APPENDIX B

IMPLICATIONS OF ACCOUNTING

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IMPLICATIONS FOR FAIR VALUE ACCOUNTING

The developments in financial economics that we have discussed in this report have had a major influence on the accounting profession which has proposed[1] that balance sheet items be recorded at fair value. Here, fair value is meant to represent an actual market value if the item has one and a theoretical market value if the item is not actively traded. In this appendix, we present a brief overview of some of the important finance concepts and their fair-value accounting implications for property-liability insurance.[2] In our discussion we emphasize several of the current controversial fair-value issues for liability valuation, such as treatment of default risk and value additivity of risk loads.

B.1. The Market-Value Balance Sheet

The accounting implications of modern finance can be illustrated by adopting an idealized balance sheet (as shown by Myers and Cohn, 1987) that displays market values. We assume that the insurance market is efficient to the extent that the insurer and the policyholder have the same knowledge about losses and market conditions. A firm is created to sell a single non-renewable policy with a limited coverage period. Assume that the owners have contributed a surplus

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[1]The U. S. proposal is the Financial Accounting Standards Board, Preliminary Views document titled "Reporting Financial Instruments and Certain Related Assets and Liabilities at Fair Value", dated December 14, 1999. Also, a parallel international proposal is the International Accounting Standards Committee, Insurance Issues Paper, released in November 1999.

[2] The concept of fair value of life insurance liabilities has been discussed by interested academic and industry researchers in the mid 1990s. See Vanderhoof and Altman (1995) and Babbel (1995).

value S, that prospective insured claim liabilities have a market value L and that prospective income taxes have a market value T. There are no intangible assets (the effect of this item is discussed below). Both L and T, being market values, include a load for risk.

In the situation where the insurer is *certain to pay* the claim and tax liability, the fair premium P equals L + T. At the time the policy is sold we have the following balance sheet:

Table 1: Balance Sheet, Guaranteed Claim Liability Payment

Assets		Liabilities	
Investments	P + S	Claims	L
		Income Taxes	T
		Equity	S

These balance sheet items reflect market or fair values, as if the liabilities could be actively traded in an efficient market. Because the premium is a fair value, the market value of the firm with or without the insurance transaction remains S. Note that current fair value proposals do not contemplate the prospective tax liability T.

B.2. The Default Option

In the more typical situation, there is a possibility of default because the contractual obligations may exceed assets and the owners are protected by *limited liability* (i.e., they are not legally required to contribute additional capital). The balance sheet can be modified to recognize the market value of the insurer's lower expected liability payoff.

This value is less than L by the value of the firm-specific expected default amount D, which is called the *default put option* in finance. In a market *with no guaranty fund*, the fair premium now will equal the original full-liability premium P, minus D, the default value.

Table 2: Balance Sheet, with Liabilities and Premiums Adjusted for Default

Assets		Liabilities	
Investments	P – D + S	Claims	L – D
		Income Taxes	T
		Equity	S

The major accounting issue presented when there is a measurable default value is how to treat L, the original claim liability without respect to default. One cannot simply ignore default in measuring the liabilities. If we define the claim liability to be L, then equity must drop to S – D so that total liabilities balance to assets. However, equity must equal S, since the fair premium has been lowered to reflect the expected default.

There are several alternatives to address this issue. One is to show the claim liability as a reduced amount L – D, as in Table 2. Another alternative separates the default from the contractual obligation L:

Table 3: Balance Sheet, with Liabilities and Premiums Adjusted for Default
Default Shown as a Separate Liability

Assets		Liabilities	
Investments	P – D + S	Contractual Claims	L
		Expected Default	– D
		Income Taxes	T
		Equity	S

A third alternative shows the default value as an intangible asset and keeps the original claim liability L.

Table 4: Balance Sheet, with Liabilities and Premiums Adjusted for Default
Default Shown as an Intangible Asset

Assets		Liabilities	
Investments	P – D + S	Contractual Claims	L
Expected Default	D	Income Taxes	T
		Equity	S

All three alternatives maintain the integrity of the balance sheet and give economically valid measures for the components. However, the second and third have the added benefits of displaying the original contractual obligation as well as the default value. This information is valuable to regulators, investors and policyholders.

B.2.1. Default Option under a Guaranty Fund

Under a guaranty fund system, an additional liability Dg is created, which equals the insurer's prospective share of other companies' aggregate expected default. Under a full guaranty fund system, where policyholders' claims are completely paid, the average insurer's guaranty fund liability Dg will equal its expected default D. This occurs because the sum of all the individual Dg values will equal the expected total default of the industry. The total expected default in turn must equal the sum of all the individual D values.

The fair premium now will be equal to the original full-liability premium P, since the claim liability is fully guaranteed. The policyholder will not care about the size of the insurer's default, since the claim benefit is guaranteed. The claim liability to the insurer is now the contractual obligation minus the value of the firm-specific default D. There is an added liability equal to the expected cost of the future guaranty fund assessments Dg. Thus, we get the following balance sheet reflecting the additional transactions created by the presence of default in the insurance system:

Table 5: Balance Sheet, with Liabilities and Premiums Adjusted for Default
Full Guaranty Fund

Assets		Liabilities	
Investments	P + S	Claims	L - D
		Guaranty Fund Liability	Dg
		Income Taxes	T
		Equity	S + D - Dg

Notice that the owners' equity has changed by the difference between the specific default D and the share Dg of other insurers' pooled defaults. This illustrates a well-known criticism of U.S. guaranty funds (see Cummins, 1988). These funds are not risk-based, so Dg will stay constant as D increases. This asymmetry creates incentives for insurers to increase risk, because doing so increases the default value and therefore, owners' equity.

An alternative balance sheet display (similar to Table 4) recognizes the default put option, net of the value of the expected guaranty fund assessments, as an intangible asset Dn = D - Dg. This asset supplements the higher or lower fair premium P (Myers and Read, 1999):

Table 6: Balance Sheet, with Liabilities and Premiums Adjusted for Default Full Guaranty Fund; Default Shown as an Intangible Asset

Assets		Liabilities	
Investments	P + S	Contractual Claims	L
Net Default	Dn	Income Taxes	T
		Equity	S + Dn

Notice that this display preserves the original no-default general obligations (L and T) as if there were no default risk. A further refinement would disclose the separate components D and Dg within the fair premium P. For most insurers the net default value would not be materially different from zero, and probably could be ignored in practice. But for insurers with default significantly different from the industry average Dg, the underlying over (under) capitalization carries a significant positive (negative) capital cost.

B.2.2. Franchise Value and the Default Option

The above single-policy model ignores (non-default related) intangible assets that can represent significant value for an ongoing firm. These intangible assets are often called *franchise value*. They arise from economic rents, which an insurer is expected to attain due to its licenses, distribution network, expertise, brand name and so forth (see Babbel, 1999). The franchise value equals the value of future earnings and includes the present value of future business, both renewals and new policies.

We extend the above single-policy model to include the value of future business (the franchise value), denoted by F. Here, the fully guaranteed fair premium remains at P = L + T, since the contractual obligations are the same. However, the owners' equity may be different since, as an ongoing entity, capital contributions or withdrawals may have occurred in the past. We denote the owners' equity, before including franchise value, as Sf. This value represents the breakup (liquidation) value of the firm, where the assets and liabilities are transferred to third parties at market values. With no guaranty fund and treating the default value as an intangible asset, the market value of the firm is Sf +F. We get the following balance sheet:

Table 7: Balance Sheet, with Liabilities and Premiums Adjusted for Default
Ongoing Firm
Default Shown as an Intangible Asset

Assets		Liabilities	
Investments	P – D + Sf	Contractual Claims	L
Default	D	Income Taxes	T
Franchise Value	F	Equity	Sf + F

If the franchise value is excluded from the accounting treatment of the balance sheet, there are some undesirable consequences. Suppose that the ongoing firm increases the risk of its assets after issuing the policy at premium P. The default value will increase to D' > D. However, this action will simultaneously reduce the franchise value to F’ < F. The franchise value drops because future policyholders are less willing to insure with this firm than before it became riskier. Therefore, the owners’ equity will decline to a value less than S + F, if the franchise value drops more than the default value increases.

In contrast, suppose that the single-policy firm increases the risk of its assets after issuing the policy. Since there is no future business and thus no franchise value, the owners’ equity will increase by an amount D’ – D. Thus, income will also increase by D’ – D. This increase in the firm’s economic income arises from a simultaneous reduction in the economic income of the policyholder, since the expected claim payment is lower.

Suppose that the firm is ongoing, but the franchise value is not recorded on the balance sheet while the default value is included. Then the balance sheet appears identical to Table 4 (with Sf replacing S), which represents the single-policy firm. An increase in asset risk will consequently boost the book equity and the reported earnings. In this case, an insurer can increase its accounting earnings by becoming financially weaker. This result may not suit the public interest for an industry built on the promise to completely pay its obligations to policyholders.

It may be impractical to include franchise value on an accounting statement due to the difficult nature of measuring the underlying intangible assets. If franchise value is excluded from the balance sheet there are alternatives that somewhat preserve the economic income measurement.

The first alternative is to book the fully guaranteed claim liability value, ignoring the default value. This is a simple alternative, but it provides no direct insolvency information to financial statement readers. This shortcoming could be overcome by disclosing the default value as a footnote.

The second alternative is to create an artificial franchise value as a fixed percentage of assets or liabilities and use the Table 7 presentation. When the default value changes, the difference is exactly offset by a reduced franchise value, with no income effect. The major disadvantage with this approach is that the equity value now includes the artificial franchise value and may not adequately represent the true market equity.

B.3. Accounting for the Risk Load

Since the typical claims liability is not actively traded in a competitive market, to determine the fair value L we employ financial pricing methods. These techniques use the estimated cash flows of the liability to derive a proxy for a market value. The result is a present value that recognizes both the timing of the cash flows and the risk. The risk load is defined as the difference between the liability fair value and the present value of the cash flows assuming no risk. In the following discussion we assume that the insurer has no default risk.

We distinguish two perspectives for recognizing the risk load as it affects P, L, and S. The first, the *composite* view, is a strict market value accounting convention. In this perspective, the nominal value of the expected liabilities, including taxes, is discounted at the risk-adjusted rate that yields P. Since P is loaded for risk and appears as an asset, L and T must be suitably discounted for risk in order to preserve the market value of equity S:

Table 8: Balance Sheet, Composite View

Assets		Liabilities	
Investments	P + S	Claims, including Taxes	L + T
		Equity	S

Here, the risk load is indirectly taken into earnings and (accounting) equity S as the risk is resolved over time.

The second perspective, the *separation* view, adopts the convention of posting the nominal value of the liability, discounted at the risk free rate to recognize the time value of money. Under this view (Babbel, 1999), nominal values underlying L and T are discounted to Lf and Tf using an expected spot yield curve matching the expected liability and tax flows. This exposes a risk load R satisfying L = Lf + R. We assume that the risk load for the tax liability is immaterial for accounting purposes. This perspective yields a balance sheet:

Table 9: Balance Sheet, Separation View

Assets		Liabilities	
Investments	P + S	Claims	Lf
		Risk Load	R
		Income Taxes	T
		Equity	S

Ideally, both perspectives preserve the market value of the firm given fair premium pricing of liabilities and taxes. In other words, either view will give the same owners' equity. Since income under fair value accounting equals the change in equity, income will also be equal. Both methods require periodic fair value updating to determine the residual S. It should be noted that in either view, the economic value of equity S is determined using an implicit fair value premium whether or not that premium has been charged to the policyholder.

Premiums charged above (below) the fair value will increase (decease) the value of equity by changing the book equity, the franchise value or both. A balance sheet that contains Lf+T, but does not separately recognize the risk premium, implicitly takes the risk premium into a book equity value of S+R.

B.4. Process Risk and Value Additivity

Much of the early groundbreaking development in modern finance (in particular, the CAPM) is based on efficient markets concepts. Under these idealized conditions, diversifiable risk (also called process risk) commands no price in the marketplace. However, newer work (Stultz, 1999) shows that process risk does in fact command a price. This occurs because managers incur costs to reduce process risk, and these are passed along to policyholders. As discussed below, the cost associated with process risk does not necessarily become a part of the risk load.

Three major methods for managing insurance process risk are reinsurance, maintaining adequate capital and product diversification.

Reinsurance is costly compared to the self-insurance alternative, due to underwriting and marketing expenses. Also, reinsurers will assume that the ceding insurer is adversely selecting against it and charge an additional premium.

Holding a large capital amount limits the risk of insolvency from diversifiable losses. But capital is costly due to double taxation. The insurer pays taxes on investment income from the capital funds provided by the investor. These taxes would not be paid if the investor purchased the same assets directly.

Product diversification creates additional costs as line managers act in their territorial interests rather than the corporate interest. Also, additional overhead costs are needed to manage a diverse multi-line operation.

Each of these costs appears on the income statement in a category of expense (or revenue reduction) that does not include a risk load per se. Reinsurance costs will appear as a reduction in premium (net of ceded losses). Capital costs will appear as income tax expense. Product diversification costs will appear as overhead expense.

Most of the process risk facing an insurer has already been eliminated by the above risk management measures. In particular, product diversification reduces the firm's total risk enormously, compared to the sum of the stand-alone risk at the individual policy level.

We expand the previous fair premium definition to include expenses, which are split into the costs of risk management (ER) and all other expenses (EO). We also split the income tax cost to show the double taxation cost TC and all other tax costs (TO). To simplify, we also assume that the default value is zero. Thus,

$$P = Lf + R + ER + EO + TC + TO.$$

The risk load R includes any residual process risk (not captured in ER) valued in the market. For example, catastrophe losses are diversifiable, but still command a large risk load (Froot & O'Connell, 1999).

B.4.1. Allocation of Costs Due to Joint Risk

Since P represents a market price, we would expect that the components satisfy value additivity. For example, the sum of risk management expenses ER for all of the product lines should equal the total for the firm. In fact, it does in conventional accounting statements. However, it is not as clear that the risk load R and the tax cost TC should satisfy value additivity, since they are a function of diversifiable process risk.

Diversifiable risk is non-linear when combining risks, since, by definition, the standard deviation of two diversifiable risks is less than the sum of the individual standard deviations. Thus costs associated with process risk can be non-linear as well. For example, if two firms with respective expected defaults D_1 and D_2 are combined, the joint default D is less than $D_1 + D_2$ if process risk is present.

How does the market allocate joint costs? Clearly, joint costs such as overhead expense are allocated to product line because prices do not include the firm's entire amount of overhead expense for each line. If prices are determined in a competitive market, the *one-price rule* (the same product fetches the same price) forces an efficient allocation of joint costs. Firms allocating too large a share of joint costs to a particular line will not be able to recover those costs in the premium.

Here we examine how joint costs are partitioned in the setting of competitive prices. An example is above tax cost of holding capital. The general technique is adapted from Butsic (1999) and Myers and Read (1999):

1. Set an objective function that incorporates the cost to be allocated. For capital allocation, the total firm default D is a function of the total capital and some risk parameters Q, or
   $D = f(S, Q)$. The insurer's total capital S determines the tax cost T such that $T = t \times S$, where t is the per-unit tax cost.

2. Determine a variable that remains constant as the product mix changes under the assumption of a competitive market. It should be a function of the cost being allocated. For capital allocation, the default value per unit of liability, or D/L, would remain constant. This follows from the assumption that, in equilibrium, prices are homogeneous.

3. Relate the variable to be allocated as a constant times a non-allocated variable. For example, the capital for product i can be expressed as a factor s_i times L_i. Here we denote product i by subscript i.

4. Vary the product mix by an infinitesimal change in product i, measuring the corresponding change in the objective function. For capital allocation, we take the partial derivative of D with respect to L_i.

5. Set the result of step 4 equal to the variable in step 2 and solve for the product-specific constant in step 3. For capital allocation, we solve for each capital factor s_i.

The above procedure guarantees that the sum of the product allocations equals the total cost. The approach is general. For example, the method can also be used to allocate reinsurance costs for an aggregate treaty to the component lines of business. Thus, risk loads as well as the various costs of risk management all obey value additivity with respect to a fair value accounting standard. This occurs even though the underlying variance or standard deviation of loss is not value additive.

B.5. Summary

Most of the difficult (and interesting) issues in fair-value accounting for insurance derive from the treatment of risk, particularly in valuation of liabilities. Because insurance liabilities are not actively traded, it is necessary to apply financial economic principles to determine values as if liabilities were traded in a competitive market.

We have explained how default risk alters the components of an insurer's economic balance sheet and have shown some alternative ways to present the market values of assets and liabilities. Much of the controversy regarding the fair value treatment of default exists because the proposed accounting measures exclude important (but difficult to measure) intangible assets or liabilities. These include franchise value, prospective income tax costs and prospective guaranty fund assessments.

Also, we have briefly discussed how risk loads can be presented in fair value accounting. In the composite view, the risk load and prospective tax liability are directly built into the claim liability value. The separation view discloses each of these components. Either view will give the same owners' equity and income.

Finally, we have described how the cost of an insurer's process risk becomes transformed into either operational expense, reduced revenue or risk load. Under a competitive market framework, which is the theoretical basis for fair value, the costs of process risk are additive when considering a firm's product lines (or other subdivisions). We have outlined a general method for allocating these costs in a way that mimics the competitive market mechanism.