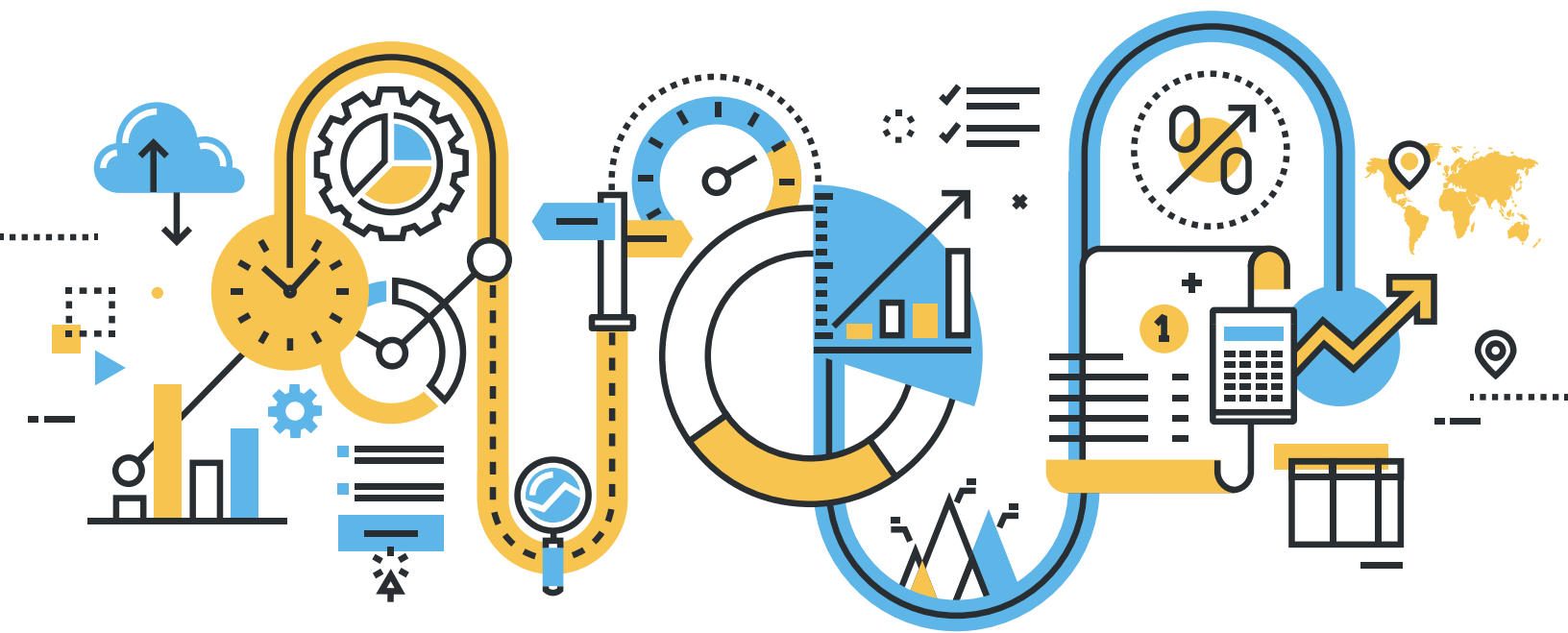


Improving Strategic Risk Management Using Macro Risk Analysis



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Recent data shows that the U.S. economy sputters about every 12 years and that the shelf life of a Fortune 500 company has dropped dramatically. Companies face risk and uncertainties like never before. It is not surprising, then, that companies are looking for new tools to help turn the morass of anecdotal and often conflicting economic reports that fill daily newspapers and clutter the internet into usable information to help identify, understand and manage strategic risks.

Globally recognized enterprise risk management frameworks emphasize the need to understand the bigger picture. ISO 31000's risk management process starts with establishing context by examining both internal and external environment factors such as financial, technological and economic. COSO's new exposure draft on enterprise risk management also highlights the importance of context and lists "considers risk and business context" as one of its principles. COSO notes that the external environment plays a role in the context of meeting business objectives. Even recent strategy books are starting to emphasize and highlight the criticality of the context and environment.

Despite these calls for understanding and managing risk within the business context and environment, there are few tools available for risk-intelligent executives to use in this area. While tools like environmental scans and black swan or scenario analysis workshops are accepted and used, empirical-based tools are not as well-known or as widely-used.

Macro risk analysis (MRA) is one such tool that uses simple modeling to quantify relationships between key indicators and a company's sales. Few risks are of more strategic importance than a company's sales trajectory, which can be determined in large part by changes in the macroeconomic environment. Further, by emphasizing the need to establish the context and understand the bigger picture, global risk management standards like ISO 31000 and the updated COSO framework have opened the door for risk managers to develop and implement tools like MRA.

The Need for Macro Risk Analysis

The financial crisis of 2008 probably did more to convince company leaders of the need for strategic risk management than any other single event in history. As the economy collapsed, CFOs everywhere lost their ability to confidently prepare budgets for their companies. Finance chiefs across all industries were simply unable to forecast sales, leaving them more uncertain than ever about what strategic risks loomed ahead for the future. Boards of directors were asking if the company had a framework and process in place to identify and manage strategic risks. Clearly, boards were interested in understanding more about the context in which companies were operating so as to improve strategic risk assessments.

Almost overnight, risk executives found themselves interviewing internal risk owners and compiling lists of risks to report to their audit committees and boards. But a lot of these risk reports for audit committees lacked an assessment of how the environment—a strategic risk—related to the company’s sales and, by logical extension, its profits and valuation. While risk managers everywhere were starting to report on internal operational risks, strategic risks were largely ignored.

This oversight created exposure for companies on both the downside and upside of risk and opportunity. On the downside, boards were asking, “How bad is it going to get for us?” On the upside, the question was, “Where is the bottom and when will things turn around?” Virtually no one had an answer.

Some companies, however, began work on MRA during the recession. For these companies, the future became clearer and risk planning more tangible. In knowing which indicators drove the business, managers at these companies greatly simplified their strategic planning process, having stripped away the confusing conglomeration of economic data being reported. By knowing not only which indicators to watch, but also the estimated effect it would have on their company’s sales, these managers achieved clarity of vision.

These companies were not caught off-guard, for example, when, in 2012, the housing market hit bottom and began to climb. Quite the opposite: These companies were ready when the housing market turned, and, having ramped up resources, they enjoyed impressive sales growth, which translated into higher profits and valuations.

Clearly, knowing the critical economic indicators that drive a company’s sales combined with the ability to create a simple model is of immeasurable strategic value to company leaders.

An Overview of Macro Risk Analysis

The beauty of MRA is that it is simple. All that is required are some basic Excel skills and a large dose of curiosity about which economic indicators might be driving the business. Virtually all economic data is reported on a quarter-to-quarter, or even month-to-month basis. MRA approach uses a year-over-year, or annual percent change convention. More frequent reporting of economic indicators creates such noise and confusion that it clouds the otherwise valid relationships among economic data series, making correlations with sales figures almost impossible.

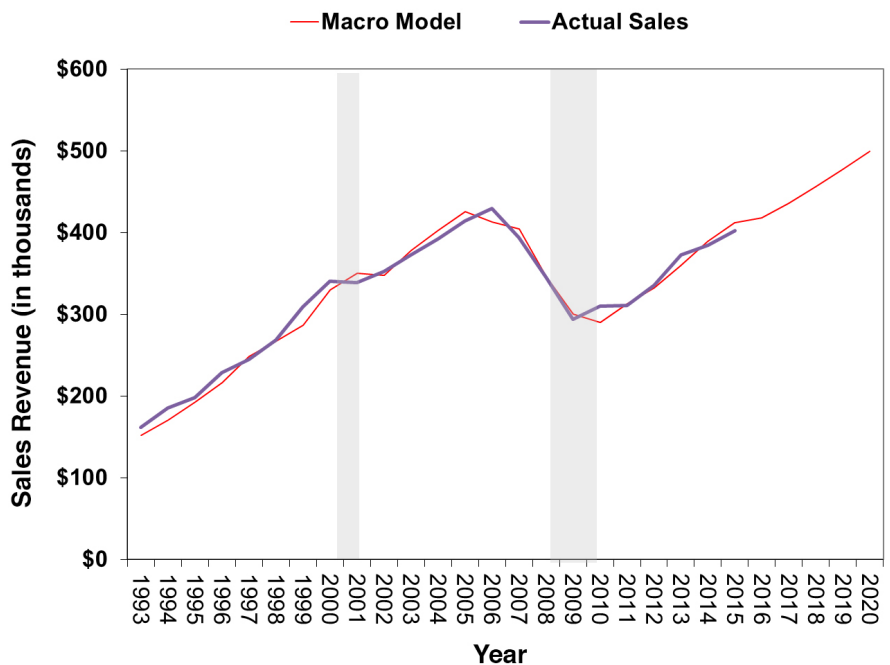
The real power of MRA comes from correlating annual rates of change. More specifically, annual percent changes in selected economic indicators are used to explain annual percent changes in a company’s sales. Once these relationships are quantified, MRA enables the company to more fully understand and evaluate past sales variations and make reliable predictions about future sales. The variables used in an MRA are industry- and even company-specific.

While it is true that the economic drivers in an industry can be common across companies, the statistical relationships can vary widely. This is demonstrated in the case of a higher-end home furnishings retailer exhibiting a 50% correlation between annual percent changes in GDP and sales while a more mainstream, slightly lower-end one correlates at 70%. These correlations are a function of the markets each of these retailers has chosen to serve. Typical examples of the variables used in MRA from across all industries are annual percent changes in GDP, new home sales, consumer confidence or disposable income, just to name a few.

Figure 1, for example, captures actual output from an MRA of an electronics retailer. This chart shows actual and predicted sales for the company over a 24-year period. Over this timespan, the economic indicators explain 80% of the variation in the company’s sales. The remaining 20% is where a company can further differentiate itself relative to its competition.

All of the external data needed to build and run an MRA is publicly available. Sources such as the Bureau of Economic Analysis, U.S. Federal Reserve Economic Data and the U.S. Census Bureau are all excellent sources of free, high-quality data.

Figure 1: Model vs. Actual Sales



Performing the Macro Risk Analysis

The first step in the MRA process is to develop a theory about which economic indicators drive the business. Often this is a very revealing exercise. Business managers’ intuition about sales drivers, while often spot-on, can sometimes be refined by statistical analysis. At this stage it is best to identify as many indicators as possible.

Next, the selected economic indicators need to be “tested” to determine if they do, in fact, have a meaningful influence on the variation in sales. This is accomplished through the use of “scatter plots.” Scatter plots are an excellent source of information about the correlation between two variables. It is as simple as plotting, say, annual percent changes in GDP against annual percent changes in sales. The scatter plots should be examined for “visual” clues that will lead to the indicators having the highest correlation with sales. During this step, new economic indicators as well as indicators that have more influence than originally believed often emerge. This process of discovery and learning can produce critical new insights that company leaders can use to adjust their strategic risk assessments. Take for example an online home furnishings retailer that believed its sales were driven by housing starts (the number of housing units on which construction has been started in a given time period). During the discovery phase of the MRA process it found, in fact, that housing starts were barely correlated to its sales (Figure 2) causing company leaders to search for a more robust economic indicator. That indicator was determined to be new home sales.

In addition to visual examination of the scatter plots, it is helpful to add a trendline to the data. Once the trendline—or line of best fit as it is known in modeling circles—is imposed on the data, Excel will provide the analyst with an R-squared. This is a statistical term that quantifies the correlation between the two variables. In this case, the higher the R-squared the better. Anything lower than 0.20 (20%) should result in discarding the variable being investigated.

The third step in the process is to take those economic indicators that appear to exhibit high correlations with sales and run them through an Excel linear regression model. A note of caution here: The best models for our purposes are those models with the fewest number of variables. This approach enables company decision-makers to focus on a few key drivers of the business

Figure 2: Housing Starts vs. Sales

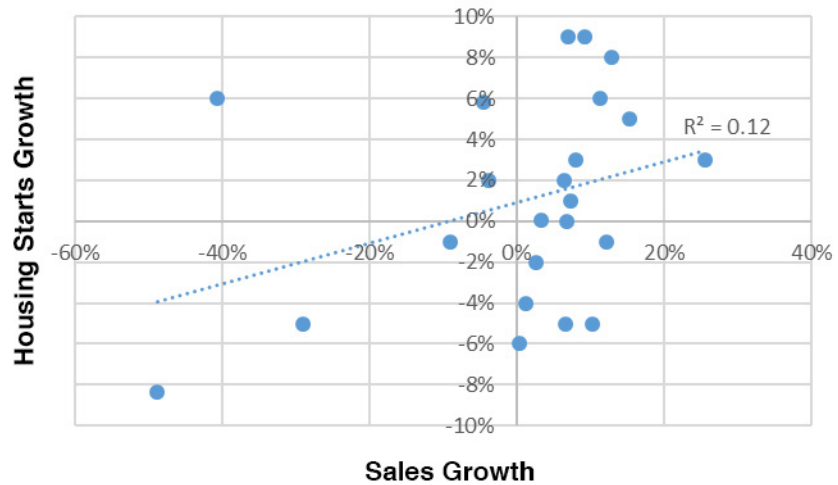
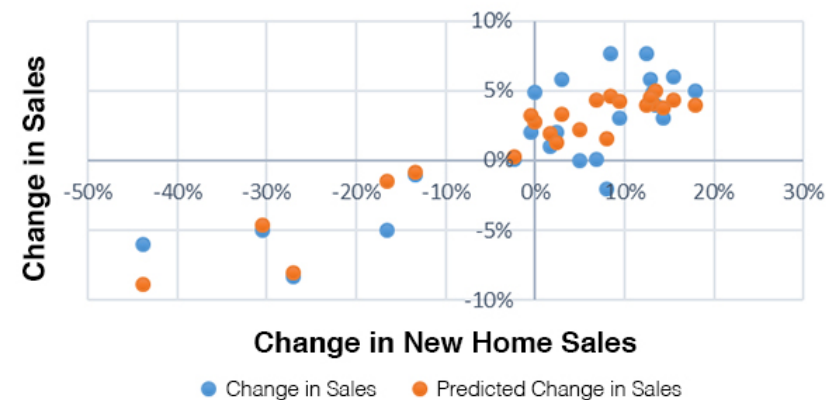


Figure 3: New Home Sales vs. Sales



rather than having to interpret and act on too much data. Revisiting the online home furnishings retailer example, Figure 3 shows a much tighter correlation with new home sales.

Finally, the output from the linear regression model will provide the regression equation. This equation will enable you to explain past—and predict future—sales. Keep in mind that the model is analyzing the statistical relationship between annual percent changes in both the economic indicators and the company’s sales. Accordingly, the results must be converted back to the actual sales levels (see appendix).

Companies need to be able to predict with some confidence the effects of trends in the economic indicators that move their businesses. It is not enough to simply “watch the economy.” If that is all one does, key inflection points in the economic environment will be missed. Rather, the risk manager must be able to exert a more granular, predictive interpretation of how changes in the economy affect the company’s sales and risks. MRA is one tool to accomplish this goal.

Additional Benefits of Macro Risk Analysis

MRA can also help companies with short- and long-term problems around budgeting and strategic planning. Earnings shortfalls are never good, but an unexpected earnings shortfall has market implications. CFOs spend a lot of their time trying to ensure that this risk is effectively managed. Most businesses are subject to the business cycle with a large percentage of their sales determined by the broader economy. By knowing which economic indicators drive its sales, a company can vastly improve its sales and profit projections. Too often annual sales forecasts are simply “bottom-up” extrapolations of perceived current trends. Relying solely on such extrapolations can be dangerous.

Alternatively, knowing the underlying drivers of the business provides a more objective, “top-down” cross-check of “bottom-up” sales forecasts. The result is a more accurate and precise sales projection, one that guards against the overconfidence bias that “bottom-up” budgeting can produce. Additionally, depending upon the amount of operating leverage a company has, variations in sales can cause big swings in

income. Accordingly, the annual budgeting process contains risk and uncertainty, something MRA helps to reduce.

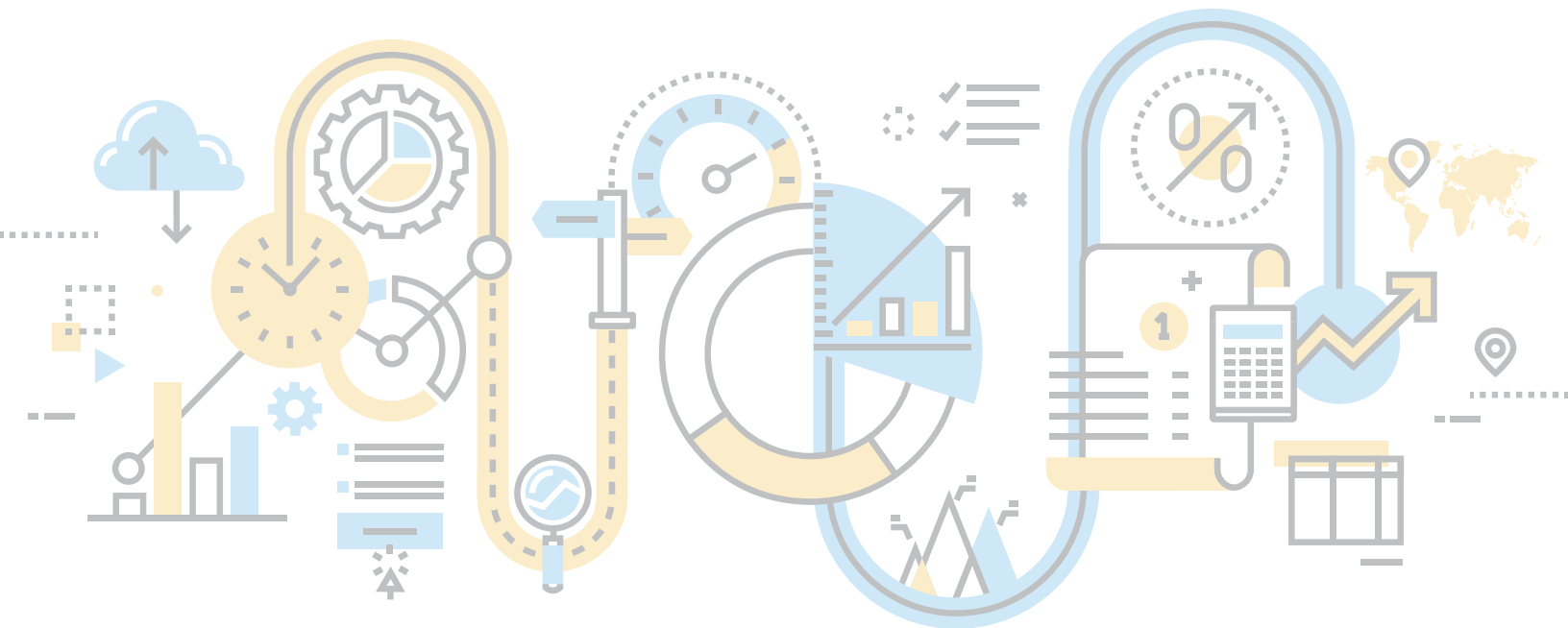
During strategic planning sessions companies develop longer-term business strategies that are based almost entirely on three-to-five year sales projections. These sales projections almost never include explicit consideration of the company’s underlying economic drivers and how they might shift through time. Failing to recognize these shifts over the planning horizon and incorporate them into the strategic plan can result in serious sales forecasting errors. These errors build, cumulatively, with each successive year in the pro-forma financials, ultimately making profit projections and the company valuations that result from them grossly inaccurate.

One of the biggest risks to a company’s strategy lies within the forward-looking sales projections. Depending on the industry, the economic environment explains a large portion—often as much as 80%—of a company’s sales. Failure to explicitly consider this bigger picture is a risk management failure. A robust strategic planning exercise must take into account a company’s statistical relationship with key economic indicators to be a viable and credible plan.

Conclusion

Strategic risk is one of the most important risks an organization faces. Yet few companies have mastered the tool set and skills needed to manage this risk. MRA is one tool that organizations can use to identify what drives a large part of their strategic success.

The conversation around the tool can also make a huge difference. Getting leadership to discuss the model, the results and what the largest drivers of value are can have significant benefits when forming a strategy. A model that reveals or confirms the value drivers can be the recipe for success in certain periods. Additionally, that model can help leadership determine if the company should change the business model or value chain, or if it needs to innovate in order to grow the business beyond what the model reveals are the drivers. An awareness of how those drivers might change or when the related assumptions are no longer valid is essential.



Appendix

Building a macro model consists of three basic steps:

- 1) Gathering data
- 2) Excel regression input
- 3) Analyzing outputs and revising the model, if necessary

The first step involves figuring out the data to use in the model. This can be anything that is related to the business. Economic data such as housing starts, new home sales, GDP or consumer confidence can be used.

The next step is to gather the data from their various sources. Assuming that housing starts and consumer confidence are the variables to be tested in the model, the sources would be *census.gov* and *data.oecd.org* respectively. The data will now need to be “cleaned.” That means that any extraneous data will need to be deleted, and the data will need to be lined up correctly by date and formatted correctly.

Once that the data is clean, manipulation of the data can begin. To generate yearly changes in percent form, insert a column next to the data that you wish to transform. The formula for yearly percent changes for linear regression is:

$$f(x_n) = \ln\left(\frac{x_n}{x_{n-1}}\right)$$

where x is the value from year n. For example, yearly change in housing starts from 1969 to 1970 was:

$$f(1970) = \ln\left(\frac{\text{Housing Starts}_{1970}}{\text{Housing Starts}_{1969}}\right) = \ln\left(\frac{1,433.6}{1,466.8}\right) \approx -2.3\%.$$

This formula is slightly different than the normal yearly change. This formula works better with regression formulas because of some detailed mathematical properties.

Now that the data is clean and transformed, the regression can be run. In Excel, make sure that the Analysis ToolPak is enabled. This can be found in File > Options > Add-ins. This adds the regression functionality to Excel. Before running the regression, make sure that the columns being used are all next to each other with no rows in between them. The model might not run correctly if they are not. Open up the Data Analysis Dialog under the Data tab, and choose regression. The Y Range will be the output (sales), and the X Range will be the inputs (economic data). Choose a place for Excel to place the output that is large enough, so that it will not overwrite any of the data. Now we can analyze the outputs.

The regression output will be very large and have a lot of information, but the main components to pay attention to are the Adjusted R-Square value and the p-values of the variables. The Adjusted R-Square shows how well the variables can predict sales. A value of 0.58 means that 58% of the variation in sales can be predicted by the variables. The p-values denote the significance of the variables. Variables below a certain level (usually 0.05) are thought of as significant, and those that are higher are deemed insignificant. In most cases, dropping variables with p-values higher than 0.05 is best. This makes sure that the model is not good “by chance.”

If the first set of variables has one or more that are insignificant then more variables can be chosen to run a second model, and so on until the best balance of Adjusted R-Square and p-values are met. By obtaining projections about the economic variables, the model can now project future sales.