

THE FAIR VALUE OF INSURANCE LIABILITIES

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Is Paul v. Virginia dead?

ABSTRACT

In this work, we articulate the case for values of insurance liabilities being company dependent. In the process, we identify main factors determining market values of such liabilities, analyze them from the perspective of dependence on the company issuing them, and follow this with a suggested regulatory approach allowing for company independent valuation. Such regulatory approach is in conceptual agreement with the emerging risk-based capital paradigm.

INTRODUCTION

Early life insurance companies, especially Friendly Societies, were troubled by unpredictability of their death benefit disbursements. As the principles of actuarial sciences developed, and mortality tables were published, this unpredictability gave in to a better understanding of death related cash flows. This contributed to the growth and success of the life insurance industry. The Golden Age (Black and Skipper, 1994) of the US insurers, the 1950s and 1960s, was characterized by nearly complete knowledge of death related cash flows because of actuarial knowledge; and predictability of other cash flows (i.e. lapses, surrenders, new business, investment returns) because of an economic environment providing stability of those factors. One could say that Golden Age was the 'quiet before the storm'. Subsequent developments (Sametz, 1987), such as:

- Unprecedented levels of inflation, and unpredictability of inflation rate;
- Unprecedented levels of volatility of financial markets, especially interest rates;
- Unprecedented deregulation, consumerism, and competition, leading to greater efficiency in consumer behavior, disintermediation, and change in the industry position versus other financial institutions,

resulted in the life insurance industry experiencing what is common in those three factors, i.e. 'the unprecedented', which first and foremost meant unpredictability of liability cash flows, or even a complete makeover of the nature of those liabilities. Any hopes of greater stability after inflation decline were quite successfully removed by the tumultuous years of 1993 and 1994.

This historical process was, in our opinion, not just a result of a change in the economic environment, but also a change in the very nature of life insurance business (within the given economic environment, of course). The factors of inflation, interest rates, or deregulation, are external to a life insurance contract. Yet we believe that in addition to those external considerations, a historic change in what life insurance is, is occurring. To explain that, let us bring a quote from the 1868 *Paul v. Virginia* Supreme Court ruling (per Black and Skipper, 1994): "Issuing a policy of insurance is not a transaction of commerce. (...) These contracts are not articles of commerce in any proper meaning of the word. They are not subject to the trade and barter. (...) They are like personal contracts between parties which are completed by their signature and the transfer of the consideration."

When the significance of this decision is discussed, the subject is usually state versus federal regulation of insurance. Nevertheless, this was also a decision concerning valuation of insurance liabilities. The decision stressed that insurance liabilities, when viewed from the perspective of the policyowner, are not marketable assets, and as such, exhibit, first and foremost, characteristics of a completely private transaction between two parties. The value of a policy asset (i.e. insurance liability) is determined solely by the original transaction, and expressed by the consideration extended. Thus book value accounting is fully justified.

The 1944 *United States v. South-Eastern Underwriters Association, et al.* decision of the Supreme Court (per Black and Skipper, 1994) overturned *Paul v. Virginia*. This meant the end of the sole state domain over insurance, even if that domain was extended by the 1945 McCarran–Fergusson Act. The part of *Paul v. Virginia* concerning implications for insurance liabilities valuation was overturned less rapidly, but probably in a more decisive fashion, in the marketplace.

In this chapter we concentrate on life insurance liabilities. We do agree that many issues raised here apply to insurance in general. Nevertheless, this concentration allows us to use some specific examples, or point out specific policy implications.

To the extent that a life insurance policy is a private transaction between the insurer and the insured, its value is given by the actuarial valuation employed by the insurer. To the degree that the policy is a traded asset, or a commodity easily replaced in the marketplace, its value is easily given by the market. We claim here that at the time of its pronouncement, the *Paul v. Virginia* decision, in the part concerning valuation, quite adequately represented reality, then. However, as the insurance marketplace developed, the traditional life insurance policy was 'peeled off', those parts of it which represent tradeable assets, or commodities, became unbundled, and either traded, or purchased separately. In fact, less and less of a traditional policy is a private transaction. In this sense the *United States v. South-Eastern Underwriters Association* also represented a recognition of reality. We claim, however, that a life insurance

policy remains, to a degree, to be specified later, an financial instrument, whose value is partly outside of the framework of market valuation.

We claim that the 'financial storms' of the 1970s, 1980s and 1990s may have precluded us from noticing that the process which was then happening was quite a natural phenomenon of establishing market values of those insurance liabilities which are properly valued by the market, and separating them from those which are not valued by the market. Sippel (1993) discusses the emerging paradigm of financial intermediation. He points out that in view of rapid changes in the nature of financial intermediation, it is natural to analyze financial products from first principles. This leads him to identify the following four elements of a financial product:

- Method of making money: bear risk, manage spread, process information, aggregate, distribute;
- Legal form: bank, property/casualty insurer, life insurer, thrift, etc.;
- Market definition: size, geography, demographics, etc.;
- Needs/wants met: uncertainty reduction, advice/information, record-keeping, access to money.

The traditional life insurance was very much a result of evolution out of medieval guilds, or other fraternal or mutual societies: it kept some of the bones of its predecessors, even though it was barely using them at all. It had a clearly defined legal form, and the market (protection and hedging of human capital value of the family breadwinner), but it bundled the functions of bearing risk, managing spread, and aggregation, while meeting the needs of uncertainty reduction in human capital value and in securities market value, as well as advice and financial planning. Sippel (1993) points out that the new paradigm calls for financial intermediaries to use capital, information, and brains, to establish products which offer any possible combination of the four elements of a financial product, often in the most refined version. One example given by Sippel is Fidelity Investments which offers aggregation of securities in such most refined version to the most widely defined market, under the legal form of private ownership, most carefully separating numerous needs and wants met. Of course, market values of Fidelity's liabilities are clearly established, as it was precisely Fidelity which worked on 'peeling off' various pieces of traditional life insurance product, in order to establish them as separate products in the marketplace.

One important part of the valuation of life insurance liabilities is whether they are company-dependent. Is life insurance protection a commodity which can be easily replaced by switching to another company? More precisely, there are two major parts of traditional life insurance:

- Death protection;
- Savings accumulation and disbursement.

These are, of course, supplemented by a bundle of human capital and financial options (we will return to this subject, also see Smith, 1982). The industry itself has successfully managed to unbundle these two products, by offering term

insurance and annuities (with these products being high growth areas). Our question can therefore be rephrased as follows:

- Do the consumers purchase death protection without any regard for the company used?
- Do the consumers accumulate and disburse their savings without regard for the company used?

If both questions are answered to the affirmative, we will have made a very strong case for identical, company independent, market value accounting of life insurance liabilities. If, on the other hand, the answer is 'no', we may have to become careful in assigning market values to those liabilities.

One more important issue to raise is the fact that the homogeneity of the product is precisely one of the defining characteristics of a competitive market. Pritchett and Wilder (1986) point out that especially cash-value life insurance products and disability income products, and, to the lesser degree, term insurance and annuities, lend themselves naturally to the product differentiation strategy. This does not imply complete monopoly power, but leads to what Pritchett and Wilder call workable competition. Nevertheless, different life insurance companies' products are not necessarily perfect substitutes for each other, and being company dependent, may lead to difficulties in establishing market values for liabilities given by them.

THE NATURE OF LIFE INSURANCE LIABILITIES

Saunders (1994) analyzed the financial intermediaries specialness and points out that the economic role of financial intermediaries lies in matching the needs of the saving public (households) with those of economic investors (corporations). This results in financial intermediaries having liabilities which are some-one else's securities. In fact, their role lies precisely in transforming the primary securities (corporate bonds and stocks, and other direct forms of debt and equity) into secondary securities, or better yet, derivative securities, i.e. securities whose cash flows are derived from other, underlying, securities. The term 'derivative security' has been reserved for more exotic creations, such as options, futures, swaps, and mortgage derivatives, yet one can clearly see that, for example, a single premium deferred annuity, is also a derivative security, as it transforms the cash flows of the insurance firm's investment portfolio into those flowing to the firm's clients.

Thus financial intermediaries provide the service of crafting derivative securities which match the supply of savings from the household sector with the demand for those savings in the corporate sector. However, the demand for savings expresses itself in the form of supply of securities, and those securities may not be the ones demanded by the suppliers of savings, herein lies the role of the financial intermediaries, who transform bonds and stocks into securities demanded by the saving public.

The key point here is that derivative securities crafted by financial intermediaries must be valued in a manner analogous to other derivative securities. In particular, we must note that the market valuation of a portfolio of life insurance liabilities is determined by the following factors:

- Existing investment portfolio;
- Baseline investment strategy;
- Existing liability portfolio;
- Baseline crediting strategy;
- Management's policy regarding new business and departures from existing baselines;
- Customers characteristics expressed in deaths, withdrawals, lapses, and terminations.

When valuing existing liabilities, we may allow ourselves to make a simplifying (yet not necessarily true) assumption that their value is indeed independent of any new business produced in the future, and of any departures from existing policies. Given that, we can now treat the remaining factors as a package of cash flows and options. Black and Scholes (1973) analysis implies then that the value of such a package can be determined by risk-neutral valuation (see also Hull, 1993, Chapter 12), as the discounted expected value in the risk-neutral world. Practically, this means averaging present values obtained along sample interest rate scenario paths. Samples such are generated by a stochastic process assumed to govern the yield curve evolution. This valuation process assumes, of course, that derivative securities valued are dependent solely on the interest rates (yield curve).

All of the above ideas are currently a standard part of actuarial valuation, especially cash flow testing. What we do want to bring into this framework is an identification of the composition of the underlying derivative securities, especially the ones which are company dependent.

It is quite clear that the contract wording, especially nonforfeiture rights, give the policyholder in a life insurance, or an annuity, policy, a set of options (Smith, 1982). In addition to that, however, we have other pieces to the combined option package, which are less obvious. First, within any possible guidelines in the policy, or regulatory guidelines, the company receives an option to set its investment policy and, in relation to it, its crediting strategy. Secondly, the company has an option to default. It is important to note that the default option is not policy-specific, but extends to all of its liabilities. This means that the combined package of options can be divided into the following pieces:

- Investment baseline of the insurance company;
- Crediting strategy of the insurance company;
- Option to default by the insurance company;
- Policyowners options, including nonforfeiture rights.

These do, in fact, correspond to the identified above factors relating to valuation of life insurance liabilities.

If valuation is performed by the firm, it is quite natural to exclude the option to default. This results in a lower risk-adjusted discounting rate, or higher value of the liabilities. However, the market value, if determined by the reinsurance price, or other price required for liabilities transfer, may indeed include that option. If a weak company transfers its liabilities to a strong one, generally the strong one requires a payment. This clearly is compensation for the increase in the market value of liabilities at the moment of transfer.

We see therefore, that there are parts of the valuation of life insurance liabilities, and all insurance liabilities at that, which are company dependent. We will now proceed to illustrate this phenomenon and to analyze it by the use of a simple example. Then we will analyze the implication of this observation.

ONE COMPANY, SEVERAL BALANCE SHEETS?

Imagine an insurance firm engaged in life insurance business. Let us call it Realife Mutual Life Company. We will study Realife's market balance sheet under very simple assumptions. We will, however, incorporate various options involved in the asset/liability portfolio. Realife issues a one-year policy promising to pay 5% on a \$1000 deposit made today in a year from now. The 5% credited rate matches the current one-year Treasury rate. Let us now consider Realife's baseline investment strategy.

Merton (1974) developed an option-based model of the risk structure of interest rates which we consider applicable to this situation. As we had indicated, it is the portfolio of options which puts a financial intermediary in business. A true market-value balance sheet must consider that. Merton's methodology is rooted precisely in that approach. It assumes that the purchaser of a bond holds a risk free note and sells a put option to the bond issuer, for which the bondholder receives the yield spread of the bond over the corresponding Treasury.

The market value of a risky loan is, in Merton's model, given by

$$F(t) = Be^{-it} [(1/d)N(h_1) + N(h_2)]$$

where the symbols have the following meanings:

- B = Maturity amount of the loan,
- A = Total assets of the borrower,
- i = Risk free rate of interest,
- t = The length of time remaining to loan maturity (here $t = 1$),
- d = The borrowers leverage ratio equal to Be^{-it}/A ,
- $N(h)$ = Cumulative distribution function of the standard normal distribution,
- h_1 = $-[0.5\sigma^2 t - \ln(d)]/(\sigma t 0.5)$,
- h_2 = $-[0.5\sigma^2 t + \ln(d)]/(\sigma t 0.5)$,

σ^2 = Volatility (measured by the standard deviation) of the assets of the borrower.

Merton's model also implies that the market yield k of a risky loan is given by:

$$k = i + (-1/t) \ln[(1/d)N(h_1) + N(h_2)]$$

Realife's baseline investment strategy is to buy bonds of the corporation named High Yield Inc. with leverage ratio of 0.7, and volatility of assets of 30%. The bonds sell at the yield of 7.063%. Realife sells a one-year single-premium deferred annuity (SPDA) with no early withdrawal privilege crediting one-year Treasury rate at \$1000 face (today). We will assume that Realife has a 5% of liabilities surplus requirement, with \$50 of company's capital invested in the project. If all of \$1,050 is invested as baseline states, and surplus requirements and default options are ignored, Realife's market balance sheet is:

Assets	\$
High Yield Inc. zero-coupon bonds due one year hence	1050.00
Liabilities	
SPDA	1000.00
Surplus	50.00

Without any default occurring, one year hence, Realife will develop the following market balance sheet:

Assets	\$
High Yield Inc. zero-coupon bonds maturing at	1124.16
Liabilities	
SPDA maturing at	1050.00
Surplus	74.16

This represents a 48.32% return on capital, clearly a rather extravagant rate. Realife may be inclined to modify its crediting strategy, by becoming more generous to its SPDA customers, and thus expanding its market share. Before we elaborate on the implications of that, let us reconsider the initial balance sheet of Realife. Merton's model implies that market value of \$1000 face of High Yield's bonds is \$979.58. Thus the true initial market balance sheet should read:

Assets	\$
High Yield Inc. zero-coupon bonds due one year hence	1028.56
Liabilities	
SPDA	1000.00
Surplus	28.56

As it turns out, Realife is failing its capital requirements, by holding only 2.86% capital. Let us now imagine that Realife decides that it no longer needs to credit as a risk-free company, but rather decides to credit 6%. It might be

interesting to note that the model of Merton implies that Realife, with its 5% capital ratio, has 7.08% volatility of assets, if it credits 6%.

If the options on the balance sheet are ignored, initial market values are:

Assets		\$
	High Yield Inc. zero-coupon bonds due one year hence	1050.00
Liabilities		
	SPDA	1000.00
Surplus		50.00

The ending balance sheet becomes:

Assets		\$
	High Yield Inc. zero-coupon bonds maturing at	1124.16
Liabilities		
	SPDA maturing at	1060.00
Surplus		64.16

The return on capital drops to 28.32%, but the company's competitive position is enhanced immensely. On the other hand, the Merton model states that the customer holding the SPDA actually had a \$990.05 note, not a \$1000.00 note, with the difference of \$9.95 effectively being paid by the state's Guaranty Fund.

The analysis given in this simple example is in no way exhaustive. In addition to that there are many factors influencing market values of liabilities which do not remain directly under company's control. Let us say some words to that issue now.

- Product market value does depend on the product type. Every insurance product carries numerous options, either sold or bought by the company, which cause the generic Treasury yields to be adjusted for discounting by the spreads paying for those options;
- Insurance firms operate in the capital market environment which causes them to have cost of funds provided for asset purchase to be influenced by both product fund costs, and capital fund costs. The process of intermediation provides a payment to purchasers of insurance product which must meet the competition for their funds, while the owners of the insurance firm must be paid for their capital enough to compensate for the additional risk undertaken.
- Despite variability of the investment baseline, the company can only do so much. Returns in the capital markets are effectively described in Markowitz' Efficient Frontier, which plays the role of 'price list of capital': it gives the effective rate of return for the degree of risk accepted.

Thus the full analysis of the appropriate market value of insurance liabilities will, first and foremost, include those factors independent of the insurance firm, i.e. cost of funds (capital and customer funds), capital market returns, and product marketplace. However, as we do point out here, even in a competitive modern insurance marketplace, it is possible to 'customize' firm's market value of liabilities by quietly purchasing one's default option from the consumers.

IMPLICATIONS FOR MANAGEMENT AND REGULATION OF
LIFE INSURANCE ENTERPRISES

Thus we conclude that Paul v. Virginia is not all dead yet. Life insurance liabilities do indeed include portions which are company dependent, and a life insurance contract is not merely a commodity traded in a perfectly competitive market, but it still holds some properties of a 'simple handshake agreement'.

Two questions naturally arise:

- Should management do something about it?
- Should regulators do something about it?

The answers suggested here are:

- No.
- Yes.

Let us explain. One of the major reasons why the Statement of Financial Accounting Standards No. 115 has set upon us is that book values of liabilities are subject to subjective factors, and do not fully correspond to objective reality, here given by the market. This clearly suggests that company-specific options, such as the option of insolvency, should be excluded from the liabilities valuation. If the liabilities were perfectly company-independent, valuation would be established quite easily, via comparison. Since some degree of dependence on the company issuing policies does exist, we consider the following approach most appropriate.

First, management should consider only the company-independent portion of the liabilities in valuing them. Two major company-dependent portions can be identified. One is the insolvency option. This one must be excluded in valuation. It is quite reasonable to expect that the company does not assume that it will not perform its obligation to customers. The other one is the investment baseline and the crediting strategy as a function of investment performance. Despite regulatory guidelines, significant variations in life insurance companies' portfolios do exist. Here, the differences among companies, in view of diversification of their portfolios, can mostly be attributed to the degree of market risk of those portfolios. The increased riskiness of the investment portfolio should be represented, however, in the insolvency option, not in the discount rate of liabilities. The option-adjusted spread of liabilities should, in fact, equal zero over that of appropriate Treasuries. The reason for that is also the regulatory framework of the insurance industry – the main reason regulation exists is to prevent market failures related to insolvencies (hopefully without harm to the market process, i.e. without promoting moral hazard).

Second, company-dependent portions of valuation of liabilities is therefore mainly expressed in the insolvency option. The company receives this option, and pays for it with additional spread credited. From the regulatory standpoint, no such spread should exist, and the option should not be created. One way to prevent that is to collect the additional spread in taxes or mandatory reinsurance. This would most likely result in a further adjustment in the price of liability, as the company would continue to trade with its customers. A

better way then seems to be to simultaneously lower the value of the option, and remove portion of the spread by requiring a portion of the assets to be placed in lower risk, lower return assets. This is precisely the risk-based capital approach. However, the existing framework calls for rather rigid computation according to asset classes. From the point of view presented in this work, it seems quite natural to view risk-based capital as an adjustment for the value of the insolvency option, effectively the only company-dependent portion of the market value of insurance liabilities.

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