

Life Insurance Funding of Buy-Sell Arrangements in Small Businesses

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Abstract

Buy-sell arrangements for the death of a co-owner may be funded with life insurance. The mechanisms and details of buy-sell arrangements were discussed. The decision whether to use life insurance was modeled using the expected utility theorem. State dependent utility was used since a surviving partner may become more (or less) risk averse upon the death of a co-owner. Life insurance funding is preferred at relatively low amounts of risk aversion, especially if the surviving partner becomes more risk averse after the co-owner's death. A lower percentage of life insurance would be used if insurance premiums are significantly above actuarially fair premiums. Given currently available insurance rates, most closely held small businesses probably should fund their buy-sell arrangements with life insurance.

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Introduction

Small businesses are often owned by more than one individual. Upon the death of one of these owners continuity of the business is often jeopardized. The deceased may have brought unique skills to the business that may not easily be replaced. In addition, the deceased ownership interest may pass to heirs who have no previous involvement with the business. For these reasons buy-sell arrangements are suggested for business partnerships. Buy-sell arrangements specify the details concerning the transfer of a business ownership interest at the occurrence of an event, such as the death of a co-owner. Contract details entail determining the seller and buyer, valuing the business interest, and specifying financing arrangements. In the case of a death, life insurance funding becomes a financing option. This paper discusses using life insurance to fund a buy-sell arrangement, and determines the level of risk aversion necessary for life insurance funding to become the preferred funding option.

The use of life insurance to fund buy-sell arrangements is typically mentioned in textbooks (Manning), but the economics of the decision have not been thoroughly researched. Tauer (1985) used stochastic dominance techniques to order the probability distributions of present costs of life insurance funding versus installment payments. He concluded that the optimal decision depended upon age, the discount rate, and the risk preference of the decision-maker, but that at least partial funding of life insurance was optimal in most cases. Tauer (1987) modeled the decision as an annual process, eliminating the role of the discount rate, but likewise found partial use of life insurance to be optimal at most age and cost scenarios. This study extends the work of Tauer (1987) by specifying utility as state dependent. A state dependent utility function specifies utility

as dependent upon a state of nature, such as the death of a partner. An individual may display different risk preferences after the death of a business partner than exhibited before death of that partner.

Use of Life Insurance in Buy-Sell Arrangements

Before a business partnership is formed the parties involved should agree upon how the partnership will be formed, how it will operate, and how it will be dissolved. (Although throughout this paper I will refer to business partnerships, these businesses may be incorporated, and the results reported are also applicable to incorporated businesses.) Agreement as to how the partnership is to be formed is always reached because it is imminent, but far too often decisions how the business is to operate over time are not discussed, including how the partnership is to be dissolved when necessary. Dissolution of the partnership will eventually occur, although the business may continue to operate with a modified set of owners.

Buy-sell arrangements are used to specify the details concerning the dissolution of the business partnership. These contracts should be negotiated at the time the business is formed because at that time individuals will not know with certainty if they or their successors will become a seller or buyer. They will protect their interests under either event, as will their partners. When done correctly, the dissolution process will be almost mechanical when an incident that triggers dissolution occurs, such as a death.

The use of life insurance is applicable for a buy-sell activated at the death of a partner. To use life insurance each partner of the partnership would purchase a life insurance policy on the life of each other partner. This can be done legally since each

partner has an insurable interest in the other partners. When a partner dies, the life insurance proceeds would be used to finance the transfer of all or part of the partnership interest. Since the deceased did not own the policy, the proceeds would not be included in his or her taxable estate, nor would the proceeds be subject to income tax. The premium payments would also be non-deductible. The alternative to life insurance would be for the surviving partners to secure outside funding, or to specify an installment sale in the buy-sell arrangement.

It is not necessary that policies be purchased on all partners. Obviously, older partners are more probable to die, but then those policies cost more. In a parent-child partnership the cost difference between the parent's policy on the life of the child and the child's policy on the life of the parent can be substantial. Thus, it is often suggested that the partnership own the policies and pays the premiums if both are to be insured. Partnership ownership is also suggested when more than two partners are involved because of the large number of policies that would be required if each of three or more partners buys a policy on two or more other partners. Partnership ownership of the policies necessitates an entity purchase (buy-out) of the business rather than a cross purchase of the deceased partner's interest.

It is normally suggested that the remaining partners have an option to buy a deceased partner's interest rather than an obligation. However, it is generally recommended that the estate have the obligation to sell if the living partners exercise their option. If the estate is obligated to sell then the sales value established in the buy-sell arrangement would be the value used in the estate tax return. The heirs would not pay

income tax on the sale except for the share of unrealized receivables (income in respect of the decedent).

Whole life or term insurance may be used. However, since the business may be dissolved for reasons other than death, in which case there would be no need for continued insurance, term insurance is usually suggested. Large amounts of annual term insurance can be purchased at low cost, a consideration for a new business facing a cash constraint.

Like any insurance decision, the selection depends upon what would transpire if the insurable event occurs without insurance. Would the business survive? Also of importance is the risk aversion of the partners. People who are more risk averse opt to purchase insurance. Thus the decision can be modeled as decision making under risk. That will be done using the expected utility theorem employing state dependent utility.

State Dependent Utility

Utility for decision making under risk is typically specified as an increasing and concave function of wealth. If utility is a function of wealth, $U(x)$, then the first derivative of this utility function with respect to wealth is positive and the second derivative with respect to wealth is negative. This implies that an individual enjoys additional wealth, but that the incremental enjoyment, although positive, decreases with wealth. Modeling decision making under this type of utility function describes an individual's behavior as risk averse. A risk averse individual prefers less variability to more at any level of expected return. A number of functional forms that are increasing and concave can be used for this type of specification, but a common one employed is the exponential, $u=1-e^{-rx}$, where u is utility, e

is the natural number, x is wealth, and r is Pratt's risk aversion coefficient. Risk aversion is constant over all levels of wealth, implying that the individual displays neither a decrease nor an increase in risk aversion as wealth is increased. Although it is generally believed that most individuals are decreasing risk averse, it is a challenge to empirically specify both the level of risk aversion of an individual and in addition, specify the degree to which that risk aversion changes over wealth levels. As a remedy to this dilemma, risk aversion will be held constant at all wealth level using the exponential utility function. As it turns out, this is not such a limiting approach, since Hammond shows that the level risk aversion coefficient can be used as a boundary coefficient value even for an individual who displays decreasing aversion to risk.

State dependent utility defines utility as not only a function of wealth but also as a function of the state of nature. State dependent utility has been used to discuss the demand for insurance for irreplaceable commodities, such as children (Cook and Graham). In the case of a death of a business partner there are two states of nature that are relevant. The first state is that the partner is alive, the second state is that the partner is dead. These states can be incorporated into decision making by specifying two separate utility functions, U_a for state a, and U_b for state b. With the exponential utility function, that implies that a different level of constant aversion to risk will exist after the death of a partner than before the death of the partner. *A priori* it is assumed that the death of a partner should make the surviving partner more risk averse, although decreased aversion to risk will also be modeled. The level of utility may also change upon the death of a partner, especially if that partner is a family member, but level increases of utility at each

wealth level will not influence the risk decision making process, only the slope of the ordinal utility function matters.

The Decision Model

The decision-maker has one of two choices to make: either to buy life insurance on the life of his or her business partner to fund the buy-sell arrangement, or to use cash (equity and loans) to fund the buy-sell arrangement if the partner dies. If this choice is modeled as a yearly decision then the use of life insurance would entail the annual purchase of term life insurance. The cost would be the premium amount regardless of whether the co-owner dies or lives. Without insurance the cost would be zero if the co-owner lives, but the amount of the co-owner's business share if the co-owner dies. It is necessary to compute the expected utility under each of these two options to determine which option provides the greatest expected utility to the decision-maker. With either funding option the deceased's business interest will transfer to the surviving partner if the co-owner dies. Thus that event can be ignored in computing expected utility of each option and only costs need to be included. The expected utility of using partial or complete life insurance funding is:

$$(1) \text{ insurance} = \text{prob} * (1 - \exp(-r * a * -(cost * f + (q - f * q)))) + (1 - \text{prob}) * (1 - \exp(-r * cost * f))$$

while the expected utility of using cash is:

$$(2) \text{ cash} = \text{prob} * (1 - \exp(-r * a * -q)) + (1 - \text{prob}) * (1 - \exp(-r * 0))$$

where prob is the probability of death of the insured during the year, and (1-prob) is the probability of living through the year. The term exp is the exponential function operator, r is Pratt's risk coefficient, and a is the state dependent term that alters (increases or

decreases) Pratt's risk coefficient when the state of nature is death. Cost is the life insurance premium to completely fund the purchase with life insurance, f is the fractional portion of the potential business purchase funded with life insurance, and q is the dollar value of the business interest.

In the first half of equation (1) the cost of funding using life insurance would be the insurance premium for the proportion of the business to be purchased with life insurance, plus the cost of using cash for the remaining portion of the business. The utility of that cost is multiplied by the probability of death. If life insurance is used to fund the entire business interest, then life insurance premiums would be the only cost. The second half of equation (1) computes only the utility of the cost of life insurance premiums multiplied by the proportion covered, since that would be the only cost incurred during the year if death did not occur, multiplied by the probability death will not occur. In the first half of equation (2) the utility of the business purchase is multiplied by the probability of death. If death does not occur then the cost is zero since the business will not be purchased, and that utility value is zero.

Taxes can be ignored in this decision process. Life insurance premiums to fund a buy-sell arrangement are not tax deductible and the proceeds are not subject to taxation. Interest on a loan to purchase the business is tax deductible, but the expected present value of the purchase should be equal to the cost of the business purchase given an after-tax weighted cost of debt and equity discount rate. It is assumed that the appraised value of the business interest is not affected by how the purchase is financed.

To implement this decision criterion it is necessary to know the cost of life insurance and the probability of death at the age of the insured. The conditional probability

of death (alive at the beginning of the year) for ages 1 through 100 were computed from the New Male Basic Table, (used to derive the 1980 CSO Table). The insurance premium cost for any age was computed by multiplying the probability of death by the face value of the life insurance. To build in administrative costs this actuarially fair premium was adjusted with various percentage markups or loadings. Premium costs per \$1,000 of face value life insurance for a 40 year old man and a 60 year old man are at various loadings shown in Table 1. Finally, it is necessary to have an estimate of the decision-maker's risk aversion coefficient before her partner dies, and the change in that risk aversion when the partner dies. With this information it is possible to compute the expected utility of the two decision options and select that decision that provides the greatest expected utility to the decision-maker.

Table 1. Cost of Life Insurance per \$1,000 Face Value Computed from CSO Probability of Death

Markup from actuarially fair premiums	40 Year Old Insured	60 Year Old Insured
0 percent	\$1.91	\$13.20
10 percent	\$2.10	\$14.52
25 percent	\$2.39	\$16.50
100 percent	\$3.82	\$26.40

Although the probability of death and the cost of insurance can be readily determined from published sources, the risk aversion of a decision-maker is rarely known. Yet after close inspection of the decision, it is clear that there is some critical value of risk aversion such that at any level of risk aversion greater than this critical value, life insurance funding would be preferred, and at any risk aversion below this critical value, no life insurance would be preferred. That is because no life insurance has a low probability of a

large negative number (the business purchase) and a high probability of zero cost (no death or business purchase). Life insurance funding has a premium cost with certainty. Since these cumulative distributions cross just once, with no-life insurance having the lowest outcome, neither financing option dominates the other by first-degree stochastic dominance. Also, since the life insurance cumulative distribution reaches the value of 1 (it is a vertical line) before the no-life insurance cumulative does, and since the no-life insurance option has the lowest outcome of the two options, neither of the two options dominates the other by second degree stochastic dominance. Thus, for a constant risk averse individual, there exists a breakeven risk coefficient such that life insurance is preferred at higher coefficient values and no life insurance is preferred at lower coefficient values (Hammond). Since neither option dominates the other by second degree stochastic dominance, that breakeven coefficient must be greater than zero. It can be computed by increasing r , Pratt's risk coefficient, starting with a value of zero and computing the expected utility of each funding option. At first the expected utility of no life insurance will be greater than life insurance, but after a critical value of r , the expected utility of life insurance will be greater than no-life insurance. That procedure was used here using MathCad as modeling software.

Results

Results are dependent upon the probability of death (age of insured), the insurance markup, and the percentage increase or decrease in the state dependent risk aversion of the purchasing partner. Results for two insured ages, 40 years old and 60 years old, for a \$1 dollar business purchase are illustrated in Tables 2 and 3. These are the ages of the

Table 2: Risk Aversion Coefficients Necessary for Various Percentages of Life Insurance Funding of Buy-Sell Arrangements, \$1 Business Purchase, **Age 40 Insured**

Percent of Life Insurance	Markup of Premium in Percent		
	10	25	100
No State Dependent Utility			
25	0.109	0.255	0.793
50	0.128	0.297	0.915
75	0.152	0.353	1.070
100	0.188	0.432	1.260
State Dependent Utility (10 % more risk averse after death of partner)			
25	0.0000	0.133	0.623
50	0.0000	0.155	0.719
75	0.0003	0.185	0.844
100	0.0003	0.228	1.000
State Dependent Utility (10 % less risk averse after death of partner)			
25	0.255	0.417	1.014
50	0.297	0.485	1.169
75	0.353	0.574	1.362
100	0.433	0.695	1.594

insured or the potentially deceased partner, while the surviving partner can be any age.

Results were also computed for a 20-year old insured, but since those results are essentially identical to the results for the 40-year old insured they are not shown. Three markups (loadings) from actuarially fair premiums are reported, 10 percent, 25 percent, and 100 percent. Finally, results are generated for 4 different proportions of life insurance funding of the buy-sell arrangement, 25 percent, 50 percent, 75 percent, and 100 percent. Since the results are reported for a \$1 business purchase, the risk aversion coefficients applicable for the decision-maker would have to be divided by the actual dollar business purchase. Alternatively, the risk aversion coefficient can be interpreted as relative risk aversion coefficients.

Table 3: Risk Aversion Coefficients Necessary for Various Percentages of Life Insurance Funding of Buy-Sell Arrangements, \$1 Business Purchase, **Age 60 Insured**

Percent of Life Insurance	Markup of Premium in Percent		
	10	25	100
No State Dependent Utility			
25	0.110	0.259	0.806
50	0.129	0.301	0.931
75	0.154	0.358	1.089
100	0.190	0.438	1.285
State Dependent Utility (10 % more risk averse after death of partner)			
25	0.0000	0.136	0.634
50	0.0000	0.159	0.733
75	0.0019	0.189	0.859
100	0.0024	0.233	1.020
State Dependent Utility (10 % less risk averse after death of partner)			
25	0.256	0.421	1.029
50	0.298	0.489	1.289
75	0.356	0.580	1.385
100	0.436	0.703	1.625

Breakeven risk aversion coefficients increase as the percent funding of life insurance increases, when insurance loadings increase, and when the insured becomes older. Yet, these coefficients are all below a value of one unless the loadings are 100 percent. Estimates of relative risk aversion coefficients have typically exceeded the value of one (Campbell, Palsson).

The results clearly show that if the markup from actuarially fair premiums is small, then anyone who is at all risk averse should probably fund the entire buy-sell arrangement with life insurance. That is especially the case if the surviving partner becomes 10 percent more risk averse upon the death of her partner. For instance, if the insured partner is 40 years old, and the insurance cost is 10 percent higher than actuarially fair premiums, then

any partner that is more risk averse than 0.188 should completely fund the buy-sell arrangement with life insurance. If he becomes more risk averse after the death of his partner by 10 percent, then any initial risk aversion greater than 0.0003 would suggest complete funding with life insurance. A 10 percent markup of actuarially fair premiums for a 40-year-old insured is an annual cost of \$2.10 per \$1,000 of life insurance (Table 1). Life insurance can be purchased for less than this amount. Even premium markups of 25 percent should not discourage the use of life insurance funding. However, higher risk aversion is necessary to prefer life insurance funding when the markup is 100 percent.

There is little difference in results between the 40-year-old insured and the 60-year-old insured except at the higher markup of 100 percent. With the older partner the surviving partner would have to be more risk averse since a 100 percent premium markup on a 60-year insured entails a significantly larger cost than if the insured was only 40 years old.

These results demonstrate that life insurance funding of buy-sell arrangements may be optimal for most closely held small businesses. Yet it is not common to find life insurance funding used. Part of the reason may be that many businesses simply do not have written buy-sell arrangements, indicating that these businesses have not implemented plans to handle the contingencies of the various co-owner exits. These exits are not considered imminent and therefore do not receive the attention of other problems facing the businesses. Even if buy-sell arrangements exist, life insurance may not be used because of cash-flow constraints. Meeting next week's payroll is more immediate than funding the business purchase from the heirs of your partner in 20 years.

Conclusions

For buy-sell arrangements written for the death of a co-owner life insurance is a funding option. The proceeds from the policy can be used to purchase a deceased co-owner's share of the business from the estate or the heirs. The decision to use life insurance funding was modeled as a risk decision using the expected utility theorem. State dependent utility was used since a surviving partner may become more (or less) risk averse upon the death of a partner.

Results show that life insurance funding is preferred at relatively low amounts of risk aversion, especially if the surviving partner becomes more risk averse after the partner's death. A lower percentage of life insurance would be used if the surviving partner becomes less risk averse upon the death of the partner, or if insurance premiums are marked up significantly above actuarially fair premiums, making insurance expensive. Given currently available insurance rates, most closely held small businesses probably should fund their buy-sell arrangements with life insurance.

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