STRATEGIC COST STRUCTURE CHOICE IN SERVICE ORGANIZATIONS: THE CASE OF THE TRANSPORTATION INDUSTRY

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Executive Summary

Two successful companies in the transportation sector, J.B. Hunt Transport Services, Inc. (Hunt) and Landstar System, Inc. (Landstar) made different strategic cost structure choices. Hunt and Landstar are compared over 1996-2004 to illustrates the risk-return trade-off from different cost structures. The analysis presented in this article shows the expected potential for higher returns but at the cost of higher operating income volatility (risk) that is evident from the results of the higher fixed cost and lower variable cost structure of Hunt in comparison with Landstar. The implications of cost structure choice on cost management systems preferences are also considered.

INTRODUCTION

The indirect costs of manufacturing companies and nonmanufacturing companies have steadily grown over the latter years of the twentieth century and into the twenty-first century. Product complexity and variety has increased for manufacturing companies (e.g., automobile manufacturing) and service organizations (e.g., banks) that require greater support resources. Also, the growing implementation of technologically advanced equipment in many organizations has increased indirect fixed costs (e.g., depreciation) while reducing variable running costs (e.g., direct labor and power).

The increasing indirect costs of organizations along with increased global competition and other factors has led to the development of strategic cost management models, such as activity-based costing, to provide better cost information to managers. In particular, services organizations need good cost management information, "(b)ecause virtually all their operating expenses are fixed once resource supply has been committed" (Kaplan and Cooper, 1998, 229). However, at least to some extent, service organizations can select the cost structure (the combination of fixed and variable costs) that best fits their strategic direction. This will be illustrated by two leading companies in the transportation industry, J.B. Hunt Transport Services, Inc., (Hunt) and Landstar System, Inc. (Landstar).

COST STRUCTURE CHOICE

The truck-load market in which Hunt and Landstar operate is highly competitive and very fragmented, consisting of thousands of carriers with many that are very small (Hunt, 2003, 8; Landstar, 2004, 7). Both companies were recognized as being among the 2005 400 best big companies in America by Forbes (Fahey, 2005, 156). In terms of one of the financial criteria, the five-year annual percentage return to shareholders, Landstar was the highest ranked transportation company at number 15 and Hunt was the second highest ranked transportation company at number 25 (Forbes, 2005). However, these two successful trucking transportation companies have adopted very different strategic approaches to their cost structure, which will be examined next.

Landstar's Cost Structure

Landstar is a large North American trucking transportation company with operating revenues of $2.0 billion in 2004 but it is non-asset based using exclusively third party capacity providers and independent commission sales agents (Landstar 2005b). In fact, Landstar's management is of the opinion that their company has the largest number of both commissioned sales agents and truckload Independent Contactors in the USA (Landstar 2005b, 4-5). The use of company-owned/leased tractors and company-employed drivers were gradually phased out several years ago in the two operating subsidiaries that used them. On August 22, 1998, an operating subsidiary, Landstar Poole, sold the last company-owned tractors, some operating assets and the business itself, and the financial results of this operating segment were reported from discontinued operations in Landstar's financial statements (Landstar, 1999, 5). Landstar operates in three reportable business segments (2004 total operating revenues): carrier ($1.455 billion), multimodal ($0.535 billion), and insurance ($0.031 billion, including $0.001 billion of investment income) (Landstar 2005b, 43). The exclusive use of independent contractors and other third party truck capacity providers in the carrier and multimodal segments, plus railroad and air freight in the latter segment too, results in a major part of Landstar's operating costs varying directly with revenue (Landstar 2005b, 3-4). For example, at the end of 2004, Landstar's carrier segment had 7,466 independent contractors (providing 8,291 tractors), over 18,000 qualified other third party tractor and trailer capacity providers, and 14,220 trailers that are mainly provided by independent contractors or are rented with payments based on the revenue earned by the trailer (Landstar, 2005b, 3). Landstar's strategy of using "Independent Contractors and other third party capacity providers enables the carrier segment to utilize a large fleet of revenue equipment while minimizing capital investment and fixed costs, thereby enhancing return on investment" (Landstar 2005b, 3). Unlike most of its competitors, Landstar deliberately operates with a high variable cost, low fixed cost structure, which is the result of its flexible business model (Landstar 2002, 9). Landstar's operating companies are all ISO 9000:2000 certified (Landstar 2005a, 2).

Hunt's Cost Structure.

Hunt also is a large North American trucking transportation and logistics company with operating revenues of $2.8 billion in 2004 (Hunt 2005). Hunt operates in three separate but complementary business segments (2004 total operating revenues): full truck-load, dry van ($0.928 billion), intermodal ($1.115), and dedicated contract services (0.760 billion), including inter-segment amounts that total $0.017 billion (Hunt 2005). Also, Hunt partly owns (37 percent in 2003) an associated logistics business company, Transplace, Inc., along with five other transportation companies (Hunt 2003, 5). Hunt predominantly uses company owned tractors driven by employees, which results in a higher fixed operating cost structure than Landstar. However, Hunt incurs the variable cost of fuel and fuel taxes, which is entirely borne by independent contractors and other third party capacity providers in the case of Landstar. At the end of 2004, Hunt owned 10,151 tractors and 48,317 trailers/containers and used 1,301 tractors provided by independent contractors who operate for the full truck-load, dry van (1,113) and dedicated contract services (188) segments (see Exhibit 1). Of course, the part of the operating costs that is fixed in the

short-run represents the cost of resources supplied and not the cost of resources used to provide the trucking services (see Kaplan and Cooper, 1998, 111-136, and Dhavale, 1998a; 1998b). This may result in unused trucking capacity for Hunt, which would be of less significance for Landstar that owns no tractors and a relatively small number of trailers (4,334, 30.4 percent, at the end of 2004) only (Landstar, 2005b, 3, percentage added).

Exhibit 1. Selected Hunt Operating Data[a]

Years Ended Dec. 31:	2004[b]	2003	2002	2001	2000	1999
Total Loads:	2,841,281	2,857,176	2,847,377	2,565,915	2,697,582	2,769,834
Company-Owned Tractors at Year End:	10,151	9,932	10,653	10,770	10,649	9,460
Independent Contractors Tractors at Year End:[c]	1,301	994	679	336	16	0
Trailers/Containers at Year End:	48,317	46,747	45,759	44,318	44,330	39,465

a Data obtained from Hunt (2003).
b Data obtained from Hunt (2005).
c In addition, there were a small number of tractors that were operated by Hunt but owned by customers; e.g., 178 in 2004 and 152 in 2003 (per source in b above).

Cost Structure Comparison

The differences between Hunt's and Landstar's cost structure are illustrated by comparing the operating expenses in their Consolidated Statement of Earnings for 2003 and 2004, which are shown side by side in Exhibit 2 and 3. Some expense items are reported by one company only as indicated in the Exhibits and it is assumed or can be determined that the other company has no equivalent expense item or only a relatively small amount of expenses in this category that are included with other expenses in a different line item. For example, Hunt reports "rents and purchased transportation" whereas Landstar reports "purchased transportation" as the equivalent line item. Landstar includes "trailing equipment rent" in "other operating costs" and "rent expense" is included in SG&A costs (Landstar 2004, 14). Hunt reports "communications and utilities" as a separate line item but Landstar's "communications costs" (and possibly utilities) is included in SG&A expense (Landstar 2004, 14). Also, some other line items that have different but similar descriptions in each company's consolidated statement of earnings are reported side by side in Exhibits 2 and 3 because the descriptions are judged to be sufficiently analogous.

Exhibit 2. 2003 Consolidated Statement of Earnings for Hunt and Landstar

	2003 Hunt[a]		2003 Landstar[b]	
	$ Millions	%	$ Millions	%
Operating revenues[e]/Revenue[f]	2,433.5	100.0	1,596.6	99.9
Investment income[c]	----------	-------	1.2	0.1
Total Operating Revenues	2,433.5	100.0	1,597.8	100.0
Salaries, wages & employee benefits[d]	791.8	32.5	-------	----
Commissions to agents[c]	-------	------	126.0	7.9
Rents & purchased transportation[e]/ Purchased transportation[f]	799.2	32.8	1,185.0	74.2
Fuel and fuel taxes[d]	232.4	9.6	------	-----
Depreciation & amortization	150.2	6.2	12.7	0.8
Operating supplies & expenses[e]/Other operating costs[f]	119.3	4.9	37.7	2.4
Insurance & claims	63.5	2.6	45.7	2.9
Operating taxes and licenses[d]	33.2	1.4	------	----
G&A expenses, net of gains[e]/SG&A[f]	34.8	1.4	105.9	6.6
Communication & utilities[d]	23.5	1.0	------	----
Total operating expenses	2,247.9	92.4	1,513.0	94.7
Operating income	185.6	7.6	84.8	5.3

a Per Hunt's 2003 Consolidated Statement of Income, Year Ended December 31, 2003 (Hunt 2003).

b Per Landstar's 2003 Consolidated Statement of Income, Fiscal Year Ended December 27, 2003 (Landstar, 2004).

c Items shown in Landstar's Consolidated Statement of Earnings only

d Items shown in Hunt's Consolidated Statement of Earnings only

e This is Hunt's description for the line item, which is assumed be analogous to Landstar's description (see f below).

f This is Landstar's description for the line item, which is assumed to be analogous to Hunt's description (see e above).

Exhibit 3. 2004 Consolidated Statement of Earnings for Hunt and Landstar

	2004 Hunt[a] $ Millions	%	2004 Landstar[b] $ Millions	%
Operating revenues[e]/Revenue[f]	2,786.2	100.0	2,019.9	99.9
Investment income[c]	----------	------	1.4	0.01
Total Operating Revenues	2,786.2	100.0	2,021.3	100.0
Salaries, wages & employee benefits[d]	830.0	29.8	-------	----
Commissions to agents[c]	-------	------	161.0	8.0
Rents & purchased transportation[e]/ Purchased transportation[f]	932.1	33.5	1,511	74.7
Fuel and fuel taxes[d]	288.6	10.4	-------	----
Depreciation & amortization	149.8	5.4	14.0	0.7
Operating supplies & expenses[e]/Other operating costs[f]	124.2	4.4	37.1	1.8
Insurance & claims	54.8	2.0	60.3	3.0
Operating taxes and licenses[d]	35.0	1.2	-------	----
G&A expenses, net of gains[e]/SG&A[f]	38.5	1.4	118.5	5.9
Communication & utilities[d]	23.0	0.8	-------	----
Total operating expenses	2,476.0	88.9	1,901.9	94.1
Operating income	310.2	11.1	119.4	5.9

a Per Hunt (2005).

b Per Landstar's 2004 Consolidated Statement of Income, Fiscal Year Ended December 25, 2004 (Landstar 2005b).

c Items shown in Landstar's Consolidated Statement of Earnings only

d Items shown in Hunt's Consolidated Statement of Earnings only

e This is Hunt's description for the line item, which is assumed be analogous to Landstar's description (see f below).

f This is Landstar's description for the line item, which is assumed to be analogous to Hunt's description (see e above).

In Exhibits 2 and 3, Landstar's predominantly variable cost structure is illustrated by the absence of the line item "salaries, wages and employee benefits," the low depreciation and amortization" costs (0.8 [0.7] percent of total operating revenues [TOR] in 2003[2004]) and the presence of "commissions to agents" (7.9 [8.0] percent of TOR) and significant "purchased transportation costs" (74.2 [74.7] percent of TOR). In 2003, Landstar's "(e)mployee compensation and benefits account for over half of the Company's selling, general and administrative expense," which therefore would be in excess of 3.3 percent of TOR (Landstar 2004, 14), but this is significantly less than Hunt's "salaries, wages and employee benefits" that are 32.5 percent of TOR in the same year. However, the absence of unionization (Hunt 2004, 7) presumably would allow Hunt management some degree of control over the variability of the "salaries, wages and employee benefits" costs. Hunt incurs the significant variable cost of "fuel and fuel taxes" (9.6 [10.4] percent of TOR in 2003 [2004]).

In Exhibits 2 and 3, the biggest change in costs as a percentage of operating revenues for Hunt from 2003 to 2004 was a 2.7 percent decrease in "salaries, wages and employee benefits." This might be evidence of sizable fixed costs in this line item that are a lower percentage of the higher operating revenues in 2004, although this cost did increase in absolute dollar terms. However, Hunt implemented a new driver pay scale in September 2004 but increased rates to customers fully recovered the driver pay increase by the end of the year (Hunt 2005). The biggest change in costs as a percentage of revenue for

Landstar was a 0.7 percent decrease in SG&A costs. Except for high litigation costs and increased incentive compensation program bonuses, the SG&A costs percentage went down due to increased revenues (Landstar 2005b, 17), which is evidence of the largely fixed nature of SG&A costs.

LONG-RUN COST STRUCTURE

Over the longer-run, cost structures are dynamic and can change. Fixed costs in the short-run become long-run variable costs over the long term that can change in response to shifts in strategy. For example, Exhibit 1 shows how Hunt has steadily moved from exclusively using company owned tractors in 1999 to 1,301 independent contractors by the end of 2004, which is ([1,301/ (10,151 + 1,301)] x 100/1) 11.4 percent of the total number of tractors in operation at the end of 2004. Over this six-year period, Exhibit 1 shows that company-owned tractors increased from 1999 to 2001, decreased in 2002 and 2003 and increased in 2004, while an increasing trend was shown by company-owned trailers/containers (except in 2001) and total loads (except in 2000, 2001, and 2004). Of course, during this period, the terrorist attacks of September 11, 2001, in New York, NY, no doubt impacted subsequent demand for transportation and tractor and trailer/container investment decisions. The adverse economic impact on the transportation industry of this tragedy and other macro-economic events (e.g., U.S. economy in recession from March, 2001) are discussed in the "Letters to Shareholders" in Hunt (2001, 1) and Landstar (2001, 4).

Hunt (2003, 15, explanation in parentheses added) stated: "When we replace company-operated tractors and driver employees with ICs [independent contractors], certain costs such as salaries, wages, employee benefits and fuel are reduced and other costs such as purchased transportation increase." It seems clear that a strategic decision was made by Hunt management to gradually introduce independent contractors to carry some loads from 2000 instead of using exclusively company owned tractors.

Landstar's variable cost structure strategy is dynamic, too. For example, in order to implement a plan to increase its available trucking capacity and generate more revenue, increasing use has been made of third party truckers other than independent contractors to transport freight in the carrier segment. In the past, Landstar has mainly used independent contractors to provide trucking capacity (Landstar, 2004, 13-14). Of course, this change in third party emphasis is still fully consistent with Landstar's variable cost structure strategy.

COST STRUCTURE AND PROFIT STABILITY

As expected, the operating costs of Landstar showed evidence of higher variable costs and lower fixed costs in absolute and relative terms than Hunt. Using least-squares regression on 1996-2004 data (see Appendix for details):
- Landstar's slope/variable costs per operating revenue dollar in real terms was $0.90 versus $0.82 per operating revenue dollar for Hunt; and
- Landstar's intercept/fixed costs (assuming linearity continues outside relevant range of data to the intercept) in real terms was $65,195 (4.8% of average operating revenue) versus $255,815 (13.1 percent of average operating revenue) for Hunt. If Hunt's and Landstar's actual fixed costs are lower or higher than the intercept numbers, it seems reasonable to assume that they will follow the pattern of the intercept relationships with Hunt's fixed costs still significantly higher than Landstar's fixed costs in absolute and relative terms.

However, the time-series regression slope/variable costs coefficients capture increases over time in long-run variable costs as well as short-run variable costs for Hunt and Landstar. For example, the numbers of tractors and trailers/containers has shown an increasing trend from 1999-2004 for Hunt (Exhibit 1). This would have resulted in increases in Hunt's long-run variable cost of depreciation. Also,

Hunt's short-run variable operating costs would have increased from 1999-2004 with the addition of increasing numbers of independent contractors to transport freight (Exhibit 1).

Companies with higher fixed costs relative to variable costs such as Hunt are expected to have potential for higher operating income but at greater risk due to the higher fixed costs that have to be covered before a positive operating income can be made. This "risk-return trade-off across alternative costs structures can be measured as operating leverage" and the degree of operating leverage (DOL) at any given sales level is contribution margin (CM)/operating income (OI) (Horngren, Datar, and Foster 2006, 72). In essence, operating income variation is expected to be higher (lower) for companies with higher (lower) proportions of fixed costs relative to variable costs. To illustrate the impact cost structure choice has on OI variability and how this is measured using DOL, a straightforward hypothetical example comparing two different cost structures is shown in Exhibit 4.

Exhibit 4. Straightforward Example of Alternative Cost Structures and their Impact on Operating Income Variability

Starting Income Statements:	High Variable/ Low Fixed Cost Structure $ Millions	Low Variable/ High Fixed Cost Structure $ Millions
Operating Revenues (OR)	100	100
Variable Costs (VC)	40	20
Contribution Margin (CM)	60	80
Fixed Costs (FC)	20	40
Operating Income (OI)	40	40
Degree of Operating Leverage (CM/OI)	(60/40=) 1.5	(80/40=) 2.0

Examples of using Degree of Operating Leverage:

If OR increases 30%, OI increases	(30%x1.5=) 45%	(30%x2.0=) 60%
If OR decreases 30%, OI decreases	(30%x1.5=) 45%	(30%x2.0=) 60%

Income Statements Following the Changes:	High Variable/ Low Fixed Cost Structure $ Millions		Low Variable/ High Fixed Cost Structure $ Millions	
Percentage Change in OR	+30%	-30%	+30%	-30%
Operating Revenues (OR)	130	70	130	70
Variable Costs (VC)	52	28	26	14
Contribution Margin (CM)	78	42	104	56
Fixed Costs (FC)	20	20	40	40
Operating Income (OI)	58	22	64	16
OI Percentage Change	+45%	-45%	+60%	-60%

Degree of Operating Leverage Example

For illustrative purposes, the operating revenues ($100 million) and operating income ($40 million) in the starting income statements are assumed to be the same for both hypothetical transportation companies in Exhibit 4 but the variable costs and fixed costs are reversed. The DOL for the high variable costs/low fixed cost structure (1.5) is lower than for the low variable costs/high fixed cost structure (2.0).

The difference in DOL is because the low variable costs and high fixed costs of the latter company cause the numerator (CM) to be higher than for the company with the high variable costs/low fixed cost structure, while the denominator (OI) is the same for both companies. For any given percentage increase or decrease in OR, the OI will increase/decrease by that percentage multiplied by the DOL, which will always be higher for the company with the low variable costs/high fixed cost structure.

For example, a 30 percent increase or decrease in OR results in a higher increase or decrease in OI for the more highly leveraged company (60 percent) than the other company (45 percent). The greater OI variability of the more highly leveraged company is also shown in dollar millions terms in the income statements following the changes. Similarly, the potentially higher return/ higher risk cost structure of Hunt compared with Landstar can be illustrated using the data shown in Exhibit 5.

Exhibit 5. Operating Profit Performance of Hunt and Landstar 1996 – 2004

Years Ended Dec.:	2004	2003	2002	2001	2000	1999	1998	1997	1996	Average
Hunt:										
Operating Revenues (OR_H) [a]	$2,786	2,434	2,248	2,100	2,160	2,045	1,842	1,554	1,487	2,073
Operating Income (OI_H) [a]	$310	186	101	72	63	74	103	43	60	113
Oper. Margin % $(OI_H/OR_H$ x 100)	11.1	7.6	4.5	3.4	2.9	3.6	5.6	2.8	4.1	5.4[c]
Landstar:										
Operating Revenues (OR_L) [b]	$2,021	1,598	1,509	1,396	1,423	1,391	1,285	1,219	1,130	1,441
Operating Income (OI_L) [b]	$119	85	84	76	83	82	61	46	38	75
Oper. Margin % $(OI_L/OR_L$ x 100)	5.9	5.3	5.6	5.4	5.8	5.9	4.8	3.8[d]	3.4[e]	5.2[c]

a Data (in $ millions) 1996-1998 from Hunt (1998); 1999-2003 data from Hunt (2003); and 2004 data from Hunt (2005).

b Data (in $ millions) 1996-1998 from Landstar (2000); 1999-2003 data from Landstar (2004); and 2004 data from Landstar (2005a). The operating revenue numbers include relatively small amounts of investment income from its insurance segment from 1998 through 2004.

c The average operating margin percentages using data adjusted for specific inflation using the producer price index (PPI) for long distance general freight trucking by the truckload were 5.3 percent for Hunt and 5.2 percent for Landstar. The PPI was provided by the U.S. Department of Labor Bureau of Labor Statistics to the author in e-mail correspondence, and can also be obtained from the www.bls.gov/ppi/ Internet site.

d The operating margin percentage increases in 1997 to 4.1 percent if restructuring costs are excluded from the operating costs.

e The operating margin percentage increases in 1997 to 3.9 percent if restructuring costs are excluded from the operating costs.

Degree of Operating Leverage for Hunt and Landstar

In 2003 and 2004, Hunt's operating revenues increased by ([2,434-2,248]/2,248) x 100/1) 8.3 percent and ([$2,786-$2,434]/$2,434) x 100/1) 14.5 percent and its operating income increased by ([186-101]/101] x 100/1) 84.2 percent and ([310-186]/186) x 100/1) 66.7 percent, respectively. Assuming no other contributory factors, this implies a DOL of (84.2/8.3) 10.1 in 2003 and (66.7/14.5) 4.6 in 2004. In 2003 and 2004, Landstar's operating revenues increased by ([1,598-1,509]/1,509) x 100/1) 5.9 percent and ([$2,020-1,598]/$1,598) x 100/1) 26.4 percent and its operating income increased by ([85-84]/84] x 100/1) 1.2 percent and ([119-85]/85) x 100/1) 40.0 percent, respectively. Assuming no other contributory factors, this implies a relatively smaller DOL than Hunt of (1.2/5.9) 0.2 in 2003 and (40.0/26.5) 1.5 in 2004. This result is consistent with the expectation of a higher fixed cost structure in the case of Hunt.

Also, the average DOL of Hunt and Landstar for 1996-2004 can be approximated for each company using the slope and intercept coefficients from least-squares regression analyses (see the Appendix) and average operating revenues, based on the time-series data from 1996 through 2004 shown in Exhibit 5. This average DOL calculation is shown in Exhibit 6, which assumes that the change in average operating revenues is the major cause of change in average operating income over the eight year period. Consistent with the estimated DOL for years 2003 and 2004, the estimated average DOL for 1996-2004 indicates a higher DOL for Hunt (3.5) than Landstar (1.9), which again is consistent with Hunt having a higher fixed cost structure than Landstar.

Exhibit 6. Estimated Average Degree of Operating Leverage in Real Terms of Hunt and Landstar 1996 – 2004[a]

	Hunt	**Landstar**
	$'000	$'000
Average Operating Revenue (AOR)	1,953,754	1,359,484
Average Variable Costs	1,593,589[b]	1,223,899[c]
Average Contribution Margin (ACM) in $'000 (ratio)	360,165 (18.4%)[d]	135,585 (10%)[e]
Average Fixed Costs (FC)	255,815[f]	65,195[f]
Average Operating Income (AOI)	104,350	70,390
Average Degree of Operating Leverage (ACM/AOI)	3.5[g]	1.9[h]
Average Breakeven Point in Sales $s (ABES$ = FC/ACM ratio)	1,390,299[j]	651,950[k]
Average Margin of Safety in Sales $s (AOR-ABES$) (% AOR)	563,455[l] (28.8%)[m]	707,534[n] (52%)[o]

a In calculating average numbers, the time series operating revenues and operating costs were adjusted for specific inflation using the producer price index (PPI) for long distance general freight trucking by the truckload that was provided by the U.S. Department of Labor Bureau of Labor Statistics to the author in e-mail correspondence, which can also be obtained from the www.bls.gov/ppi/ Internet site. The average degree of operating leverage numbers for Hunt (3.1) and Landstar (1.7) using the original, unadjusted data were similar to those shown in the Exhibit that were calculated using PPI adjusted data.
b Calculated using "X Variable" (slope) coefficient (from least-squares regression calculations on 1996-2004 data, PPI adjusted, using Microsoft Excel Regression software) times Average Operating Revenue (PPI adjusted) = 0.815655 x $1,953,754 = $1,593,589 (in $'000) for Hunt.
c Calculated using "X Variable" (slope) coefficient (from least-squares regression calculations on 1996-2004 data, PPI adjusted, using Microsoft Excel Regression software) times Average Operating Revenue = 0.900267 x $1,359,484 = $1,223,899 (in $'000) for Landstar.
d Average CM percentage of average revenue for Hunt = ($360,165/1,953,754) x 100 = 18.4%.
e Average CM percentage of average revenue for Landstar = ($135,585/1,359,484) x 100 = 10%.
f Intercept coefficients from least-squares regression calculations on 1996-2004 data (PPI adjusted) using Microsoft Excel Regression software for Hunt and Landstar.
g $360,165/$104,350 = 3.5 .
h $135,585/$70,390 = 1.9.
j $255,815/0.184
k $64,195/0.1
l $1,953,754-$1,390,299
m ($563,455/1,953,754) x 100/1
n $1,359,484-$651,950
o ($707,534/1,359,484) x 100/1

Other Evidence of Hunt and Landstar Cost Structure Differences

From 1996 through 2004, Hunt's operating margins had a range of 2.8 to 11.7 percent whereas Landstar's operating margins had a more stable range of 3.4 to 5.9 percent (Exhibit 5), which are significantly different using an F-test two-sample for variances (See Appendix for details). Landstar's

range of operating margins is even tighter at 3.9 to 5.9 percent when restructuring costs in 1997 are excluded (Exhibit 5, footnote e). As mentioned earlier, it is expected that companies with higher fixed cost structures will exhibit greater profit variability than companies with lower fixed cost structures. Interestingly, Hunt's average operating income percentage over 1996-2004 was 5.4 percent of average operating revenue that is comparable to Landstar's marginally lower 5.2 percent (Exhibit 5), despite more widely fluctuating profit margins over this period.

Of particular significance is the large increase in Hunt's operating margin percentage to 7.6 percent in 2003 and to 11.1 percent in 2004. It is possible that revenue growth in these years has enabled Hunt to more fully benefit from its higher DOL. In addition, the devastating economic effects of the September 11, 2001, terrorist attacks and the nationwide economic downturn that began in that year should have a limited impact on the 2003 and 2004 results. As shown in Exhibit 6, Hunt's estimated average contribution margin (CM) ratio over 1996-2004 was 18.4 percent or 18.4 cents per average revenue dollar versus 10 percent or 10 cents per average sales dollar for Landstar (in real terms). Based on these calculations, Hunt's average OI before tax would have accelerated at 18.4 cents in the average sales dollar once the higher fixed costs have been covered compared with 10 cents in the average sales dollar in Landstar's case (in real terms), which illustrates Hunt's higher return potential.

The estimated average breakeven point in sales dollars (in real terms) for Hunt ($1,390,299,000 is more than double than for Landstar ($651,950,000) (Exhibit 6). Also, the estimated average margin of safety in sales dollars (percentage) in real terms for Hunt is $563,455,000 (28.8 percent), which is less than Landstar's estimated average margin of safety of $707,534,000 (52 percent) (Exhibit 6). The estimated average breakeven point and average margin of safety differences between the two companies are further evidence of Hunt's riskier cost structure.

SUMMARY AND IMPLICATIONS

The comparison of the comparative performance of Hunt and Landstar over 1996-2004 illustrates the risk-return trade-off from different cost structures using the transportation industry as an example. This is an interesting example in the service sector that is the growth area in the U.S. compared with the manufacturing sector. The analysis presented in this article also illustrates the significant amount of useful cost structure analysis that can be accomplished using publicly available data only.

The expected potential for higher returns but at the cost of higher operating income volatility (risk) is evident from the results of the higher fixed cost and lower variable cost structure of Hunt in comparison with Landstar. Interestingly, the average profit margin percentage of average operating sales over the long haul (1996-2004) was about the same for each company despite the significantly higher profit margin percentage variability of Hunt versus Landstar over the nine years.

The comparison of Hunt's and Landstar's cost structure shows that a steady march to higher fixed costs and lower variable costs is not inevitable for all companies, even in the typically high fixed cost service area. A more traditional high variable cost/low fixed cost structure, more typical of years gone by, may be the preferred choice for some companies even in industries where other companies make different strategic choices for their cost structures. Of course, such decisions are likely based on the risk profiles of corporate executives (e.g., are they predominantly risk averse or risk takers) and projections about future revenue growth and stability.

Interestingly, the variable cost structure choice of Landstar actually eliminates the high variable costs resulting from fuel purchases and other variable costs associated with company-owned tractors, such as hiring temporary tractor drivers during busy periods. This would impact the comparison of Landstar with more traditional transportation companies, such as Hunt, which might actually be high fixed cost and moderately high variable cost structure companies.

Apart from risk-return considerations, cost structure choice has implications for cost management systems preferences. A company with lower fixed costs and higher variable costs is less likely to find sophisticated strategic cost management models, such as activity based costing, cost-beneficial in comparison with a company with low variable costs and high fixed costs. For example, by definition, a high variable/low fixed cost structure means that a high proportion of the costs are likely driven by unit level (volume-based) cost drivers, such as direct labor hours, that are typically used in simpler traditional costing systems. Also, capacity measurement issues regarding such matters as the cost of used and unused capacity are not as important for companies with high variable cost/low fixed cost structures as a large proportion of the operating resources are supplied and paid for as used (e.g., independent contractors) rather than supplied and paid for in advance (e.g., company owned tractors).

It is pertinent to conclude by noting that both Hunt and Landstar seem to have successfully managed the U.S. recession that officially started in March 2001, disruptions caused by the terrorist attacks on New York, NY, of September 11, 2001, and other adverse economic events with both companies earning profit margins in 2001 and 2002 that were about (Landstar) or above (Hunt) those earned in 2000 (Exhibit 5). Although different, the cost structures of both Hunt and Landstar were robust to the severe economic challenges of 2001.

APPENDIX: STATISTICAL CALCULATIONS

Least-Squares Regression Analysis

Microsoft Excel Regression software was used to perform the least squares regression calculations and the time series operating revenues and operating costs were adjusted for specific inflation using the producer price index for long distance general freight trucking by the truckload that was provided by the U.S. Department of Labor Bureau of Labor Statistics to the author in e-mail correspondence, which can also be obtained from the www.bls.gov/ppi/ Internet site. The r^2 was 0.968 for Hunt and 0.998 for Landstar and the operating costs slope coefficient for both Hunt and Landstar were both highly significant at alpha = 0.01 with each having p-values less than 0.0001 (single-tailed test). The intercept coefficients were significant at alpha = 0.05 with single-tailed p-values less than 0.01 for Landstar and less than 0.03 for Hunt. Of course, interpreting the intercept as an estimate of fixed costs is of concern as costs at zero activity are outside the relevant range of the publicly available data used in the regression analysis. Interestingly, the regression results for both Hunt and Landstar using unadjusted data were very similar to those shown using PPI adjusted data, with slightly higher r^2 numbers and marginally more significant P-values for the slope and intercept coefficients.

F-Test Two-Sample for Variances

Using Microsoft Excel "F-Test Two-Sample for Variances" the null hypothesis of equal variances for the profit margin percentages for years 1996-2004 can be rejected at alpha = 0.01 with a p-value of 0.006 (two-tailed test).

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