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BUSINESS VALUATION UPDATE

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A Forgotten Statistical Concept Tells Why Your Multiple May Be Wrong

By Bob Dohmeyer, ASA, and Dr. Herbert Kierulff

In 1885, Sir Francis Galton published a breakthrough treatise entitled *Regression Toward Mediocrity in Hereditary Stature*. In it, he demonstrated that the children of very tall or very short people tended toward average over time. Galton interpreted this finding to mean that variations from average were due to the luck of the draw with respect to parents tempered by the skill of individuals in coping with their environment.

Galton's regression to the mean as explained by a combination of luck and skill apply to one of the most important theoretical and practical concepts in pricing small private businesses: economic rents (aka excess profits) tend to revert to a mean of zero over time. Unfortunately, many appraisers have missed the statistical and causal subtleties inherent in both luck and skill, adhering to conventional wisdom that says "companies with superior margins *deserve* a premium multiple." Conversely, inferior margins must deserve inferior multiples.

We show with data and logic that, counterintuitive as it may seem, the reverse is true. Placing high values on companies with superior margins acts to the detriment of valuations. In addition, we discuss other implications of the data on the valuation assignment.

What the data show. The best measure of excess rents is the implied CFROI of new investments to the WACC ratio. Our proxy for this statistic is the subject business margin relative to the median industry margin. Our data demonstrate that investors in small privately held businesses generally place lower multiples on companies with superior

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Personal Injury Cases: Opportunity for Appraisers?

By Stuart Weiss, CPA/ABV

Among the most interesting types of engagements for valuation experts are personal injury cases—but not because the math is all that challenging (it isn't). Rather, these cases test your ability to gather the right data and tell an easily understood story in a written report and on the witness stand. Of course, as with any new area of practice, you need to educate yourself in that area and examine its nuances.

Overview. Personal injury cases typically involve three types of damages: lost earnings, medical expenses, and lost household services. Lost earnings include past loss of earnings, that is, earnings lost from the date of the incident to the

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date of the trial or settlement, and future loss of earnings, or earnings lost from the date of trial or settlement to the end of the plaintiff's preaccident work life expectancy, discounted to the present value. Mitigating earnings are past and future earnings that an individual can achieve based on the individual's health, age, experience, and other factors.

In a case I worked on recently, the plaintiff was an injured police officer whose biggest loss wasn't future wages but the loss of retirement benefits. These are extremely generous in Oregon and increase rapidly with years of service.

To estimate future loss of earnings, you need to estimate work life expectancy, which is the number of years the plaintiff could have expected to work but for the loss event. The U.S. Department of Labor, Bureau of Labor Statistics publishes a commonly cited work life table. The discount rate to bring future cash flows into the present is a risk-free rate, using U.S. government securities. The period of loss determines the maturity of the bond that you use as a guide.

Mitigating earnings are deducted from lost earnings calculations. A vocational expert report is strongly advised for subjects who are totally or partially disabled. Once a base wage for mitigating earnings is established, wage growth, fringe benefits, and work life expectancy are determined and future mitigating earnings are discounted to present value.

Past medical expenses are fairly easy to collect. The hard part is determining future medical expenses. For this, you need a medical expert to estimate future medical needs and a medical cost consultant to estimate the current cost of such treatment. You can estimate the growth of such costs by using the Medical Care Price Index found in the Economic Report of the President. Again, the discount rate should be a risk-free rate.

The plaintiff is also entitled to recover the cost of past and future household services that can no longer be performed due to the incident. Household services include such functions as cooking, cleaning, auto repair, and gardening.

An expert comments. At the annual NACVA conference this past June, James Koerber, CPA/ABV, CVA, CFE, CFF (The Koerber Co., P.A.), gave an excellent presentation on the subject of personal injury and how valuation experts can get involved as consultants. I had the chance to speak with him recently.

Stuart Weiss: What are the main differences between a business lost profits analysis and personal injury or wrongful death engagements?

James Koerber: A business lost profits analysis might be related to a breach of contract, and there are a lot of guides out there. With personal injury and wrongful death, a lot of it is driven by case law, which is very state-specific. What you do in Mississippi may not apply to Alabama or Georgia. You've got to be very careful about that.

SW: Since you're not an attorney, and I don't mean that disrespectfully, every jurisdiction has different laws. Do you let the attorney guide you?

JK: I do talk to the attorneys and ask whether any cases might affect my opinion. But we also read publications. The *Journal of Forensic Economics* produces articles on just about every state on how to handle personal injury and wrongful death economic damage calculations.

SW: How is the market for this type of work?

JK: If you do good work, the attorneys will know about you. We work for both plaintiffs and defense lawyers.

SW: Economists versus CPAs. Does it matter what your background is?

JK: No. An attorney once told me that the reason he hired college professors is because they were good teachers. If you're qualified to do the work, it doesn't matter whether you're a college economics professor or a CPA. As long as you can understand issues regarding discount rates and growth rates and comply with the facts and circumstances of the case as well as case law of the particular state, you can make those calculations.

SW: Do you consider income taxes in your analysis?

JK: I can't tell you that the case law in Mississippi is the same as in Oregon. But, in Mississippi, you do deduct taxes when projecting income. You want to put the person in the same position as before the accident. If you don't deduct taxes, then you're overcompensating the person. However, if case law says you don't deduct it at all, then you have to abide by that state's case law. Per Internal Revenue Code Section 104, the awards related to a personal injury or wrongful death are always tax-free—unless it's punitive damages, which we don't calculate.

SW: Many times, people have medical expenses, but they're covered by insurance. How do you deal with that?

JK: In many states, under the Collateral Source rule, you can't bring it up in court. If a person is hurt who has disability insurance, you can't bring it up in court to the jury. If there's an injury, and an insurance company has paid benefits, then it will want to be compensated for any expenses it had to pay that may have been awarded for personal injury or wrongful death. But you don't include insurance coverage of any kind.

SW: For the discount rate, why do you use the risk-free rate?

JK: The argument is that, but for the accident, you would have earned this money. You shouldn't be put in a position where you have to have a risky investment. Most states allow you to use U.S. Treasury rates. However, some states, such as Georgia, have specific rates as determined by the legislature.

SW: Do you work with a vocational expert to analyze future earnings and a life-care planner to estimate future medical costs?

JK: The vocational expert is helping you to determine whether the person can return to work

and when and how much they can earn. The life-care planner will tell you about the future medical needs including medical services such as doctors, hospitals, and medical equipment such as wheel chairs or special vehicles.

SW: If you got a call from Joan Rivers's attorney, what are some of the factors that you would look at?

JK: You'd still have to look at work life tables. And someone who is 81 has only a few years left. To project it any further would just be speculation.

Example. During his NACVA session, Koerber went through an example of a personal injury damages calculation. John Doe was 46 years old when he was injured in a car accident. He had a high school diploma and some technical training as an electrician. He was employed by XYZ Corp. for six years and had just been promoted to maintenance supervisor. The year before the accident, he earned $87,362 in total wages. It was determined by examining his W-2s going back 10 years that his average wage growth was 2.83%. Fringe benefits of 21.1% were added, including Mr. Doe's medical, dental, vision, long-term disability, and accidental death insurance plus the employer contribution to his retirement plan.

Work life expectancy was determined to be 16.35 years using the U.S. Department of Labor Bureau of Labor Statistics Work Life Estimates

Exhibit 1. John Doe Loss of Earnings

General Information	
Age at Injury Date:	46
Work-Life Expectancy:	16.35
Base Wage:	$87,362
Earnings Growth Rate:	2.83%

Year	Age	Annual Wage [1]		Income Taxes 14.78%	Payroll Taxes 7.65%	Fringe Benefits 21.10%	Available For Support	Discount Rate 1.19%	Present Value	Cumulative Present Value
Past Loss:										
1	47	$89,834		$(13,282)	$(6,872)	$18,955	$88,635	1.000	$88,635	$88,635
Future Loss:										
2	48	92,377		(13,657)	(7,067)	19,491	91,144	0.988	90,069	$90,069
3	49	94,991		(14,044)	(7,267)	20,043	93,723	0.977	91,525	181,593
4	50	97,679		(14,441)	(7,472)	20,610	96,376	0.965	93,005	274,598
5	51	100,443		(14,850)	(7,684)	21,194	99,103	0.954	94,509	369,107
6	52	103,286		(15,270)	(7,901)	21,793	101,908	0.942	96,037	465,143
7	53	106,209		(15,703)	(8,125)	22,410	104,792	0.931	97,589	562,733
8	54	109,215		(16,147)	(8,355)	23,044	107,757	0.920	99,167	661,900
9	55	112,306		(16,604)	(8,591)	23,696	110,807	0.909	100,771	762,671
10	56	115,484		(17,074)	(8,835)	24,367	113,943	0.899	102,400	865,071
11	57	118,752		(17,557)	(9,085)	25,057	117,167	0.888	104,056	969,127
12	58	122,113		(18,054)	(9,342)	25,766	120,483	0.878	105,738	1,074,865
13	59	125,568		(18,565)	(9,606)	26,495	123,893	0.867	107,448	1,182,313
14	60	129,122		(19,090)	(9,878)	27,245	127,399	0.857	109,185	1,291,499
15	61	132,776		(19,630)	(10,157)	28,016	131,004	0.847	110,951	1,402,449
16	62	136,534		(20,186)	(10,445)	28,809	134,712	0.837	112,745	1,515,194
16.35	62	48,260	[2]	(7,135)	(3,692)	10,183	47,616	0.833	39,686	$1,554,880
		$1,834,949		$(271,289)	$(140,374)	$387,174	$1,810,460		$1,643,516	
									Past Loss	**$88,635**
									Future Loss	**1,554,880**
									Total Loss	**$1,643,515**

(1) Adjusted for real wage growth by multiplying the beginning annual wage by one plus the earnings growth rate of 2.83%.
(2) The projected annual wage of $136,534 times portion of the year, or 0.35, equals $47,787, times one plus wage growth adjusted for the portion of the year, or 0.99 percent (2.83% x 0.35).
(Source: The Koerber Company, P.A.)

as well as other studies. The combined federal and state income tax rate (average, not marginal) was calculated at 14.78%, while the payroll tax rate was 7.65% for Social Security (6.2%) and Medicare (1.45%). A discount rate was determined to be 1.19%.

Exhibit 2. John Doe Loss of Household Services

General Information	
Age at Injury Date:	46
Full Function Life Expectancy:	16.35
Hourly Cost	$7.25
Earnings Growth Rate:	2.83%
Discount Rate:	1.19%

Year	Age	Hourly Cost [1]	Hours Per Year	Value of Household Services	Discount Factor 1.19%	Present Value	Cumulative Present Value
Past Loss:							
1	47	$7.25	734	$5,322	1.00000	$5,322	$5,322
Future Loss:							
2	48	7.46	734	5,472	0.98820	5,408	$5,408
3	49	7.67	734	5,627	0.97654	5,495	10,903
4	50	7.88	734	5,786	0.96502	5,584	16,486
5	51	8.11	734	5,950	0.95364	5,674	22,160
6	52	8.34	734	6,118	0.94239	5,766	27,926
7	53	8.57	734	6,291	0.93127	5,859	33,785
8	54	8.81	734	6,470	0.92029	5,954	39,739
9	55	9.06	734	6,653	0.90943	6,050	45,789
10	56	9.32	734	6,841	0.89870	6,148	51,937
11	57	9.58	734	7,034	0.88810	6,247	58,185
12	58	9.85	734	7,234	0.87762	6,348	64,533
13	59	10.13	734	7,438	0.86727	6,451	70,984
14	60	10.42	734	7,649	0.85704	6,555	77,539
15	61	10.72	734	7,865	0.84693	6,661	84,200
16	62	11.02	734	8,088	0.83693	6,769	90,969
17	63	11.33	734	8,317	0.82706	6,878	97,848
18	64	11.65	734	8,552	0.81730	6,990	104,837
19	65	11.98	734	8,794	0.80766	7,103	111,940
20	66	12.32	734	9,043	0.79813	7,217	119,157
21	67	12.67	734	9,299	0.78872	7,334	126,492
22	68	13.03	734	9,562	0.77941	7,453	133,944
23	69	13.40	734	9,833	0.77022	7,573	141,518
24	70	13.78	734	10,111	0.76113	7,696	149,213
25	71	14.16	734	10,397	0.75215	7,820	157,034
26	72	14.57	734	10,691	0.74328	7,947	164,980
27	73	14.98	734	10,994	0.73451	8,075	173,055
28	74	15.40	734	11,305	0.72584	8,206	181,261
28.66	74	15.69 [2]	484 [3]	7,601	0.72018	5,474	$186,735
				$230,336		$192,056	
						Past Loss	$5,322
						Future Loss	186,735
						Total Loss	$192,056

(1) Adjusted for real wage growth by multiplying the beginning hourly wage by one plus the earnings growth rate of 2.83%.
(2) The projected hourly wage of $15.40 times one plus wage growth adjusted for the portion of the year, or 1.87% (2.83% x 0.66).
(3) Adjusted for the portion of the year, or 484 hours (734 hours x 0.66).
(Source: The Koerber Company, P.A.)

Exhibit 3. John Doe Medical Expenses

General Information	
Age at Injury Date:	46
Life Expectancy:	32.20
Annual Cost	$145,426 (1)
Medical Care Growth Rate:	3.91%
Discount Rate:	1.19%

Year	Age	Annual Cost (4)		Discount Factor 1.19%		Present Value	Cumulative Present Value
Past Loss:							
1	46	$987,542	(2)	1.00000		$987,542	$987,542
Future Loss:							
2	47	4,676	(3)	1.00000	(6)	4,676	$4,676
2	47	145,426		1.00000	(6)	145,426	150,102
3	48	151,112		0.98820		149,329	299,431
4	49	157,021		0.97654		153,338	452,769
5	50	163,160		0.96502		157,453	610,223
6	51	169,540		0.95364		161,680	771,902
7	52	176,169		0.94239		166,020	937,922
8	53	183,057		0.93127		170,476	1,108,398
9	54	190,214		0.92029		175,052	1,283,449
10	55	197,652		0.90943		179,750	1,463,199
11	56	205,380		0.89870		184,575	1,647,774
12	57	213,410		0.88810		189,529	1,837,304
13	58	221,755		0.87762		194,616	2,031,920
14	59	230,425		0.86727		199,840	2,231,760
15	60	239,435		0.85704		205,204	2,436,965
16	61	248,797		0.84693		210,712	2,647,677
17	62	258,525		0.83693		216,368	2,864,045
18	63	268,633		0.82706		222,176	3,086,221
19	64	279,137		0.81730		228,139	3,314,360
20	65	290,051		0.80766		234,263	3,548,623
21	66	301,392		0.79813		240,551	3,789,174
22	67	313,176		0.78872		247,008	4,036,182
23	68	325,422		0.77941		253,638	4,289,819
24	69	338,146		0.77022		260,446	4,550,265
25	70	351,367		0.76113		267,436	4,817,701
26	71	365,105		0.75215		274,615	5,092,316
27	72	379,381		0.74328		281,986	5,374,302
28	73	394,215		0.73451		289,555	5,663,857
29	74	409,629		0.72584		297,327	5,961,184
30	75	425,645		0.71728		305,308	6,266,491
31	76	442,288		0.70882		313,503	6,579,994
32	77	459,581		0.70046		321,917	6,901,911
32.20	77	92,635	(5)	0.69880		64,733	$6,966,645
		$9,579,098				$7,954,187	
						Past Loss	**$987,542**
						Future Loss	**6,966,645**
						Total Loss	**$7,954,187**

(1) Estimated annual medical cost of living at home, per the Preliminary Life Care Plan Vocational Rehabilitation Evaluation of John Doe prepared by Life Care Planner, MS, CRC, CCM; as of February 6, 2012.
(2) Per itemization of medical expenses provided by plaintiff's attorney.
(3) Represents an initial one-time fixed expenses of living at home.
(4) Adjusted for medical care growth rate by multiplying the beginning annual cost by one plus the medical care growth rate of 3.91%.
(5) The projected annual cost of $459,581 times portion of the year, or 0.20, equals $91,916, times one plus the medical care growth rate adjusted for the portion of the year, or 0.78% (3.91% x 0.20).
(6) Assumed payments are received at the beginning of the year. Therefore, no discounting in the initial year of the future medical expense projection.
(Source: The Koerber Company, P.A.)

To calculate lost earnings, an Excel spreadsheet is set up to arrive at a loss of $1,643,515 (see Exhibit 1).

A similar calculation arrives at the value of lost household services as $192,056 (see Exhibit 2).

Past medical expenses totaled $987,542 (see Exhibit 3). Current medical expenses were estimated from a life-care planner. Those expenses are projected forward by 32.2 years, using a life expectancy table for males aged 46. A growth rate of 3.91% was used for future medical costs and comes from the Bureau of Labor Statistics. The present value of future medical expenses was $6,966,645. Total medical expenses were estimated to be $7,954,187.

Note that medical insurance benefits are not counted due to the Collateral Source Doctrine, which states that, in a personal injury action, evidence that the plaintiff's medical bills were paid by insurance is not admissible. Some states have modified the rule on the grounds that it is unfair to allow an award of damages if the plaintiff has already been compensated.

Exhibit 4. John Doe Summary of Damage Calculations		
Lost Earnings:		
Past Loss of Earnings	$88,635	(1)
Present Value of Future Loss of Earnings	1,554,880	(1)
Total Lost Earnings	1,643,515	
Medical Expenses:		
Past Medical Expenses	987,542	(2)
Present Value of Future Medical Expenses	6,966,645	(2)
Total Medical Expenses	7,954,187	
Household Services:		
Past Loss of Household Services	5,322	(3)
Present Value of Future Loss of Household Services	186,735	(3)
Total Household Services	192,056	
Total Economic Damages	**$9,789,758**	
ROUNDED	**$9,790,000**	

(1) See Exhibit 1.
(2) See Exhibit 3.
(3) See Exhibit 2.
(Source: The Koerber Company, P.A.)

Adding lost earnings of $1,643,515 and lost household services of $192,056 arrives at total economic damages of $9,789,758 or $9,790,000 rounded (see Exhibit 4).

Your task will be to write a report in plain English and possibly explain on the witness stand why the plaintiff's injury results in compensatory damages of nearly $10 million.

Final point. Although expanding your practice into personal injury cases is certainly feasible, you need to realize that you may come up against experts who do nothing but this type of work—and have been doing it for years. While the work may appear straightforward, there are always nuances in every area of practice. Therefore, make sure you are fully up to speed before you jump into this type of assignment. Another good idea is to find a mentor who can help you in the beginning.

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Forgotten Statistical Concept

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margins than companies with less-than-satisfactory margins. The data consist of all BIZCOMPS data in the size range of $500,000 to $5 million for every SIC code that had 50 comparables or more in the specified size range (19 qualifying SIC codes making up 2,152 transaction comparables).

For each comp within each SIC code, we calculated a margin performance ratio of the individual comparable's seller's discretionary earnings (SDE) margin and divided by the median margin of the other comps in that SIC code.[1] For example, if the comp had a 40% SDE margin and the median margin in its SIC code was 20%, then its margin performance ratio would be 2.0.

We then calculated the industry median SDE multiple for all 19 industries and used this to calculate every actual SDE multiple divided by the industry median multiple. Finally, we sorted all 2,152 comps by the margin performance ratio from worst to best (from left to right in Exhibit 1) and calculated a 50-point moving median of the price-to-SDE multiple and the margin performance ratio.

Exhibit 1 shows the clear relationship of margin performance and price to SDE. However, the data are heavily skewed at the low end of the margin scale, which needs to be explained. In Exhibit 2, we show one of the 19 industry groups (Property Management, 6531) on a price-to-sales basis.

If our subject has normal margins (1.0 on the x axis), the central tendency would be about 0.4X sales. With a tripling of the margin to 3.0 on the x axis, the central tendency would be approximately 0.95X sales. Notice with a tripling of profit margin (1.0 to 3.0) the estimated price only increases by about 2.37X. In other words, the price-to-SDE multiple is about 21% less at the highest margins compared to the normal margin (consistent with the mean reverting margin discussion above).

1 We excluded negative and below 1% SDE margins.