

# Case 2: Motomart

## INTRODUCTION

The Motomart case is designed to supplement your managerial/cost accounting textbook coverage of cost behavior and variable costing using real-world cost data and an auto-industry-accepted cost driver. Unlike textbook problems, this data is real. It won't necessarily produce a clear solution when you attempt to analyze cost behavior and apply scatter-plot, high-low, and regression methods to separate mixed costs into their fixed and variable components. This case also illustrates that financial accounting decisions and methods can have an influence on cost accounting and managerial applications and decisions.

## OBJECTIVES

When you complete this case, you'll be able to

- Explain the importance of accrual accounting and proper application of the matching principle for the computation of contribution margins and break-even points
- Apply knowledge of generally accepted accounting principles (GAAP) to a specific real-world example
- Integrate statistical analyses and scatter plots, line graphs, and regression to determine the reliability of financial information prepared for external use
- Use analytical review procedures to examine a firm's financial statements
- Apply critical-thinking skills to real-world business circumstances

## CASE BACKGROUND

This case is based on real financial data provided by a retail automobile dealership (Motomart) seeking to relocate closer to an existing retail dealership. You'll examine the mixed cost data from Motomart and apply both high-low and regression to attempt to separate mixed costs into their fixed and variable components for break-even and contribution margin computations. You'll find that the data is flawed because Motomart was a single observation in a larger database. Don't attempt to correct the data (e.g., remove *outliers* or *influential outliers*). You'll be producing a scatterplot and apply high-low and regression methods to the extent practicable and writing a summary report of the findings.

Motomart operates a retail automobile dealership. The manufacturer of Motomart products, like all automobile manufacturers, produces forecasts. It has long been an industry practice to use variable costing-based/break-even analyses as the foundation for these forecasts, to examine their cost behavior as it relates to the *new retail vehicles sold (NRVS)* cost driver. In preparing this financial information, a common financial statement format and accounting procedures manual is provided to each retail auto dealership. The dealership is required to produce monthly financial statements using the guidelines provided by this common accounting procedures manual, and then furnish these financial statements to the manufacturer. General Motors, Ford, Nissan, and all other automobile manufacturers employ similar procedures manuals.

The use of a common format facilitates the development of composite financial statements that can be used to estimate costs and produce financial forecasts for future or proposed retail dealership sites (Cataldo and Kruck 1998). Zimmerman (2003) suggests that as many as 77 percent of manufacturers divide costs into variable and fixed components, and that managers arrive at these estimates by classifying individual accounts as being primarily fixed or primarily variable (67).

For this case, you'll examine mixed costs as defined by the manufacturer. Using the scatterplot, high-low, and regression methods, separate these mixed costs into their fixed and

variable components. The data is problematic, and a clear solution won't exist. Don't attempt to correct the data by removing outliers, but make observations based on any patterns you observe. The case will expose you to actual data and require you to summarize your findings, including any conclusions you're able to reach and why the financial data makes it impossible to separate the mixed costs into their fixed and variable components.

## **Motomart: A Litigation Support Engagement**

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The Motomart case evolved from a litigation support engagement. The lead author of this case was hired to analyze the data and provide expert testimony. His report and testimony was made available to the public (for a fee to cover reproduction costs). A broad description of the relevant points for the Motomart case follows.

Motomart wanted to move their retail automobile dealership, blaming their location for declining profits and increasing losses. They provided financial projections, using variable costing, to show that after relocation both Motomart and the existing dealership would be profitable. They created these financial projections using a database provided by the manufacturer, which included all North American retail automobile dealerships. Motomart was one of the observations or retail automobile dealerships included in the database used to create these financial projections. You'll be examining portions of Motomart's historical financial data.

The relocation site was quite close to the existing dealership (which we'll refer to as Existing Dealer), and Existing Dealer felt that, if the relocation was permitted, one or both of the dealerships would fail to break even and eventually go bankrupt, leading to poor service, or what the industry refers to as "orphaned" owners of these automobiles.

Antitrust laws provided Existing Dealer with the means to block the relocation requested by Motomart, but only if it could prove that the relocation wasn't in the best interest of the consuming public. Generally, the only way to prove this

is to prove that there's simply not enough business for both retail automobile dealerships to break even (or generate a reasonable return on investment, given the risks associated with the industry). Again, the manufacturer, in support of the proposed Motomart relocation, supplied financial projections showing that both retail automobile dealerships would be profitable after the relocation.

The expert witness hired to investigate the merits of the relocation was given the Motomart data, but not the entire database that included the Motomart data. The Motomart data was in such poor form that it wasn't possible to produce a financial forecast. An alternative forecast, not included in this case, was produced. This alternative forecast did *not* support the relocation of Motomart to a site closer to Existing Dealer. The alternative forecast showed that the market simply couldn't support two retail automobile dealerships. The implication was that, as the weaker of the two dealerships, Motomart was losing business to Existing Dealer. In conclusion, the relocation request by Motomart was denied.

## Income and Expense Data

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The following tables give you information such as income statements, semi-fixed expenses, and salaries for Motomart. Look for unusual entries or discrepancies in their records and, where you can, note the cause of the problems.

**Table 3** summarizes financial and cost driver information produced by Motomart, where new retail vehicles sold (NRVS) is the cost driver. The account classification method has resulted in three cost behavior classifications: variable, semi-fixed, and fixed costs. Semi-fixed is the automobile industry-specific term used for mixed costs. We'll assume that Motomart's classifications of variable costs (VCs) and fixed costs (FCs) are correct, and focus our analysis on Motomart's semi-fixed or mixed costs.

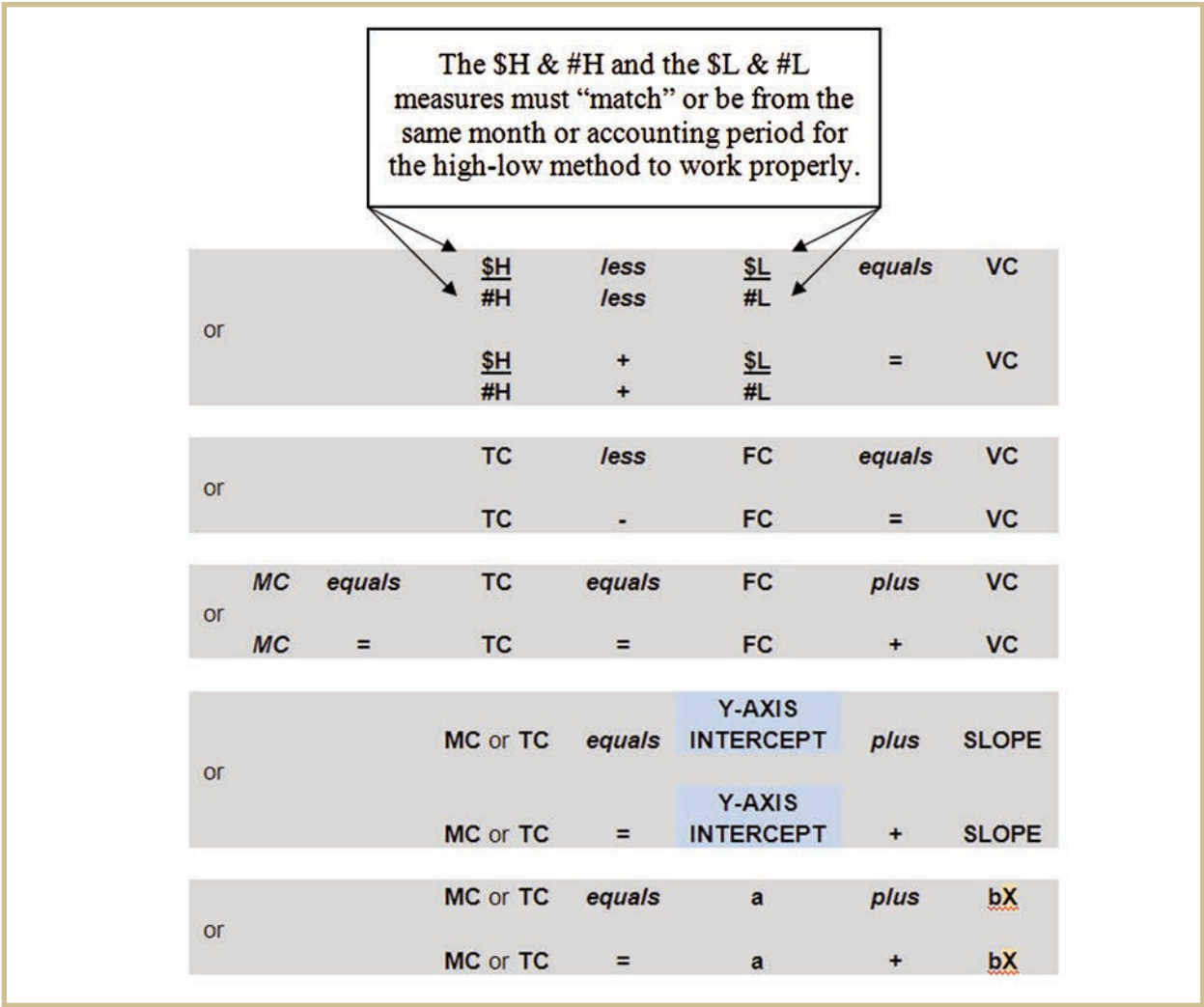
<b>Table 3</b>					
<b>SELECTED HISTORICAL INCOME STATEMENT AND RELATED MEASURES</b>					
	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>
Net Variable Revenues*	2,885,969	3,828,255	4,086,667	3,940,799	4,298,748
Semi-Fixed (S-F) Expenses:					
Salaries	613,006	968,789	1,211,464	1,289,758	1,360,489
Vacation	600	26,705	19,468	19,059	18,268
Advertising & Training	210,226	288,347	281,219	309,608	371,314
Supplies/Tools/Laundry	31,473	46,141	75,468	65,935	81,252
Freight	5,719	5,987	6,528	5,731	4,663
Vehicle	22,913	23,718	23,664	20,370	19,483
Demonstrators	10,465	4,969	-1,513	4,192	707
Floor-Planning	278,531	301,113	276,201	156,129	305,044
<b>Total S-F Expenses</b>	<b>1,172,933</b>	<b>1,665,769</b>	<b>1,892,499</b>	<b>1,870,782</b>	<b>2,161,220</b>
Fixed Expenses:					
Total Fixed Expenses	1,449,208	2,050,172	2,290,867	2,164,362	2,653,620
Operating Profit/(Loss)**	263,828	112,314	-96,699	-94,345	-516,092
New Retail Vehicles Sold	1,798	1,977	1,674	1,450	1,897
<i>Notes:</i>					
* Revenues less variable costs equal Net Variable Revenues (or Contribution Margin, in aggregate).					
** Net Variable Revenue less Total S-F Expenses less Total Fixed Expenses equals Operating Profit/(Loss).					

Table 4 provides five years of monthly data (N=60) for NRVS and the related semi-fixed or mixed cost measures. Semi-fixed costs were significant. Recall that they ranged from nearly \$1.2 million for calendar and fiscal year (FY) 1984 to almost \$2.2 million for FY 1988 (see Table 3).

Recall the cost function applying to the high-low and regression methods, which are provided in a variety of forms, depending on the texts you used in your previous math, economics, or accounting courses. Figure 3 is a brief outline of the high-low and regression methods.

**Table 4**  
**SEMI-FIXED (MIXED) EXPENSES FOR THE 60-MONTH PERIOD**  
**(FY 1984 THROUGH 1988)**

<u>Mo</u>	<u>NRVS</u>	<u>Salary</u>	<u>Vacation</u>	<u>Adv/Trng</u>	<u>SplyTls/Lndry</u>	<u>Freight</u>	<u>Vehicles</u>	<u>Demo's</u>	<u>Floor-Plan</u>	<u>Total</u>
1	197	\$ 52,951	\$ -	\$ 22,561	\$ 1,118	\$ 382	\$ 2,052	\$ 1,881	\$ (78,173)	\$ 2,772
2	133	\$ 47,054	\$ -	\$ 19,040	\$ 3,573	\$ 409	\$ 1,405	\$ 695	\$ 28,456	\$100,632
3	132	\$ 55,372	\$ -	\$ 14,373	\$ 1,388	\$ 742	\$ 1,380	\$ 469	\$ 34,423	\$108,147
4	141	\$ 46,114	\$ -	\$ 15,022	\$ 2,894	\$ 675	\$ 2,057	\$ 125	\$ 5,697	\$ 72,584
5	182	\$ 48,309	\$ -	\$ 19,966	\$ 1,896	\$ 572	\$ 1,603	\$ 131	\$ 34,599	\$107,076
6	156	\$ 49,643	\$ -	\$ 12,019	\$ 1,188	\$ 407	\$ 2,524	\$ 1,229	\$ 53,737	\$120,747
7	196	\$ 55,784	\$ 300	\$ 13,217	\$ 3,912	\$ 643	\$ 2,348	\$ 1,206	\$ 5,507	\$ 82,917
8	178	\$ 47,957	\$ -	\$ 17,303	\$ 2,012	\$ 605	\$ 1,208	\$ 436	\$ 32,436	\$101,957
9	159	\$ 53,743	\$ -	\$ 16,535	\$ 2,717	\$ 209	\$ 2,400	\$ 1,476	\$ 28,950	\$106,030
10	141	\$ 53,109	\$ -	\$ 23,821	\$ 1,102	\$ 184	\$ 2,076	\$ 1,168	\$ 20,876	\$122,336
11	152	\$ 45,491	\$ 300	\$ 14,146	\$ 2,630	\$ 331	\$ 1,677	\$ 635	\$ 45,278	\$110,488
12	31	\$ 57,479	\$ -	\$ 22,223	\$ 7,043	\$ 560	\$ 2,183	\$ 1,014	\$ 66,745	\$157,247
13	280	\$ 49,049	\$ -	\$ 19,992	\$ 1,999	\$ 582	\$ 1,927	\$ (477)	\$ (30,104)	\$ 42,968
14	136	\$ 46,698	\$ 300	\$ 20,251	\$ 1,192	\$ 603	\$ 1,156	\$ 1,839	\$ 50,583	\$122,622
15	174	\$ 59,790	\$ 200	\$ 20,082	\$ 1,336	\$ 492	\$ 1,898	\$ 1,260	\$ 18,803	\$103,861
16	171	\$ 80,773	\$ 600	\$ 26,716	\$ 3,873	\$ 559	\$ 1,808	\$ 510	\$ 23,080	\$137,919
17	167	\$ 71,130	\$ 9,212	\$ 25,223	\$ 5,560	\$ 356	\$ 1,816	\$ 2,350	\$ 18,774	\$134,421
18	161	\$ 82,490	\$ 6,007	\$ 21,106	\$ 1,737	\$ 439	\$ 1,384	\$ (288)	\$ 23,802	\$156,677
19	173	\$ 98,172	\$ 500	\$ 17,799	\$ 1,847	\$1,628	\$ 1,962	\$ 1,591	\$ 33,848	\$157,347
20	161	\$ 90,685	\$ 2,690	\$ 28,038	\$ 4,415	\$ (12)	\$ 2,446	\$ (3,308)	\$ 13,480	\$138,434
21	167	\$ 97,771	\$ 600	\$ 37,284	\$ 2,827	\$ 480	\$ 2,296	\$ 1,709	\$ 22,965	\$165,932
22	153	\$ 87,129	\$ 1,740	\$ 24,236	\$ 5,836	\$ 79	\$ 3,175	\$ 798	\$ 18,898	\$141,891
23	201	\$ 95,910	\$ 2,074	\$ 27,244	\$ 3,387	\$ 188	\$ 1,287	\$ (2,025)	\$ 38,699	\$166,764
24	33	\$109,192	\$ 2,782	\$ 20,376	\$ 12,132	\$ 593	\$ 2,563	\$ 1,010	\$ 68,285	\$216,933
25	227	\$ 89,041	\$ 1,880	\$ 26,719	\$ 4,383	\$ 769	\$ 2,205	\$ 2,493	\$ (44,140)	\$ 83,350
26	150	\$ 92,165	\$ 3,602	\$ 14,727	\$ 10,231	\$ 593	\$ 2,289	\$ (2,051)	\$ 36,311	\$157,867
27	142	\$ 88,981	\$ 744	\$ 27,880	\$ 7,734	\$ 414	\$ 1,891	\$ 386	\$ 19,865	\$147,895
28	104	\$ 95,898	\$ 960	\$ 21,872	\$ (684)	\$ 425	\$ 2,288	\$ 178	\$ 19,013	\$139,950
29	121	\$ 96,245	\$ -	\$ 18,705	\$ 8,329	\$ 483	\$ 2,223	\$ (262)	\$ 16,228	\$141,951
30	99	\$106,364	\$ -	\$ 23,835	\$ 2,540	\$ 417	\$ 1,683	\$ (1,356)	\$ 37,637	\$171,120
31	150	\$ 90,564	\$ 1,950	\$ 25,605	\$ 5,862	\$ 222	\$ 1,586	\$ 486	\$ (1,121)	\$125,154
32	144	\$ 98,418	\$ 1,540	\$ 17,763	\$ 6,998	\$ 49	\$ 1,751	\$ (1,924)	\$ 34,757	\$159,352
33	154	\$110,436	\$ 2,693	\$ 32,379	\$ 8,131	\$ 818	\$ 2,082	\$ 1,547	\$ 26,419	\$184,505
34	130	\$102,042	\$ 1,060	\$ 19,324	\$ 6,026	\$1,015	\$ 1,714	\$ 132	\$ 21,134	\$152,447
35	202	\$124,413	\$ 3,519	\$ 22,412	\$ 9,120	\$1,255	\$ 2,173	\$ (2,337)	\$ 18,578	\$179,133
36	51	\$116,897	\$ 1,520	\$ 29,998	\$ 6,798	\$ 68	\$ 1,779	\$ 1,195	\$ 91,520	\$249,775
37	148	\$ 97,083	\$ 1,080	\$ 9,112	\$ 6,627	\$ 565	\$ 1,324	\$ 1,164	\$ (73,753)	\$ 43,202
38	153	\$104,727	\$ 3,230	\$ 38,616	\$ 5,892	\$ 369	\$ 1,523	\$ (1,839)	\$ 30,443	\$182,961
39	83	\$ 95,622	\$ 953	\$ 22,690	\$ 3,450	\$ (182)	\$ 2,087	\$ 454	\$ 17,725	\$142,799
40	101	\$ 96,438	\$ 1,244	\$ 14,703	\$ 5,259	\$ 709	\$ 2,095	\$ 868	\$ 26,402	\$147,718
41	140	\$114,995	\$ -	\$ 28,764	\$ 2,294	\$1,006	\$ 1,304	\$ (1,990)	\$ (3,789)	\$142,584
42	132	\$105,337	\$ 160	\$ 27,253	\$ 8,155	\$ 521	\$ 1,667	\$ 1,869	\$ 15,090	\$160,052
43	112	\$ 98,989	\$ 2,480	\$ 24,419	\$ 1,621	\$ 514	\$ 1,040	\$ 329	\$ (945)	\$128,447
44	127	\$124,352	\$ 1,800	\$ 26,011	\$ 902	\$ 917	\$ 2,880	\$ (1,897)	\$ 30,405	\$185,370
45	139	\$115,875	\$ 1,417	\$ 24,492	\$ 5,158	\$ (77)	\$ 1,281	\$ 2,959	\$ 14,781	\$165,886
46	156	\$113,035	\$ 1,820	\$ 31,158	\$ 2,901	\$ 450	\$ 2,259	\$ 417	\$ 15,613	\$167,653
47	126	\$119,106	\$ 3,338	\$ 32,213	\$ 14,426	\$ 120	\$ 1,394	\$ (2,659)	\$ 40,968	\$208,906
48	33	\$104,199	\$ 1,537	\$ 30,177	\$ 9,250	\$ 819	\$ 1,516	\$ 4,517	\$ 43,189	\$195,204
49	209	\$ 98,938	\$ 1,866	\$ 26,737	\$ 1,694	\$ 853	\$ 1,657	\$ 601	\$ (20,127)	\$112,219
50	124	\$108,606	\$ 3,676	\$ 31,084	\$ 9,040	\$ 498	\$ 2,266	\$ (284)	\$ 18,236	\$173,122
51	131	\$106,396	\$ 1,197	\$ 33,278	\$ 2,099	\$ 605	\$ 1,952	\$ 668	\$ 15,176	\$161,371
52	144	\$106,778	\$ 241	\$ 32,657	\$ 9,328	\$ 483	\$ 1,852	\$ 1,409	\$ 25,245	\$177,993
53	93	\$124,805	\$ 500	\$ 29,794	\$ 4,268	\$ 788	\$ 1,704	\$ (1,771)	\$ 6,493	\$166,581
54	199	\$110,153	\$ 1,910	\$ 38,431	\$ 5,407	\$ 529	\$ 1,882	\$ 453	\$ 21,851	\$180,616
55	170	\$117,276	\$ 800	\$ 27,640	\$ 9,305	\$ (180)	\$ 977	\$ 1,310	\$ 7	\$157,135
56	186	\$112,055	\$ 980	\$ 28,657	\$ 1,803	\$ (242)	\$ 846	\$ (2,844)	\$ 17,192	\$158,447
57	200	\$114,765	\$ 1,695	\$ 36,425	\$ 8,839	\$ 859	\$ 2,856	\$ 1,532	\$ 14,864	\$181,835
58	146	\$128,007	\$ 1,560	\$ 27,720	\$ 10,944	\$ (492)	\$ 1,864	\$ 1,400	\$ 10,121	\$181,124
59	222	\$116,811	\$ 2,249	\$ 27,941	\$ 5,775	\$ 245	\$ 1,141	\$ (3,513)	\$ 7,946	\$158,595
60	73	\$115,899	\$ 1,594	\$ 30,950	\$ 12,750	\$ 717	\$ 486	\$ 1,746	\$ 188,040	\$352,182



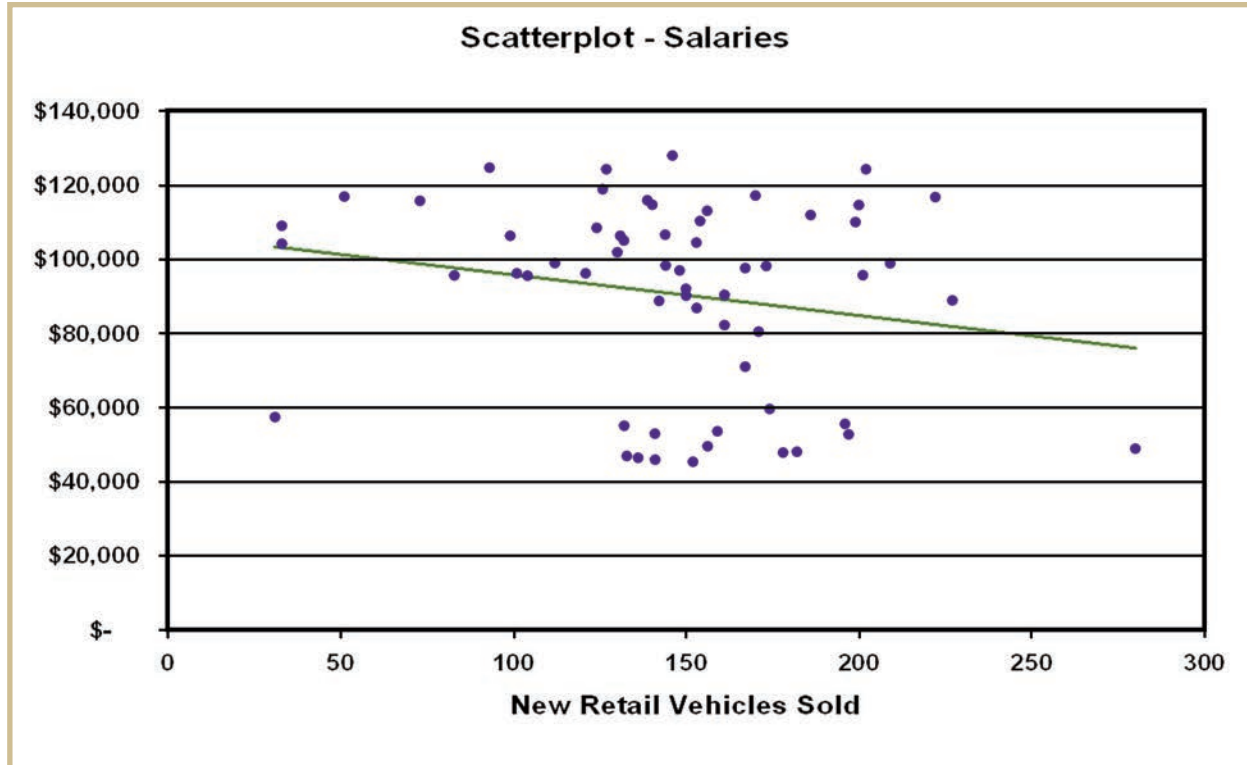
**FIGURE 3**—For the high-low method to work, the \$H and #H and the \$L and #L measures must be from the same accounting period.

## Preparing Graphs

The single cost driver and nonfinancial measure in [Table 4](#) is new retail vehicles sold (NRVS or X in the above cost function). There are eight financial measures (salary; vacation; advertising and training; supplies, tools, and laundry; freight; vehicles; demonstrators; and floor-planning [also known in the automobile retail industry as interest expense relating to new car inventory]), as well as a total (aggregate measure) provided for all eight financial measures (or the Y in the above cost function).



Using NRVS, the only available cost-driver, use Excel to prepare nine separate scatter plots and cost function-based trend lines and nine separate line graphs for each of the financial measures provided in Table 4. See Figure 4 and Figure 5 for a examples of completed graphs for salaries.

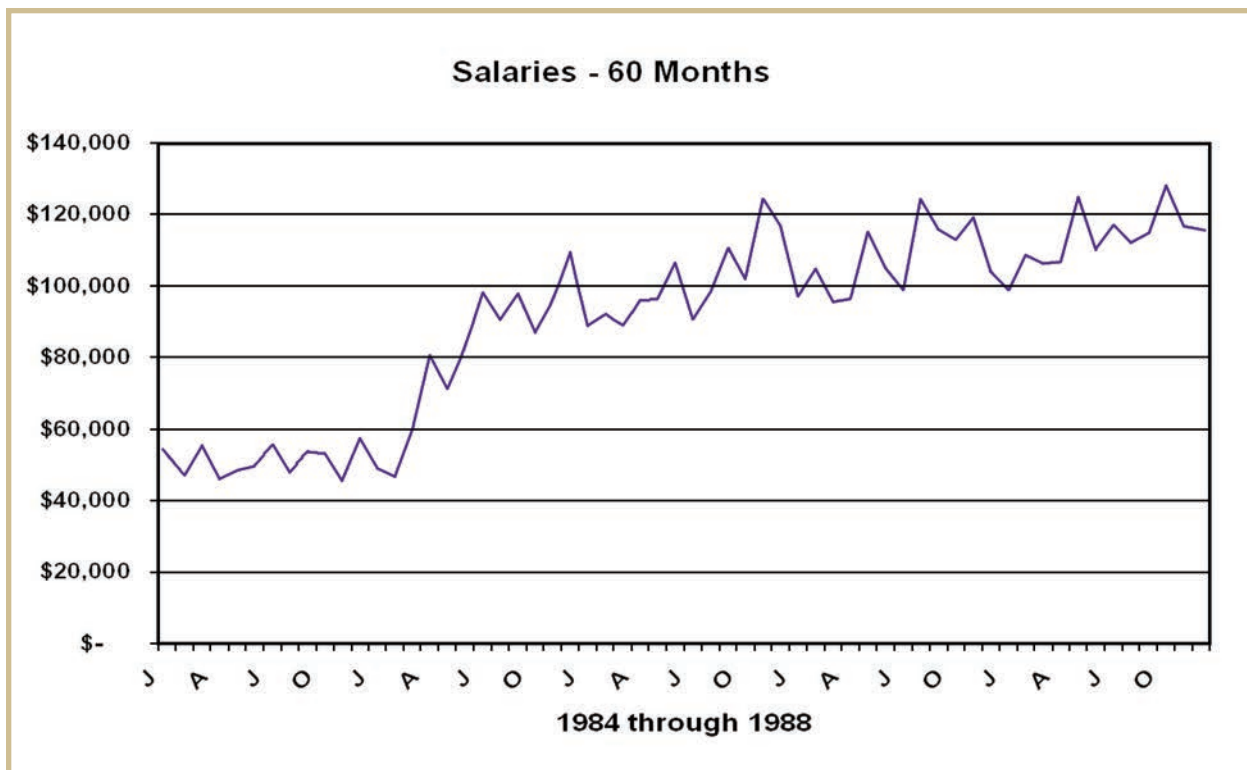


**FIGURE 4—A Scatterplot Graph for Motomart Salaries**

Now examine, on a preliminary basis, the pattern or trend (or lack thereof) for each of the “X” (NRVS) and “Y” (financial measure) data pairs and consider the following questions:

- You’re observing these data pairs for a 60-month period (i.e., five years); are any annual or other seasonal patterns or trends immediately apparent?
- Do the slopes of the trend lines (i.e., variable costs) make sense?





**FIGURE 5—A Line Graph for Motomart Salaries**

In the case of salaries (see Figures 4 and 5), there’s no apparent trend or pattern. It’s odd that salaries decrease as NRVS increases—in fact, this doesn’t make any sense. However, it’s consistent with the high-low results, which also didn’t make sense. But remember, since this data came from Motomart, the firm attempting to relocate, it’s real and from an actual litigation support engagement (not a textbook problem), so it won’t necessarily work out perfectly.

The cost equation in Table 5 shows fixed costs (FC) at \$106,866.00 and variable costs to be used to “reduce” total costs (TC) by \$110.10 per NRVS. Compare the salary figures and coefficients (in bold type) to Figure 4. Notice that if you extended the trend line in Figure 4, it would hit the y-axis intercept at \$106,866.00 (the fixed cost). Also notice that the R-squared (R-sq) measure in Table 5 equals 4.1 percent.

<b>Table 5</b>						
<b>SALARY = \$106,866.00 - \$110.10 NRVS</b>						
<b>Predictor</b>	<b>Coefficient</b>	<b>Std Deviation</b>	<b>t-statistic</b>	<b>p-value</b>		
Constant	106,866.00	10,793.00	9.90	0.000		
NRVS	110.10	70.17	-1.57	0.122		
s = 25300 <b>R-sq = 4.1%</b>						
<b>Analysis of Variance</b>						
<b>SOURCE</b>	<b>DF</b>	<b>SS</b>	<b>MS</b>	<b>F-statistic</b>	<b>p-value</b>	
Regression	1	261,795	261,795	0.10	0.754	
Error	58	152,801,120	2,634,502			
Total	59	153,062,912				

Your math and statistics courses probably reviewed the use of the t-statistic, overall F-statistic, and related p-values, as well as some of the other measures presented here. Our application is a very simple one, so we'll focus on only the R-squared measure. The other measures are provided in this example only for completeness.

Because the high-low technique didn't work, it makes sense that the regression technique wouldn't work well, either. Therefore, the results for high-low and regression are consistent. The advantage of the regression technique is that it mathematically quantifies the level of the problem or difficulty with the data. In this case, one of simple regression, the R-squared measure tells the story. Still focusing on the salaries example in [Figure 5](#), the R-squared measure tells us that only 4.1 percent of the total or mixed or semi-fixed cost is explained by NRVS. This means that that cost equation developed from this historical data isn't helpful in predicting future costs, as nearly 96 percent of the cost behavior, through use of this equation, remains unexplained.