expense is the change in the unfunded liability over time. Under the mark-to-market approach, a plan sponsor has an incentive to invest assets in a bond portfolio whose duration matches that of the plans benefit liabilities, since the market value of the assets and liability will move together, minimizing fluctuations in the net unfunded liability. This model raises two issues.

First, most economic studies have shown that investing in equities provides superior performance over bonds in the long term. Thus, sponsors who invest a portion of their pension plan assets in equities should, other things being equal, out-perform sponsors who invest exclusively in bonds. In today's highly competitive business environment, even a small edge from superior performance by a company's pension portfolio can make the difference between the ultimate success and failure of a business. No company can afford to ignore potential financial advantage in any part of its business.

Second, from an economic perspective, one of the important roles of equity investments is to provide an instrument for transferring the ownership of companies from one generation to the next. Since the primary role of pension plans is to transfer cash in the opposite direction, this makes pension plans and equity investments natural economic partners.

Just as mathematical consistency does not make Euclidian geometry the geometry of the universe, mathematical consistency does not make financial economics the proper framework for measuring the unfunded liability and expense associated with defined benefit pension plans. And just as observable inconsistencies between Euclidian geometry and the universe cast doubt on Euclidian geometry as the correct geometry of the universe, observable inconsistencies between financial economics and the realities of the economic environment cast doubt on financial economics as the correct model for evaluating defined benefit pension plans.

But how can we find the correct model? A possible solution lies in enhanced disclosure. With modern computer technology, an actuary can churn out a great deal of information quickly and cheaply. There is no reason a company's audited financial statement cannot include all important components of a standard actuarial expense calculation at quarter point discount rate intervals from the risk-less rate up to the long-term assumption, perhaps even extending a half point or so on either side of this interval. Further, the financial statement could give the address of a web site from which an audited list of the plan's assets can be downloaded in a standard format. This would enable a financial analyst to compute pension expense at any desired discount rate using any desired cost method and asset valuation technique. Thus, rather than imposing any one model for valuing DB pension plans on financial analysts, competing models could be tested in the marketplace. If one model ultimately proves more reliable for predicting future company financial performance, perhaps that model would become a *de facto* standard, although, given the wide variation in practice among analysts, it seems unlikely the necessary consensus would ever emerge.

## Reinventing Accounting

Accounting developed in an information-poor age. A Renaissance businessman may have had data about his business, *e.g.*, inventories of raw materials and their value in the local currency, the labor and raw materials required to produce a finished product, the value of the finished product and annual sales of that product, but before the development of accounting principles, this data told him little about his business. Accounting provided the businessman with useful information about his business - was it profitable, how much was it worth.

The basic accounting principles used today were codified by the late fifteenth century. While these principles have been extended to cover financial entities and transactions undreamed of back then, accountants still structure their financial reports around a balance sheet, income and expense statement and cash flow statement that have changed little in the past 500 years. As a result, the complexities of modern business practice are still boiled down to a few "bottom line" numbers, such as net worth and profit or loss.

One need not look far to find business practices that severely challenge this model. A good example is employee stock options. Many firms in emerging high technology fields, which must often rely for operating funds on new investments rather than product sales, have routinely attracted and retained employees by providing a portion of their compensation in stock options to avoid paying the entire market value of their employees' services in cash. The ultimate value of these stock options depends on the future financial performance of the company issuing the options, which may range from total failure to market dominance in its field. While formulas exist for determining a fair value for stock options, the formulas cannot predict the future. Formulas may produce the same value for the options of companies whose ultimate financial performance diverges widely.

Another example is life insurance company accounting. In the US, life insurance companies must report their financial results on three bases, one for public reporting of financial results, one for reporting financial results to tax authorities, and one for determining the amount of required statutory reserves.

The three methods differ principally in their manner of measuring the financial impact of future contingencies, relating both to an insurer's insurance liabilities and to the assets set aside to fund those liabilities. That the results on these three bases can differ significantly illustrates the uncertainty inherent in life insurance accounting.

Much the same problem plagues accounting for DB pension plans. The company-specific risk associated with a DB pension plan depends on future contingencies relating to the benefit liabilities, the trust fund assets and the performance of the sponsoring company. Many methods have been used for measuring the net liability and expense associated with DB pension plans, and these methods can give widely varying results.

As a final example, some economists want companies to include in their annual statements the financial effects of their environmental practices, *e.g.*, use of limited resources such as oil, fresh water and tropical forests; degradation or enhancement of the quality of air and water; *etc.* These economists have developed elaborate models for placing economic value on these environmental factors. However, most mainstream economists reject these models as too speculative to employ in determining economic value in the marketplace.

Two characteristics of current accounting methods contribute to the problems described above. First, accounting is a retrospective process: accountants look back to see what happened, not forward to see what might happen. As a result, accounting deals poorly with items, such as described in the examples above, whose current value depends on future events. Second, accounting was designed to deal with tangible assets. Each of the examples described above includes an intangible element. Pension plans provide financial security to employees during retirement. Thus, a pension plan has value beyond its monetary liabilities for benefits and the assets invested to fund those liabilities. Economic models designed to capture this additional value can be as speculative as models for placing an economic value on biodiversity.

We live in an information-rich age. Accounting practice should be updated

to take full advantage of the resulting possibilities. Bottom line numbers, such as net worth and profit or loss, which provided valuable information about a business in the Renaissance, now serve only to hide information by compressing the complexities of a modern business into a few figures. The primary goal of accounting, rather than tying up corporate financial results in a neat little package, should be publishing the greatest possible volume of accurate financial information about companies. Rather than imposing a single economic model on the financial community, the accounting profession should provide the information necessary to allow financial analysts to apply competing economic models. Failure to modernize accounting practice has several consequences:

By reducing the amount of financial information available about companies and imposing a single "certified" economic model on the information actually published, current accounting practice suppresses innovation in the field of financial analysis. For example, if companies were required to publish in their annual reports the financial effects of their environmental practices, analysts would be free to ignore the information; but if those analysts who used the information proved more successful in predicting companies' long-term financial performance, incorporating this information into financial analysis would likely become standard practice. Current accounting rules make such a change in practice nearly impossible to bring about.

By developing in the accounting profession, through training and long practice, a vested interest in published financial standards, current accounting practice discourages changes to those standards even when experience shows those standards to be deficient. The reluctance of the FASB to reevaluate the pension accounting standard despite criticism from many quarters illustrates the inertia built into current accounting practice. This inertia can only increase when accounting standards become international.

By focusing on a few bottom line figures, current accounting practice provides a road map for fraud, as the recent financial scandals demonstrate. Once financial results have been boiled down to a few figures, it is easy for those with fraudulent intent to design a scheme which reproduces those figures within expected ranges, making fraud detection through published



financial results nearly impossible. Further, the inertia built into existing standards ensures opportunities for fraud will be exploited far more quickly than the standard setters can move to address them.

Accounting for defined benefit pension plans constitutes only a small part of preparing financial reports for large modern corporations. However, it not only demonstrates many of the deficiencies in current accounting practice, but also provides a potential model for developing a new accounting practice which will better serve companies, financial analysts and the investing public.

## **Objections From the Accounting Profession**

I am not so naive as to believe the accounting profession will reinvent itself at my say-so. A primary goal of financial accounting has been to provide comparability between financial statements for the same company from year to year and among different companies for the same reporting period. Enhanced financial disclosure would not only eliminate these types of comparability, it would even eliminate comparability for the same company for the same reporting period, since different financial analysts could publish different results based on their preferred models. Clearly, this would be a large pill for the accounting profession to swallow. However, in light of the performance of accountants and financial analysts during the recent stock market boom and bust, it's not clear that, in eliminating comparability, anything of value would be lost. It seems fatuous to claim that the panoply of companies in the world today can be meaningfully compared based on the few numbers which appear in their audited financial statements, no matter how those numbers are calculated.

Of course, many accountants and analysts will say not showing traditional bottom line figures will cause chaos in the financial and investment communities. Experience shows that, if patriotism is the last refuge of the scoundrel, threatening impending chaos is the last refuge of the vested interest. Enhanced financial reporting would open up opportunities for creative analysts to find new and more accurate ways for predicting companies' future financial performance, while consigning those who have grown comfortable with the old ways of doing things to the ash bin of history.

## Directions For Research

Actuaries who tout the financial economics model for measuring the unfunded liability and expense associated with defined benefit pension plans have raised important questions about the economics of these plans which have not previously been explored adequately. For decades pension actuaries have eschewed rigorous analysis of the principles underlying their work both because their work has historically led to the successful long-term funding of the plans under their charge and because no one had thought to raise a challenge to these large unspoken principles. Now, both the financial stresses resulting from the recent stock market boom and bust and the explicit challenge from the financial economics actuaries has made the need research into these issues obvious. Some areas where such research is necessary include:

The role of legislative constraints on plan funding in the current underfunding crisis.

The possible role of catastrophe bonds in eliminating the company-specific risk of pension underfunding.

The effect of investing pension fund assets in equities *vs.* bonds on long-term corporate financial performance.

The economic dynamics of large-scale asset transfers between generations and the role of pension plans and Social Security in these dynamics.

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