

Risk Cluster Framework - How to analyse Companies by Operating Leverage

Andreas Gruener^{1*}, Fabian Schoenenberger², M1 AG

¹School of Finance (SoF), University of St. Gallen, Switzerland.

²M1 AG, St. Gallen, Switzerland.

Abstract

Sales volatility and Operating Leverage are main drivers of earnings changes. Because of the importance of earnings for analysts, investors and executives, operating leverage is the key information for companies' assessment. Companies with rigid cost structures are more risky compared to companies with flexible cost structures. The developed framework uses changes in sales and cost structure rigidity to define risk clusters. Companies within a risk cluster show similar return-risk relations. The framework is useful for inter-industry analysis and for deriving standard strategies based on considerations of how companies may diversify their product offering to smooth revenues and to increase profitability.

Interdiction

The operating leverage is part of most management accounting textbooks. The considerations are limited to breakeven analysis. However, the operating leverage is a key element of each company's business activities. The volatility of sales and the operating leverage are the main drivers of changes in earnings. This insight stems from the textbook formula of the operating leverage solved for changes in earnings. Because of the importance the operating leverage is part of most management accounting textbooks. The considerations are limited to breakeven analysis. However, the operating leverage is a key element of each company's business activities. The volatility of sales and the operating leverage are the main drivers of changes in earnings. This insight stems from the textbook formula of the operating leverage solved for changes in earnings. Because of the importance of earnings for analysts, investors but also executives, the operating leverage is the key information for the assessment of companies. Companies with rigid cost structures are more risky compared to companies with flexible cost structures, because earnings react more sensitive to changes in sales. If operating costs vary with sales, earnings do not change a lot. The developed framework uses changes in sales and the cost structure rigidity to define four risk clusters. Companies within a risk cluster show similar return-risk relations based on accounting figures. The framework is useful for inter-industry analysis. It goes beyond the generally applied approach of defining peer groups according to the industry affiliation. The framework is further used to derive standard strategies based on the considerations of how companies may diversify their product offering to smooth revenues while at the same time use the leverage of the cost structure rigidity to increase profitability. It is a very useful tool to monitor key competitors or for portfolio

construction in asset management. Of earnings for analysts, investors but also executives, the operating leverage is the key information for the assessment of companies. Companies with rigid cost structures are more risky compared to companies with flexible cost structures, because earnings react more sensitive to changes in sales. If operating costs vary with sales, earnings do not change a lot. The developed framework uses changes in sales and the cost structure rigidity to define four risk clusters. Companies within a risk cluster show similar return-risk relations based on accounting figures. The framework is useful for inter-industry analysis. It goes beyond the generally applied approach of defining peer groups according to the industry affiliation. The framework is further used to derive standard strategies based on the considerations of how companies may diversify their product offering to smooth revenues while at the same time use the leverage of the cost structure rigidity to increase profitability. It is a very useful tool to monitor key competitors or for portfolio construction in asset management.

Financial practitioners agree that the discount rate (r) and the growth rate (g) are two crucial factors for the valuation of a corporate entity. This is obvious for the various methods using income stream variables, for instance the Discounted Cash Flow (DCF), Dividend Discount Model (DDM) or the Residual Income Model (RIM). The output, that is the value of a company, is responsive to the choice of the variables r and g . Small adaptations in these figures may lead to large changes in the calculated value. This responsiveness is particularly true in the determination of the continuing value that is the part of the valuation assuming an income stream in perpetuity. Because of this responsiveness it is comprehensible that academics in the field of finance put much effort in determining r . However, there are also counterexamples. For instance, the well-known investor Warren Buffett does not use discount rates calculated according to the Capital Asset Pricing Model (CAPM). The CAPM is a method to define the cost of equity. He simply uses the long-term treasury rate to define the upper bound of a company's value [1]. However, according to valuation methods an appropriate discount rate is linked to the riskiness of the respective entity. But, from an active shareholder aspect the crucial aspect is to find business aspects worth to be improved in order to increase the value of the entity above its purchasing price.

Or more generally speaking, for proponents of fundamental equity research (where active shareholder belong to) finding the appropriate value drivers is of paramount interest. Focusing exclusively on the fluctuations of stock prices compared to an index, this is a very simplified view of the CAPM, is insufficient. Value drivers are those triggers that enable a company to improve the input/output-relation or reduce the riskiness of this production process. Such factors summed up define a company's business model. A business model explains how the executive board of a company uses input factors to generate sustainable returns. The goal of each business model is to establish a competitive advantage. The important aspect is that a business model refers to the inner workings of a company, for instance the production process, but also to the approach the company satisfies its customers' needs. This is a very important element because this approach has an impact on the fluctuations of the company's sales. The business model explains also

*Corresponding author: ¹Andreas Gruener, School of Finance (SoF) University of St. Gallen (HSG), Switzerland.
E-Mail: andreas.gruener@unisg.ch

²Fabian Schoenenberger, M1 KG, St. Gallen, Switzerland.
E-mail: fabian.schoenenber@gmail.com

Received: November 19, 2017; Accepted: December 04, 2017; Published: December 07, 2017

the inner workings of a company, for instance the amount of fixed and variable costs a company uses to produce its output. Both types of costs are largely controlled by the production process. For equity analysts it is important to know how the executive board controls such cost factors. With detailed understanding of a company's strategy inclusive its impact on the production process, analysts are able to give guidance for the income stream variable.

Generally speaking, between a company's revenues and its earnings stand the expenses. To estimate the profit an analyst needs to know how the cost structure varies with changes in revenues. The Operating Leverage (OL) explains this relation of changes in sales and changes in profits. This article develops a framework based on the OL formula to gain detailed understanding of a company's fundamental business characteristics. The ambition is to be able with the framework to invest in a business that can be improved on, make the improvements, and enhance the value of the business [2].

The framework serves to define risk clusters. It provides a method of sorting firms into risk categories using a two-way classification: based on sales volatility and rigidity of cost rigidity. The cost structure is key for this approach. The framework considers the source of a company's riskiness from a business perspective beside the financial leverage. It puts the operating process at first priority and expects the financial leverage to be the result of the business model. From a legal perspective the financial leverage is key. It determines the solvency of a company. But, without a solid business model, a company is hardly able to generate sales. Before one can think about paying interest costs, a company needs customers. Further, putting the focus on the operating leverage pronounces the responsibility of the board of executives for cost controlling.

The OL Formula

It is too simplified to equate the OL with the amount of fixed costs, what is often the case in management textbooks. Fixed costs are expenses that do not vary with changes in the amount of output produced. On the contrary, variable costs are dependent on the cost driver, which is very often a function of output produced.

Instead, there are two perspectives on the OL to be differentiated. First, the OL explains the uncertainty of changes in operating income according to changes in sales. This perspective focuses on the elasticity of operating income. Second, the OL characterizes a company's cost structure. According to this perspective the amount of fixed costs and the distance to the breakeven point have to be taken into account. With increasing distance to the breakeven point, fixed costs lose importance because they are split over many items. Their impact on earnings caused by changes in sales reduces with increasing distance. These two perspectives are the two sides of the same coin. Previous research has shown mathematically the link between the two sides [3].

Often, the following formula is used to approximate the OL:

$$\text{Degree of OL} = \frac{\Delta \text{Operating Income}}{\Delta \text{Sales}}$$

This formula refers to the elasticity aspect of the OL. In the context of valuing a company it teaches an important lesson: Changes in operating income, that is the growth rate of operating income, are dependent on changes in sales and the cost structure. So, for the OL to become effective, sales have to vary. In other words, a company may only benefit from the operating leverage if they manage at the same time to increase its revenues [4].

Fundamental equity analysts should consider these two aspects when analysing the business perspectives of a company. Because the responsibility of analysts is to have an own view about the prospective earnings a company may generate, they benefit from knowing the OL

formula. The volatility of sales and the operating leverage are the main drivers of earnings. Companies with sustainable sales with low volatility are less risky compared to companies with seasonal demand. A large impact on operating income as a result of small changes in sales is caused when a company produces near the breakeven point and has a lot of fixed costs. Of course, such a company is riskier compared to a company with a variable cost structure. The following formula2 is an abbreviation of the before-mentioned textbook formula of the OL. It expresses the previous discussion with a simple accounting relation:

$$\Delta \text{Operating Income} = \Delta \text{Sales} * \text{OL}$$

The first variable on the right-hand side of the formula measures changes in sales. More difficult is to approximate the operating leverage.

Measuring the rigidity of the cost structure

There are several ways to estimate the OL of a company. There are point estimates, point-to-point estimates and also time-series estimates. External analysts, contrary to insiders these analysts do not have access to information from management accounting systems, face the same challenges in computing the OL irrelevant of the method chosen. Only publicly available information may serve as source for estimates. They do not know the exact number of products or the production function of each product.

The before-described textbook formula has the disadvantage of producing irrational results for companies generating losses. In practice, the operating income may also decrease when at the same time sales increase. Changes in accounting standards or extraordinary expenses may cause such developments. In order to circumvent such difficulties, an obvious solution is to focus on the cost-side of the OL. [5, 6]

Excluding companies generating losses from empirical investigations is not an adequate solution of the problem. From an operating leverage perspective, such companies are of interest, too.

The rigidity of the cost structure is best approximated with regressing operating costs on sales. Researchers have used this approach already in the past [7]. However, it is important to work with the logarithms instead of absolute values. Working with the logarithms, the regression coefficient measures the elasticity of operating costs according to changes in sales. This is exactly what we are looking for: How much vary operating costs with changes in sales? Large betas see formula 3 below, indicate that operating costs are dependent on changes in sales and therefore the cost structure is dominated by variable costs. Low betas indicate the opposite: Operating costs do not vary with changes in sales and therefore the cost structure is rigid. Regarding the differentiation between variable and fixed costs, the logical interpretation is that low betas should relate to large levels of fixed costs and vice versa. The following formula expresses the regression:

$$\text{Operating Costs}_{j,t} = \alpha_{j,t} + \beta_{j,t} * \text{Sales}_{j,t} + \varepsilon_{j,t}$$

Operating Costs_{j,t} is the logarithm of total operating costs. The same is true for Sales_{j,t}. The regressions are conducted for each company separately on a five-year moving time window. Betas are therefore available on a yearly basis after the first year of the five-year time window. This aspect is indicated by the term t in β_{j,t}. The term j refers to firms. This approach allows changes in the cost structure to be tracked. This is a very important aspect because companies react to the developments of their environment. For instance, Lev (1974) has already mentioned that the characteristics of the cost structure vary over time [8].

What kind of expenses can be qualified as operating costs? In financial reporting COGS and SGA qualify as operating costs. Some academics argue that fixed costs are related to fixed assets. The main expenses from fixed assets are depreciation. However, depreciation are not cash-relevant. Further, they are highly dependent on individual

judgments about the lifetime of the corresponding asset. Depreciation, and also amortization, are therefore not considered as operating costs. Other costs as a result of fixed assets, for instance, expenses in the form of long-term contracts with suppliers, are part of COGS or SGA and therefore considered in the approximation of the cost structure rigidity.

Research Design

The application of the developed framework uses publicly available data. These data are necessary to apply formula 3, which is the main characteristic to separate companies according to the framework. Using the Wharton Research Data Services online tool, the necessary information from the balance sheets and income statements of active and inactive companies for the fiscal years from 1984 to 2011 was downloaded. Only companies reporting in USD are considered. Companies with a 4-digit SIC between 6000 and 6999 (financial companies) are dropped, because the accounting characteristics of financial institutions are hardly comparable with other non-financial companies. Only companies listed on NYSE, Amex or NASDAQ are included in the sample. Because of the focus on companies with operating activities, the limitation that sales, COGS and SGA are larger than 0 is applied. Further, only companies that differentiate between COGS and SGA are considered. Companies with negative or missing equity (CEQ) are dropped. All accounting information must be provided on a yearly basis. Moreover, SGA, COGS and sales have to be available for five successive years, otherwise the company is dropped. This is necessary to apply formula 2 upon five-year moving time windows. In total, the sample consists of 2717 companies, 17590 observations, and a time period of 26 years. On average, information is available for 677 companies per year.

The framework for defining appropriate risk clusters

The idea for the following framework to build risk clusters arose with the study of the OL formula. Earnings, which are the key driver for the valuation of a company, are part of this equation. So, solving formula 1 for changes in operating income delivers the two dimensions of the framework. First, changes in sales are to some degree a pre-condition for changes in earnings. The volatility of sales is therefore the first criterion. Second, changes in sales have an impact on earnings through the characteristics of the cost structure. So, the second factor of the framework is the characteristic of the cost structure that is approximated with the before-described regression coefficient $\beta_{j,t}$ in formula 2. Because industry dynamics have an impact on both factors, the definition of thresholds to assign a company to the clusters takes place within an industry. The process of defining appropriate risk clusters is: [9]

1. The first step is to define the industry classification of interest.
2. The second step is to separate companies with volatile sales from those with stable income streams. As threshold serves the median of changes in sales of the total sample.
3. The third step is to segregate the two groups from step 2 into four clusters according to differences in the cost structure rigidity. Again, as threshold serves the median of $\beta_{j,t}$ of the total sample.

After these three steps, a risk map with four clusters results, each representing a unique mix of risk sources.

- Cluster 1: low dependence on business cycle, flexible cost structure.
- Cluster 2: low dependence on business cycle, fixed cost structure.
- Cluster 3: high dependence on business cycle, flexible cost structure.
- Cluster 4: high dependence on business cycle, fixed cost structure.

Cluster 1 consists of companies with low exposure to the development of the economy. The cost structure is flexible and therefore, these companies reveal low levels of riskiness. The opposite is true for companies belonging to cluster 4. These companies are dependent on business cycles and their cost structure is rigid. The combination of these two factors makes these companies risky. Cluster 2 and 3 are expected to show similar levels of riskiness. Companies within cluster 2 may afford rigid cost structures, because they are only modestly dependent on the economy. Cluster 3 companies compensate the high dependence with a flexible cost structure. The procedure to define these clusters has to be executed for each industry individually. Next, the procedure is applied.

Practical application of the procedure

The before-mentioned approach is simple to put into practice. Table 1 summarizes the number of companies in each category after the corresponding segregation, i.e. step 1 to 3. The sample consists of 17590 observations. Three industries, namely business equipment, manufacturing and others, comprise more than 50% of the available observations. Step 2 means to separate those companies with volatile sales from the others. The threshold is the median of the total sample's sales' volatility. This step reveals that some industries are more dependent on business cycles than others. This insight is in line with approaches explained by financial companies. For instance, Morningstar Research [10] divides industries into three super sectors: cyclical, defensive and sensitive. Companies in these super sectors differ according to their exposure to economic cycles. Business equipment is regarded as sensitive to changes in the business cycle. Table 1 supports this expectation: Above 60% of the companies within this industry belong to group 2 after the second step. The third step is to further split the two groups according to a company's degree of cost structure rigidity. The median of the total samples' rigidity coefficient $\beta_{j,t}$ is used. The results are two more groups, consisting of more or less similar numbers of companies. The resulting four clusters comprise companies with similar dependence on business cycles and similar degree of cost structure rigidity [11].

The use of this approach gets concrete when the before-mentioned procedure is applied for a specific industry. Because the clustering of the level of riskiness is the paramount goal, time-series averages of risk indicators are shown. In order to compare industry differences, the following explanations are limited to two industries.

The first industry chosen is business equipment. The ratio of companies with sales volatilities above and below the median of the sample is as already said about 60:40 for the total time period. Therefore, business equipment is a cyclical industry. The opposite is true for the second industry. Consumer non-durables is a defensive industry because companies from this industry benefit from stable demand dynamics. This is visible with the before-mentioned ratio which is about 40:60 [12].

Table 2 summarizes four risk parameters for each industry and within an industry, for each risk cluster. In general, companies within business equipment show large accounting return volatilities. For each risk cluster, the average is above the total sample's average. Standard deviations of the margin and ROE steadily increase from risk cluster 1 to 4. This increase provides evidence that differentiating between sales volatility and cost structure rigidity separates companies according to their level of riskiness [13]. To compensate the uncertainties stemming from such accounting properties, the leverage ratios are low. So, financial leverage serves to balance to the overall riskiness. As a result of the volatilities in earnings, systematic risks are quite significant. Further, beta increases from cluster 1 to cluster 4. To conclude, the risk parameters move in the expected direction. Comparing these results with the figures from Consumer non-durables, it becomes visible that different industries have different risk characteristics, and that the differentiation between risk cluster 1 to 4 makes sense

because the risk parameter move in the expected direction, too. So, the explanatory powers of sales volatility and the cost structure are true for this defensive industry, too. Again, the group of companies with rigid cost structures have larger earnings volatilities, lower leverage ratios but higher systematic risks compared to the groups consisting of companies with flexible cost structures [14].

These two industry examples show the benefit of the approach: The differentiation between the sensitivity to changes in the business cycle and cost structure rigidity lead to a clustering of the level of riskiness. From the perspective of an analyst or the management, the same procedure can be utilized in order to assign the object of interest, i.e. a specific company, to one of the four clusters.

There are manifold benefits of this procedure. First, the four risk clusters make it simple to define a company's risk exposure. There are two dimensions that represent risk aspects. Second, the risk cluster is the accurate peer group, because these companies have comparable exposures to these sources of risk. Based on the comparable level of riskiness, these companies should achieve similar returns. Table 3 confirms the risk-return relation. Third, the risk clusters facilitate to deduce strategies to improve the exposure to risk sources.

Deduction of standard strategies

After the assignment of a specific company to the clusters described previously, the user gets a better understanding of the source of riskiness. It can be the dependence on the development of the economy, the degree of cost structure rigidity or even both. The statistical data to build the clusters as well as the information utilized to assign companies to the clusters refer to past accounting performance. The responsibility of the analysts and the managements is to give reason to handle the corresponding sources of riskiness. For managements, the reference to these risk clusters facilitates the justification for certain strategic moves. On the other side, analysts can use this framework to challenge a management's vision for the company. Based on the clusters they are able to forecast to some degree a comprehensible strategy. These aspects vary according to the four clusters:

- Cluster 1 - "The Stable": low dependence on business cycle, flexible cost structure. Companies within this cluster show low levels of riskiness. The low dependence on the economy is an indicator for stable revenue streams. The flexible cost structure means that

there is only a modest operating leverage impact on earnings. The business itself and how the company manages this business are not sources of riskiness. Because of this situation such companies may try to get some leverage on earnings with increasing the debt levels. Therefore, analysts should pay close attention to the financial side of the balance sheet. Another strategy to leverage on earnings is to make the cost structure more fixed costs orientated. To conclude, this cluster may have below average ROE, but above average leverage ratios.

- Cluster 2 - "The Efficient": low dependence on business cycle, fixed cost structure. Contrary to cluster 1, companies within this cluster have rigid cost structures. This means that the low changes in sales impact more on the bottom line compared to cluster 1. The rigid cost structure is a source of risk, and therefore analysts may expect higher ROE compared to cluster 1. Only below average leverage ratios may compensate this increased level of riskiness. This means that analysts should pay attention to both the cost structure and the leverage ratio. A sudden loss of revenues has an adverse impact on the bottom line. In general, companies within this cluster reveal an interesting mix of risks. Especially, because the cost structure is under influence of the management and therefore can be adjusted if the demand situation changes.
- Cluster 3 - "The Ineffective": high dependence on business cycle, flexible cost structure. Because sales vary heavily with changes in business cycle, companies within this cluster are risky. Because operating costs vary with sales, companies face difficulties to increase the ROE. The ROE is expected to be below the average of cluster 2 companies. Analysts may expect large fluctuations in earnings, but low ROE. This combination seems to be only limited attractive for investors. Therefore, the strategic focus should be a diversification of revenue streams.
- Cluster 4 - "The Hazardous": high dependence on business cycle, fixed cost structure. Companies within this cluster are very risky. Their revenue streams are dependent on economic developments. Additionally, the rigid cost structure amplifies these variations in sales. These companies should reduce their total risk level with only modest indebtedness. Similar to the situation in cluster 3, a diversification of income streams would reduce the risk level, but the company could still amplify their earnings with their rigid cost

Risk Cluster	Step 1		Step 2		Step 3			
	1	1	2	1	2	3	4	
Business equipment	3263	1243	2020	623	620	876	1144	
Chemicals	823	578	245	281	297	145	100	
Consumers Durables	615	375	240	207	168	127	113	
Consumers Non Durables	1510	992	518	494	498	306	212	
Energy	1203	291	912	148	143	375	537	
Healthcare	1690	953	737	457	496	341	396	
Manufacturing	3579	1823	1756	876	947	814	942	
Others	2517	1112	1405	599	513	709	696	
Shops	1775	1105	670	694	411	432	238	
Telecom	505	254	251	98	156	133	118	
Utilities	110	69	41	34	35	26	15	
Total	17590	8795	8795	4511	4284	4284	4511	

Table 1 shows the number of companies in the eleven industries across different risk clusters. The column with heading Step 1 summarizes the total number of companies for each industry. Step 2 divides the companies within an industry into two groups according to sales volatility; 1 means low and 2 high volatility. Step 3 results in four clusters through a further segregation of the companies within an industry according to the cost structure rigidity; 1 means low sales volatility with flexible cost structure, 2 means low sales volatility with fixed cost structure, 3 means high sales volatility with flexible cost structure and 4 means high sales volatility with fixed cost structure.

Table 1: Segregation of companies within industries.

	Margin(sd)				ROE(sd)			
	1	2	3	4	1	2	3	4
Business equipment	2.50%	3.40%	5.00%	6.70%	7.90%	8.70%	13.40%	15.80%
Chemicals	1.70%	1.90%	2.50%	4.50%	6.10%	7.10%	19.80%	15.70%
Consumers Durables	1.70%	1.90%	2.20%	3.70%	5.10%	5.50%	9.50%	12.80%
Consumers Non Durables	1.60%	2.00%	2.70%	4.20%	6.70%	6.70%	9.30%	11.10%
Energy	2.00%	3.10%	4.40%	6.70%	7.10%	8.10%	10.70%	12.30%
Healthcare	1.90%	2.70%	3.80%	5.80%	7.30%	7.90%	11.40%	14.30%
Manufacturing	1.60%	2.20%	2.70%	4.30%	5.40%	6.80%	9.60%	11.80%
Others	1.90%	2.60%	3.60%	5.10%	7.40%	8.20%	11.30%	12.60%
Shops	1.10%	1.40%	2.30%	3.40%	5.70%	6.40%	10.10%	14.20%
Telecom	2.50%	3.40%	4.00%	5.80%	9.10%	11.00%	14.80%	13.90%
Utilities	2.30%	1.90%	4.10%	5.20%	2.70%	2.60%	6.40%	8.20%
Total	1.80%	2.40%	3.50%	5.40%	6.50%	7.50%	11.10%	13.50%
	Leverage				Beta			
	1	2	3	4	1	2	3	4
Business equipment	42.70%	34.70%	44.20%	30.80%	0.31	1.15	1.23	1.42
Chemicals	72.60%	61.20%	106.00%	184.60%	1.85	0.9	1	1.12
Consumers Durables	61.40%	48.40%	92.20%	60.40%	0.6	0.94	1.03	1.02
Consumers Non Durables	133.70%	76.40%	120.00%	57.90%	0.58	0.78	0.9	0.98
Energy	87.70%	71.70%	371.80%	89.20%	0.89	0.89	1.01	0.97
Healthcare	75.00%	43.60%	67.30%	36.80%	0.37	0.92	0.86	0.87
Manufacturing	54.20%	54.00%	95.30%	69.50%	0.7	0.97	1.01	1.12
Others	174.60%	89.30%	150.30%	101.40%	1.01	0.96	1	1.08
Shops	88.80%	57.20%	120.00%	91.50%	0.92	1.02	1.01	1.12
Telecom	164.50%	695.60%	245.00%	172.10%	1.72	0.99	1.05	1.37
Utilities	91.20%	101.30%	159.80%	215.40%	2.15	0.38	0.25	0.82
Total	90.00%	81.80%	125.50%	70.20%	0.7	0.96	1.01	1.14

Table 2 summarizes time-series averages of the standard deviation of the margin (Margin (sd)) and the return on equity (ROE(sd)), as well as the financial leverage (Leverage) and beta (Beta). The averages are calculated for the companies in a risk cluster. Each industry is treated separately. 1 means low sales volatility with flexible cost structure, 2 means low sales volatility with fixed cost structure, 3 means high sales volatility with flexible cost structure and 4 means high sales volatility with fixed cost structure.

Table 2: Time-series averages of risk parameters for risk clusters.

Risk Cluster	Margin(sd)				ROE(sd)			
	1	2	3	4	1	2	3	4
Business equipment	13.40%	16.50%	13.10%	15.20%	7.10%	9.30%	7.60%	9.80%
Chemicals	13.70%	17.90%	14.70%	18.70%	6.20%	8.20%	5.40%	7.20%
Consumers Durables	13.00%	17.40%	14.10%	18.20%	7.00%	9.30%	6.00%	8.90%
Consumers Non Durables	19.20%	23.00%	14.20%	18.60%	7.90%	11.30%	6.80%	10.30%
Energy	12.00%	18.90%	14.60%	16.30%	5.10%	7.40%	5.50%	7.40%
Healthcare	17.60%	23.50%	16.00%	18.40%	9.40%	12.40%	7.60%	10.80%
Manufacturing	14.10%	16.40%	13.20%	16.30%	7.00%	8.30%	6.20%	8.10%
Others	14.60%	18.30%	13.50%	14.40%	6.70%	8.30%	5.20%	6.50%
Shops	13.80%	16.40%	17.50%	17.30%	7.10%	8.70%	5.20%	7.10%
Telecom	13.80%	17.60%	19.70%	13.90%	6.50%	6.80%	6.30%	6.10%
Utilities	9.40%	11.70%	9.80%	12.90%	3.10%	4.20%	3.90%	4.40%
Total	14.80%	18.50%	14.40%	16.10%	7.20%	9.20%	6.20%	8.50%
Risk Cluster	Leverage				Beta			
	1	2	3	4	1	2	3	4
Business equipment	9.10%	12.00%	9.80%	13.40%	55.00%	59.10%	60.10%	65.70%
Chemicals	9.60%	11.60%	9.10%	12.10%	44.80%	46.50%	39.40%	42.20%
Consumers Durables	9.10%	11.50%	7.50%	9.60%	52.10%	54.00%	46.10%	52.40%
Consumers Non Durables	11.70%	15.10%	9.80%	13.10%	48.20%	51.90%	47.00%	54.70%
Energy	7.80%	12.30%	12.20%	19.30%	40.80%	43.80%	42.10%	47.50%
Healthcare	15.30%	18.10%	13.10%	18.20%	55.10%	57.00%	54.00%	62.30%
Manufacturing	9.30%	10.90%	8.40%	10.80%	50.40%	51.10%	45.40%	52.70%
Others	10.80%	12.90%	9.90%	14.00%	46.50%	48.40%	41.90%	47.90%
Shops	6.30%	8.20%	8.20%	6.80%	50.00%	52.80%	43.30%	48.40%
Telecom	19.70%	17.10%	17.20%	18.40%	46.00%	42.20%	36.50%	45.10%
Utilities	16.80%	25.60%	25.60%	15.40%	33.60%	35.00%	33.90%	28.70%
Total	10.10%	12.80%	9.70%	13.70%	49.90%	52.00%	47.60%	54.80%

Table 3 summarizes time-series averages of ROE, ROA, Margin and equity ratio. The averages are calculated for the companies in a risk cluster. Each industry is treated separately. 1 means low sales volatility with flexible cost structure, 2 means low sales volatility with fixed cost structure, 3 means high sales volatility with flexible cost structure and 4 means high sales volatility with fixed cost structure.

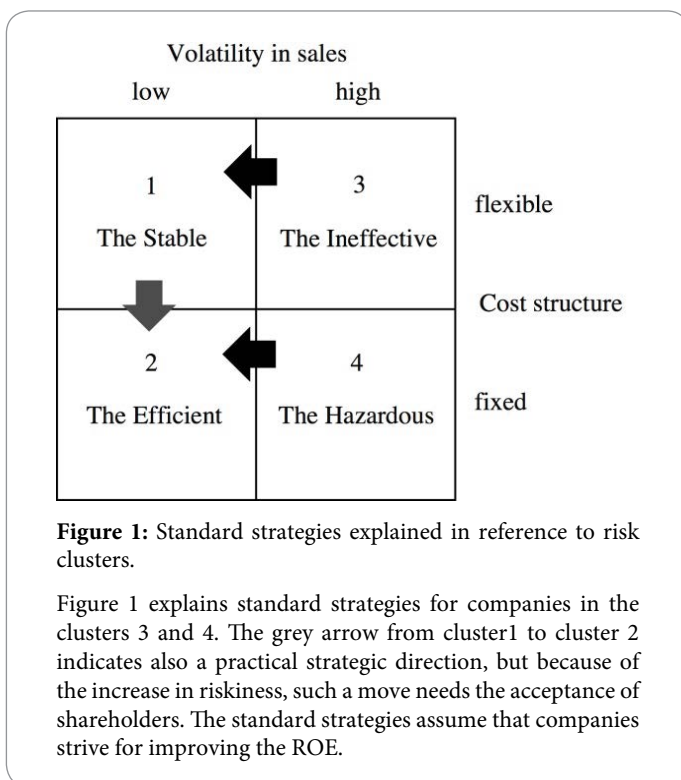
Table 3: Time-series averages of accounting figures for risk clusters.

structure. Analysts are well advised to closely monitor revenue streams, business operations and the leverage ratio. Because of these diverse sources of risk, above average ROE is expected.

These explanations based on the four clusters reveal that actually, only two clusters have an appealing mix of risk sources. “The Stable” and “The Efficient” risk clusters are attractive for investors because they are in good position to achieve high returns with modest risk exposures. Figure 1 makes clear, that the management and analysts should expect the following efforts from cluster 3 and 4 companies.

Because cluster 3 companies face difficulties to materialize changes in sales to improve the bottom line, these companies may invest in a diversification of revenue streams. Because of the high level of riskiness, companies within cluster 4 should also try to reduce their sales volatilities. With lower volatility in sales, such companies benefit still from rigid cost structures. Cluster 1 companies earn stable returns with lowly volatile sales. With a more rigid cost structure, these companies may increase their ROE. The arrow is only grey and not black, because such a strategic change increases the level of riskiness and therefore, the management has to expect reactions from their shareholders. Such above may not be accepted [15].

To conclude, Figure 1 provides analysts and managements with a map and compass, so they know where the target company stands and where the company should go to. Basically, with “The Stable” and “The Efficient” there are only two attractive risk clusters where the other companies should aim at. The general motivation beyond these strategies is either an increase in expected ROE or the reduction of the level of riskiness without a loss in potential ROE.



Conclusion

These considerations explain the usefulness of the OL formula beyond its assignment in management accounting aspects. The simple formula has lots of power to further distinguish between risky and less risky companies within an industry. Fundamental equity analysts benefit from deeper understanding of company’s business risk. The framework with four risk clusters allows monitoring different companies. It is possible to draw conclusions about the strategy of the company from a continuous re-assignment of its cost structure rigidity. This may be useful in portfolio considerations, too.

References

1. Buffett W. To the Shareholders of Berkshire Hathaway Inc. 1998.
2. Lord R. Interpreting and measuring operating leverage. *issues in Accounting Education*. 1995; 10: 317-329.
3. Hodgin R, Kiyamaz H. Extending the profit elasticity measure of operating leverage in managerial economics texts. *Journal of Economics and Economic Education Research*. 2005; 6: 23-36.
4. Kelly E, Sussman R. Operating Leverage: A Clarification. *National Association of Accountants*. 1966; 34-35.
5. Novy-Marx R. Operating leverage. *Review of Finance*. 2011; 15: 103-134.
6. Garcia-Feijoo L, Jorgenson RD. “Can operating leverage be the cause of the value premium?”. *Financial Management*. 2010; 39: 1127-1154.
7. Baruch L. On the Association between Operating Leverage and Risk. *The Journal of Financial and Quantitative Analysis*. 1974; 9: 627-641.
8. Lev B. On the Association between Operating Leverage and Risk. *The Journal of Financial and Quantitative Analysis*. 1974; 9: 627-641.
9. O’Brien T, Vanderheiden P. Empirical measurement of operating leverage for growing firms. *Financial Management*. 1987; 16: 45.
10. Morningstar Research. Morningstar global equity classification structure. 2011; 1-33.
11. Mandelker G, Rhee S. The impact of the degrees of operating and financial leverage on systematic risk of common stock. *Journal of Financial and Quantitative Analysis*. 1984; 19: 45-57.
12. Petersen MA. Estimating standard errors in finance panel data sets: comparing approaches. *Review of Financial Studies*. 2009; 22: 435-480.
13. Petersen MA. Cash flow variability and firm’s pension choice. A Role for Operating Leverage. *Journal of Financial Economics*. 1994; 36: 361-383.
14. Gahlon J, Gentry J. On the Relationship between Systematic Risks and the Degrees of Operating and Financial Leverage. *Financial Management*. 1982; 11: 15-23.
15. Sopariwala PR. Using theoretical capacity to eliminate manipulation of absorption casting income. *Cost Management*. 2007; 21: 40-47.