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## Lost Profits Damages to New Businesses: Adjusting for Survival

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# Lost Profits Damages to New Businesses: Adjusting for Survival\*

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## **Abstract**

Survival risk of new businesses is a challenging issue to incorporate into lost profits analyses used in litigation, an issue some financial experts and courts ignore rather than consider explicitly. This paper considers several ways to make qualitative and quantitative adjustments for the survival rates of new businesses. The paper concludes firm-specific modeling of survival rates is the most appropriate way to weight future economic returns because it offers the best alternative in terms of fitting the analysis to the facts of the case and doing so in a credible and clear manner.

**KEYWORDS:** lost profits, survival, new businesses

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The likelihood of survival by a new business is an overarching factor in consideration of lost profits yet this topic has been largely unexplored. New businesses, historically considered “unestablished” businesses, previously were unable to recover lost profits or even lost value of the entire business due to the “new business rule”; namely, courts considered profit claims for such businesses speculative due to lack of operating history. Over time, legal standards for new business lost profits have moved away from the dichotomous new business rule to a standard based more on reasonable proof of damages. Still, lacking much if any operational history, especially profitable operations, means estimating damages for new businesses is still problematic for legal and economic reasons; moreover, evidence of future viability of the new business becomes an important factor.<sup>1</sup> This paper offers and evaluates four qualitative and quantitative ways to adjust lost profits damages for survival: (1) qualitative approaches using factor lists, including factors which may be associated with higher or lower cost of capital; (2) quantitative approaches which rely on survival averages of cohorts of new firms; (3) quantitative approaches which use survival averages of subgroups of firms in (2); and (4) quantitative survival adjustments using empirical studies of new firm survival and matched characteristics of the target business.

## Background

A new business can experience damages for several reasons, including breach of contract, business interruption due to a fire, flood, earthquake or other natural disaster, intellectual property infringement, death or injury to a “key” person, or other cause of actions and the courts have increasingly allowed lost profits as a part of damages to such businesses.<sup>2</sup> As several authors have noted, especially Dunn (2000) and Lloyd (2002) the current and developing standard used by courts puts the emphasis on *evidence* in consideration of reasonable certainty of lost profits by the new businesses. Included in this evidence are factors such as (1)-(3)

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<sup>1</sup>Courts generally accept two broad ways to assess lost profits: the before/after method and the yardstick method. The problems with the before/after method applied to new businesses are the before period may be insufficient to compare with the after period and/or the before period characterized by startup features like operating at a net loss. In this situation, Gaughan (2004) says the plaintiff damages expert is restricted to a yardstick approach (p.49). However, use of the yardstick method, in which the expert contrasts the target company’s profits with the business performance of comparable business (es) can be challenged in terms of how closely the target and comparison business match in terms of location, size, industry, product life cycle, competition, dates of financial records of each, and the likelihood of survival of each business. We prefer a third method which combines elements of each. Namely, the analyst makes a revenue forecast based on best evidence available (e.g. “revenue before”, or industry trend, or business plans), then computes profits using expense information from industry sources and/or business plans, then adjusts future profits for business survival using one of the methods described in this paper.

<sup>2</sup> Lloyd (2000). Also, see Gaughan (2004).

plaintiff's experience before and after the damaging event and plaintiff's experience at other locations; (4) lost customers; (6) defendant's experience; and (7) industry and economic factors, including the experience of others in the same industry, market, and location. Survival evidence is also needed.

### Qualitative Approaches

One way for the valuation consultant to "adjust" for new business survival is to list and analyze a number of factors which might reasonably bear on survival. This might include the seven factors listed above regarding the reasonable certainty of any profits. In addition, one might refer to components associated with specific risk factors in computing a risk adjusted cost of equity capital.<sup>3</sup> This list includes the following components:

Small Company	Management Depth
Access to Capital	Customer Concentration
Customer Pricing Leverage	Supplier Concentration
Supplier Pricing Leverage	Product or service diversification
Geographic distribution	Volatility of earnings or cash flow
Technology Life Cycle	Potential new customers
Life cycle of current products or services	Availability of labor

The list is suggestive and not all factors may apply to the target business. Also, there is some debate as to exactly how best to use this particular list. For instance, Hitchner and Vogt offer three suggestions in the context of cost of capital analysis: assign specific values to each component, score each as + or – or NA, or just provide a summary risk factor for the entire list.<sup>4</sup> Lloyd offers a similar list when discussing firm survival and also suggests consideration of cash flow, the quality of company records, the economic milieu in which the business operates, third- party information on the target company, and non-economic factors such as possible willingness of self-employed owners to accept lower than expected income due to possible advantages of self employment.<sup>5</sup>

Exactly how the damages expert makes qualitative adjustments for survival is case-specific. One possibility, that implied by Hitchner and Vogt (2005) involves an analysis leading to a greater (or lower) company-specific risk factor as a component in the cost of capital used to discount future lost profit damages;

<sup>3</sup> Hitchner and Vogt (2005).

<sup>4</sup> *Ibid.* 3-4.

<sup>5</sup> Lloyd, *loc cit.* pp. 10-11.

but that is not the only way to surface survival as a factor.<sup>6</sup> The point is the qualitative approach to survival adjustments for a new firm is largely a judgment call by the expert and sometimes the line between legal and economic views may not be that clearly defined. For these reasons it is important to consider quantitative adjustments to survival, especially methods which include some of the qualitative factors associated with survival of a new business.

### Quantitative Approaches

A number of articles address new firm survival and the impression one gets from these is most new businesses fail within a few years after start up, thus possibly reinforcing the traditional new business rule used by some courts that lost profits in such firms are indeed speculative. For instance,

- “An analysis of start-up ventures in a wide variety of industries found, for example, that more than 80% failed to achieve their market-share targets.”<sup>7</sup>
- In describing results of a national study conducted at the Bureau of Labor Statistics, the author observes “the data show, across sectors, 66 percent of new establishments were still in existence 2 years after their birth, and 44 percent were still in existence 4 years after.”<sup>8</sup>
- Six years after birth, two studies found nearly identical new firm survival rates after six years, 39.5% for Headd (2003)<sup>9</sup> and 39.8% for Phillips and Kirchhoff (1989)<sup>10</sup> even though they considered different data sources and different time periods.

An implication of this research for litigation involving lost profits or business value of a start up is to weight lost profits by average survival rates found in the studies above; this is a second approach to survival-adjusting lost

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<sup>6</sup> One of the authors was admonished by a judge in an arbitration hearing involving a new business for using the word “speculative”. The judge said “That word is the ultimate decision and the court’s not yours to use” to which the expert replied “OK, there was no business plan, less than a high school education by owner, a history of owner hospitalizations due to two recent heart attacks, 25% risk of failure for local firms in target industry, no operational history, no assets, no accounting records and yet opposing financial expert believes the firm will grow from no sales to \$3 million in 5 years and I do not find this credible”. The judge allowed use of this listing of factors and subsequently denied lost profits damages.

<sup>7</sup> Lovallo and (2003), p. 57-58. Note: the authors do not say when, how and where this analysis was conducted and if it was peer-reviewed. The impression given is the failures were due to exaggerated goals of executives in start up firms.

<sup>8</sup> Knaup (2005), p.51.

<sup>9</sup> Data source from U.S. Census Bureau’s Characteristics of Business Owners (CBO) and Business Tracking Series (BITS)

<sup>10</sup> Data source derived from United States Establishment Longitudinal Microdata (USELM) which in turn is from D&B’ “Dun’s Market Identifier: file (DMI).

profits for new businesses. Yet, is it appropriate to multiply economic returns by the *overall average* likelihood of survival to derive expected economic returns? To address this question calls for a more detailed analysis of each source.

- As noted, the Lovallo/Kahneman citation is vague regarding critical details and unlikely to be useful in making a quantitative adjustment to profits or value.
- On first impression the Knaup study suggests weights of 66% for 2 years and 44% for 4 years; however, closer examination of exits by year is worth considering:<sup>11</sup>

	2Q98	2Q99 Yr1	2Q00 Yr2	2Q01 Yr3	2Q02 Yr4
Surviving	212,812	172,379	139,543	115,194	94,116
Cumulative Exits	0	40,433	73,269	97,618	118,696
Percent of Total Exits	0.0%	34.1%	61.7%	82.2%	100.0%
Processed results from Knaup (2005).					

The main point is that *most exits take place within the first two years of start up*.<sup>12</sup> For instance, if a consultant is dealing with a firm that has been in existence for 3 years, then it would be incorrect to adjust profits using overall average survival rates like 39.5% or 44%, citing Headd or Knaup, respectively.

- *Growth has a strong impact on survival rates of start up firms* which suggests that the analysts investigate the growth of firms in litigation in valuing lost profits. Phillips and Kirchhoff found six year survival rates by growth as follows:

No Growth	Low Growth 1-4 added	Medium Growth 5-9	High Growth 10+	All Classes
27.5%	66.3%	75.5%	78.4%	39.8%

<sup>11</sup> Knaup, *op cit.* results processed from Table 3, p. 54.

<sup>12</sup> The result comes from data which includes dot.com bubble bursting and 9/11 both economic shocks. As such the result warrants further study but for now, based on similarity of Knaup's results compared to Headd and Phillips/Kirchhoff we believe it credible.

Again, virtually any growth means use of 39.8% survival rate is too much of an adjustment for measuring the survival-adjusted lost profits or business value of a new business.

- *Not all exits by start ups denote failure.* Headd found that 4 years after new firms began, only 33% had closed and were unsuccessful; 50% were surviving and 17% closed and were successful. The latter means the owner may have executed a planned exit strategy, closed without excess debt, sold a viable business, or simply retired from the work force.<sup>13</sup>

The main point is that summary averages on start up survival, a second way to adjust lost profits for survival, should be used cautiously if at all because such data include a variety of time profiles, growth rates and types of exits. The consultant basing an opinion on summary statistics should expect to be challenged on the basis of what may be mitigating factors surfaced by noting data subdivisions. a third adjustment method is consideration of survival subgroup averages, meaning survival matched to the target firm by time period, growth rate or type of exit; this is an improvement over use of summary average survival rates.

#### *Predicting Survival for the Individual Start Up Business*

In this section, we demonstrate a fourth way to adjust lost profits damages for new businesses; namely, we predict future survival rates for a new business using results from the Headd (2003) study. Using data from the U.S. Census Bureau's Characteristics of Business Owners (CBO), Headd examined the survival rate over the 1992 to 1996 period for firms that started between 1989 and 1992. This data set is very useful since it contains information on both the business as well as the owners. In addition, it covers most industries and had a response rate of about 60 percent in 1992. Specifically, Headd used a logit model, in which P is the probability of survival,

$$P = 1 / (1 + e^{-(bX)}) \quad (1)$$

to estimate  $b$  given values of a vector of characteristics of the firm,  $X$ . These characteristics include but are not limited to availability and amount of start up capital, industry, number of owners, owner's age, minority group status and if another firm was owned.

We use results from the Headd study to develop a predicted survival rate for a hypothetical startup firm, Ajax Inc., based on the characteristics of the firm and its owners. The characteristics of Ajax are that it had more than \$50,000 is

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<sup>13</sup> *Op cit.* p. 51.

start up capital, was in the services industry, urban location, with 7 owners, employer firm, the owners had at least a college degree, and owned another firm.

Table 1 shows the predicted survival rate for Ajax as well as for the average startup firm. To develop the predicted survival rate for Ajax, a predicted  $\Sigma XB$  is generated by multiplying the each coefficient for model 2 in the Headd study by the Ajax firm value and then summing these values. The  $\Sigma XB$  is converted into a predicted probability of survival (p) by using the following formula:  $p = e^{\Sigma XB} / (1 + e^{\Sigma XB})$ . The same process is used to generate a predicted survival rate for the average start-up firm based on the means for the CBO included in the Headd study.

A problem with the CBO data is the greater non-response rate among failing firms. To correct for this deficiency, we use information on survival in the U.S. Census Bureau's Business Information Tracking Series (BITS). BITS is a universe of 5.5 million employer firms every year. The predicted survival rates for Ajax, based on the CBO data, are scaled to the BITS survival rates.<sup>14</sup> Specifically, the Ajax survival rate was calculated by subtracting from 1.00 the scaled Ajax closure rate, which was calculated by multiplying the ratio of the predicted Ajax CBO closure rate to predicted average CBO startup closure rate (.107). The scaled survival rates are shown in Table 2.

Results in this case are that Ajax, Inc. had a much higher than average survival rate for each of the six years shown. For example, 4 years after "birth", the average firm survival rate is 49.6% vs. 93.5% for Ajax, Inc. nearly a 90% greater survival rate.<sup>15</sup> The damages expert who uses year-specific average survival rates without attention to firm-specific information may over or underestimate "but-for" economic gains. To understand this point, consider an example in which "but-for" economic returns for the business would have been \$10,000 per year for six years and further assume a 15% cost of capital. In Table 3 we show that by adjusting economic returns by average firm survival rates we find a present value of \$22,769 vs. \$36,237 using factors specific to Ajax Inc. a nearly 60% greater present value.<sup>16</sup>

<sup>14</sup> The BITS survival rates are from Headd (2003), Table 3.

<sup>15</sup> The higher survival rate for Ajax is the result of a variety of factors including having more than \$50,000 in start-up capital, being an employer firm, and 7 owners of the firm. If Ajax had no start-up capital and was not an employer firm, the 4 year survival rate would have been 70.1%. If in addition to no startup capital and not being an employer firm, Ajax had only 1 owner instead of 7 owners, the 4 year survival rate would fall to 47.5% (which is below the average for start-up firms).

<sup>16</sup> This particular example, which yields a result with survival higher than average, is based on data from an actual firm with name disguised for this article. Obviously, data from another firm might yield survival rates below national averages. Another point is that Headd offers two models and results in Table 1 are based on Headd's "model 2" in which parameter estimates were all significant statistically.

Table 1 Predicted Survival Rates for Average Startup Firm and Ajax, Inc. Using Characteristics of Business Owners Data <sup>1</sup>					
Variable	Beta <sup>2</sup>	Ajax Value	Average Firm Value <sup>2</sup>	Beta * Ajax Value	Beta * Average Firm Value
Intercept	0.37	1	1.00	0.370	0.370
No Start Up Capital	-0.38	0	0.31	0.000	-0.118
Start up Capital \$50,000+	0.55	1	0.07	0.550	0.039
Retail	-0.32	0	0.14	0.000	-0.045
Services	-0.21	1	0.46	-0.210	-0.097
Urban/Suburban	-0.17	1	0.78	-0.170	-0.133
Employer Firm	0.98	1	0.08	0.980	0.078
Home-Based	0.13	0	0.64	0.000	0.083
Number of Owners	0.13	7	1.17	0.910	0.152
Owner's Age <35	-0.37	0	0.30	0.000	-0.111
Bachelor's or greater	0.52	1	0.37	0.520	0.192
Start for Personal Reason	0.48	0	0.32	0.000	0.154
Owned Another Firm	0.31	1	0.22	0.310	0.068
ΣXB				3.260	0.634
Probability of Survival <sup>3</sup>				0.963	0.653
Probability of Closing				0.037	0.347
<sup>1</sup> Predictions are based on estimated survival models and data included in Headd (2003). <sup>2</sup> Based on model 2 of Headd (2003). <sup>3</sup> The probability of survival (p) is generated using the following formula: $p = e^{\Sigma XB} / (1 + e^{\Sigma XB})$ .					

Table 2		
Predicted Survival Rates for Ajax Inc. Scaled to Business Information Tracking Series		
Data		
	BITS Average Startup Firm <sup>1</sup>	Ajax Inc. Scaled to BITS Average Startup Firm <sup>2</sup>
1 Year	0.830	0.982
2 Years	0.660	0.964
3 Years	0.578	0.955
4 Years	0.496	0.946
5 Years	0.446	0.941
6 Years	0.395	0.935

<sup>1</sup> The even year survival rates are from Table 3 in Headd (2003). The odd year rates are interpolated.

<sup>2</sup> Ajax survival rate was calculated by subtracting from 1 the scaled Ajax closure rate, which was calculated by multiplying the ratio of the predicted Ajax CBO closure rate to predicted average CBO startup closure rate (.107).

### *Adjusting Lost Profits for Survival Rates*

There are several ways to adjust for lost profits damages for survival rates, including shortening the length of the loss period, weighting economic returns by the risk of survival and increasing the discount rate to account for survivor risk. In the example provided in Table 3, the firm has six prospective years of \$10,000 in economic returns. One possible correction would be to consider only those years in which the likelihood of survival is 50% or more. Using results based on national surveys such as those cited earlier by Knaup (2005) or Headd (2003), this means one would only consider three years of returns to a startup, a PV of about \$16,000 vs. \$22,769 in Table 3. This negative adjustment however may be too large or too small. To some analysts only counting three years of lost profits may be too severe since there is some positive likelihood of economic returns in future years, 4, 5 and 6 and the overall expected return not the expected return in any one year arguably may be more relevant. On the other hand, using the 50% or greater survival criteria and firm-specific survival rates would mean in our example, using results from Table 2, that one would use all six years of economic returns for Ajax Inc. without further adjustment; a result one could argue would be too generous.

A better way to adjust economic returns for survival than simply including all or some of the future years is to “model” or weight the economic returns for each future year by the likelihood of survival, an approach that is shown in Table

3. Within this “modeling” approach, we believe use of firm-specific factors and use of a predictive model based on a study such as Headd’s (2003) is the preferred way to make this adjustment.

	Year					
	1	2	3	4	5	6
"But-For" Economic Return	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
Average Startup Firm Survival Rates	83.0%	66.0%	57.8%	49.6%	44.6%	39.5%
Returns Weighted by Average Firm Survival Rates	\$ 8,300	\$ 6,600	\$ 5,780	\$ 4,960	\$ 4,460	\$ 3,950
Ajax Inc. Scaled Survival Rates	98.2%	96.4%	95.5%	94.6%	94.1%	93.5%
Returns Weighted by Ajax Survival Rates	\$ 9,819	\$ 9,637	\$ 9,550	\$ 9,463	\$ 9,409	\$ 9,355
Discount Factor ( $r=15\%$ )	0.8696	0.7561	0.6575	0.5718	0.4972	0.4323
PV of Average Firm Returns	\$ 7,217	\$ 4,991	\$ 3,800	\$ 2,836	\$ 2,217	\$ 1,708
PV of Ajax Inc Returns	\$ 8,538	\$ 7,287	\$ 6,279	\$ 5,410	\$ 4,678	\$ 4,044
Sum of PV of Average Firm	\$22,769					
Sum of PV of Ajax Inc.	\$36,237					

A third way to incorporate survival risk into the computation of economic profits of a new business is via a risk-adjusted discount rate. In either the build up method or the modified capital asset pricing model, a company-specific risk adjustment, so-called unsystematic risk, would suggest that a new business would have a greater discount rate than a firm that has been operational for several years, other things equal.<sup>17</sup> The problem is exactly how much weight to attribute to

<sup>17</sup> Pratt (2002), Chapters 8 and 9.

unsystematic risk and within this set of factors how much weight to give the fact of a business being new.

In Table 4, we show two ways to make an adjustment for survival risk, each resulting in the same PV of future economic returns, \$36,237. In both scenarios, unadjusted returns are \$10,000 for 6 years. In the first situation, we again assume a 15% cost of capital and weight returns by the firm-specific likelihood of survival each year. The result is a present value of future economic returns of \$36,237. In the second situation, we obtain the same \$36,237 by use of a 16.634% discount rate.<sup>18</sup> However, the fact that this equivalency is technically possible does not mean that the wide-spread practice of including survival rate adjustments within a discount rate via unsystematic risk is preferable. In this situation, we know that increasing the discount rate by 1.634 percentage points yields the same PV of future economic returns, but it is unlikely that the analysts would know this exact adjustment.

	Year					
	1	2	3	4	5	6
Economic Returns	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
Ajax Inc Survival Rates	98.2%	96.4%	95.5%	94.6%	94.1%	93.5%
Survival-Adjusted Returns	\$9,819	\$ 9,637	\$ 9,550	\$ 9,463	\$ 9,409	\$ 9,355
Discount Factor (r=15%)	0.8696	0.7561	0.6575	0.5718	0.4972	0.4323
Present Value of Survival-Adjusted Returns @ r=15%	\$ 8,538	\$ 7,287	\$ 6,279	\$ 5,410	\$ 4,678	\$ 4,044
Sum of PV	\$36,237					
PV of \$10,000/yr for 6 yrs @ r=16.6342%	\$36,237					

Important goals of the damages expert before a judge and jury are to be credible and clear. Discounting is already complex and explaining discounting in a lost profits testimony and dealing with what may appear to be esoteric issues such as how one interprets a list of company-specific risk factors into an additive component of a discount rate is always challenging to the expert witness and a

<sup>18</sup> See Dunn and Harry (2002).

rich opportunity for opposing counsel to challenge the expert: “Why this factor?” “Why this amount for that risk factor?” We believe a more credible and more transparent approach is to model the adjustment for survival rates using firm-specific attributes and clearly show year-by-year how these forecast survival rates are used to adjust future economic returns.

### Summary

Survival risk of new businesses is a challenging issue to incorporate into lost profits analyses used in litigation. While survival risk is generally known, the approaches up to now have been legal, e.g. not to consider the lost profits of any such firm (the “new business rule”) or, more recently an updated legal approach in which the basis for any lost profits of a new businesses depends on the evidence, including the likelihood of survival. Within this new approach, one way to incorporate survival risk is to include it in a litany of qualitative factors offered to the court as to the fact of any lost profits. Subsequently, if measurement of profits is an issue, many of the same qualitative factors may be used in deriving a risk-adjusted cost of capital but this is not the only way for the consultant to adjust for survival risk. Having considered several ways to make qualitative and quantitative adjustments for the survival rates of new businesses, we favor the latter approach. Within the various suggestions for quantitative adjustments for new business survival, we believe use of firm-specific modeling of survival rates is the most appropriate way to weight future economic returns because it offers the best alternative in terms of fitting the analysis to the facts of the case and doing so in a credible and clear manner.

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