

The Application of Variance Analysis in FP&A Organizations: Survey Evidence and Recommendations for Enhancement

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Accounting Variance Analysis, a tool widely taught in academic environments, is important to the financial planning and analysis (FP&A) departments of firms. However, there is a dearth of evidence on how variance analysis is really applied in practice. Investor relations quarterly presentations demonstrate a wide variety of formats and variance buckets. Our survey of the FP&A department of organizations finds that while variance analysis is viewed as a very valuable tool, there is significant variation on its actual use. We conclude with recommendations to improve usage of variance analysis.

INTRODUCTION

Accounting Variance Analysis, a tool widely taught in academic environments, has been shown via surveys to be of high importance to FP&A organizations via extant surveys. There is near unanimity that variance analysis is an important tool for business decision-making. However, there is a dearth of evidence that we believe exists as how variance analysis is really applied in FP&A organizations. Investor relations quarterly presentations demonstrate a wide variety of formats and variance buckets. Our survey of FP&A organizations finds that while variance analysis is viewed as a very valuable tool, supporting what others have found, there is significant variation on its actual use. Our survey indicated that nearly all respondents requested a summary of the results with many stating their interest in hearing what others actually do in practice. Our analysis also was directed to the use of a tool within variance analysis often referred to as “walks,” “bridges,” “waterfalls,” and/or “floating bars.”

Today most would agree that data analytics has grown in relative importance as an FP&A tool. Insights from effective data analytics can be directly linked to variance analysis. FP&A roles do offer significant career opportunities for individuals with the correct skill sets and we want to ensure that FP&A professionals are using the most robust variance analysis tools in support of management’s decision-making and Operational Review processes. The robustness can come from knowing what others do, that you may not have considered.

An illustration of the importance of variance analysis comes from Mark Guinan, the Chief Financial Officer (CFO) of Quest Diagnostics who says “Variance Analysis is a fundamental tool for business decision-making. Whether it is comparing performance to budget, or to the prior year, it is the best way to understand the robustness of your ability to forecast, as well as how well controlled your key business

processes are. Using high level BVA tools enables the organization to understand emerging deviations and point one's resources towards the key risks and opportunities as quickly as possible.”

Our belief is that accounting variance analysis is a tool best utilized in planning, meeting commitments (i.e., execution) and/or growth variances. Understanding variances can enhance a company's competitive advantage, demonstrate effective risk management, and increase the probability of meeting commitments all of which may have linkages to creating and sustaining shareholder value.

Our next section provides a Literature Review followed by the Survey Data. The concluding section is devoted to a Summary and Recommendations for FP&A practitioners. An appendix is devoted to sample real world Variance “walks,” “bridges,” “waterfalls,” and/or “floating bars.”

LITERATURE REVIEW

While the specifics of how variance analysis is used by FP&A is not well known, we do know from prior research and surveys it is a tool that as a generalization is critical to the FP&A toolkit. When surveyed about how his firm uses variance analysis, Donald Allan, the CFO of industrial company Stanley Black & Decker told "One of the most important elements to drive agility in today's dynamic business environment is the ability to execute operating performance commitments within a particular planning period, despite changes in business conditions. At Stanley Black & Decker, we place a heavy emphasis on the development of a robust set of business drivers that provide a strong foundation for reality-based performance expectations. These drivers are developed using internal and external factors relative to the business segments that we participate in, and complemented by a variance analysis process that continuously evaluates our performance vs. these drivers. This is one of the most critical value-added activities led by the Finance team to effectively track performance and, importantly, make adjustments as necessary to stay on track to deliver our financial commitments."

In the academic literature, Hansen, Otley, and van der Stede (2003) point out its practicality and use in industry budgeting. Kaplan and Atkinson (2015) discuss the technique as a major tool used in industry from a financial accounting perspective. As Balkrishnan and Sprinkle (2003) show, variance analysis can be used as part of a framework to improve managerial information and decision making. Chenhall and Langfield-Smith (1998, 1999) show that 95% of firms use variance analysis for business control purposes. Aruomoaghe and Agbo (2013) provide a thorough analysis of the uses of variance analysis in practice.

Variance analysis in a meeting-commitments framework is typically a fundamental pedagogy in the financial and accounting entry-level training programs of numerous global corporations. Fowler (2011) and Tan, Fowler and Hawkes (2004) show survey evidence that clearly demonstrates that accounting variance analysis ranks consistently higher in importance to practitioners than to educators, and that its practical importance had increased between 2001 and 2010. These findings are consistent with the research by Adler, Everett, and Waldron (2000). Overall of 21 significant managerial accounting techniques, practitioners rank variance analysis as 3rd to 4th most important while educators rank the tool at 10th to 13th most important according to Fowler's findings in 2001 and 2010. A CIMA study (2009) found that 70%+ of respondents viewed variance analysis as a critical tool. Only forecasting was viewed as being somewhat higher but in our opinion forecasting is a fundamental input to variance analysis.

A required disclosure of the SEC is for the MD&A section of a Form 10K to include an analysis of variances with regard to prior year (not prior year to budget or actual to budget). There is currently not a specific methodology that must be followed. Interestingly, we have found a very preliminary source of variance specific buckets is often seen in IR Quarterly Presentations to Wall Street and typically in a form of a variance walk or bridge.

Even given the aforementioned significant literature on variance analysis beyond price and volume variances little is known about specific applications or variance buckets in practice. This is a primary motivation of our current survey, knowing it is a great tool, how is it actually used.

SURVEY DATA

Our survey was comprised of data specific and open-ended questions. The tool was survey-monkey. The survey was sent to 2553 finance professionals with 154 respondents. The response rate was 6% (surveys of finance professionals by both the academic and practitioner world show response rates of 5 to 10%). While we cannot claim total elimination of a nonresponse bias our response rate we do have comfort in the fact that the response rate for the Fortune was over 30% of the Fortune 500 and all industries were represented. One interesting fact was even given the smaller sample size everyone indicated an interested in receiving the follow up summary with many noting they also were not aware of the differences across FP&A organizations. The distribution of respondent's titles is given by:

TABLE 1

CFO	23
Sr. Dir. Finance	45
VP Finance	27
VP FP&A	36
Controller	5
Other	18
Total	154

The industries represented in the 154 are a cross-section of the global economy (manufacturing, service, financial, utilities, short-cycle, long-cycle, high-tech, energy and commodity).

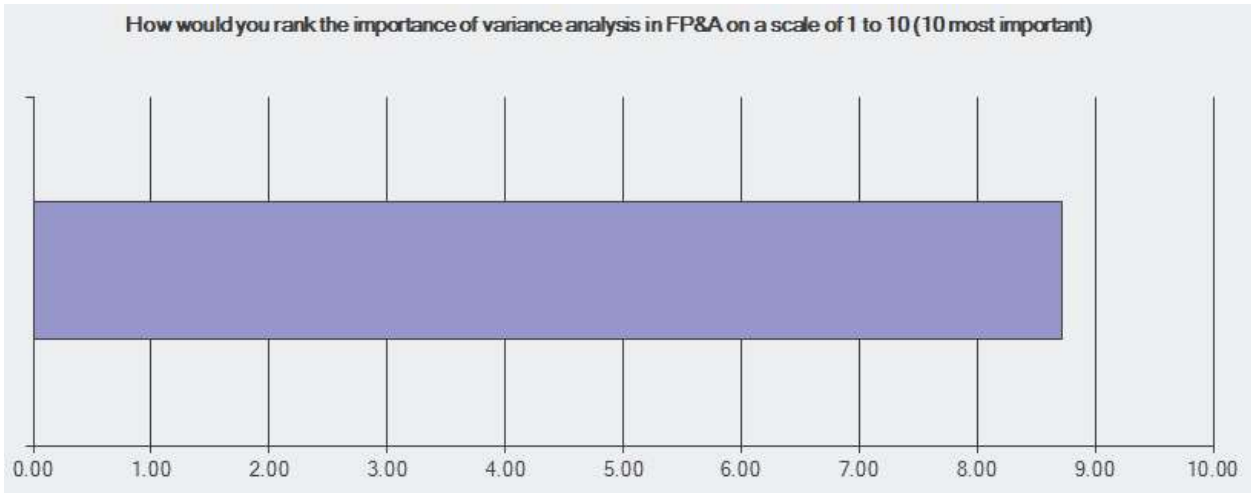
SURVEY RESULTS

All of our non-open-ended questions are below in *italic*. Details of the open-ended questions are embedded into the discussion as appropriate.

How would you rank the importance of variance analysis in FP&A on a scale of 1 to 10 (10 highest)

We will demonstrate below that there is significant differences in the application of accounting variance analysis. However, there is broad agreement among the respondents that variance analysis is an important factor in the FP&A toolkit. Survey participants ranked the importance of variance analysis at 8.7 out of 10 as seen in Figure 1 below. When asked for comment on what tools were more important than variance analysis, only data analytics was consistently referenced. This result is consistent with the aforementioned literature on variance analysis.

FIGURE 1



Do you use variance analysis walks in your professional role?

Figure 2 below shows that the vast majority of survey participants were familiar with variance walks and used them to some degree in their professional roles. This does not imply the 14 who did not use variance walks did not use variance analysis or were not familiar with it. The key is that variance analysis walks are widely used in practice which supports the fact that IR presentations will often have graphical versions of the walks. In appendix 1 and 2 we present the generic calculation of a variance graphic as well as an example from a Cooper Standard IR presentation with essentially the same variances in practice.

FIGURE 2



At what levels of the P&L are variance walks used?

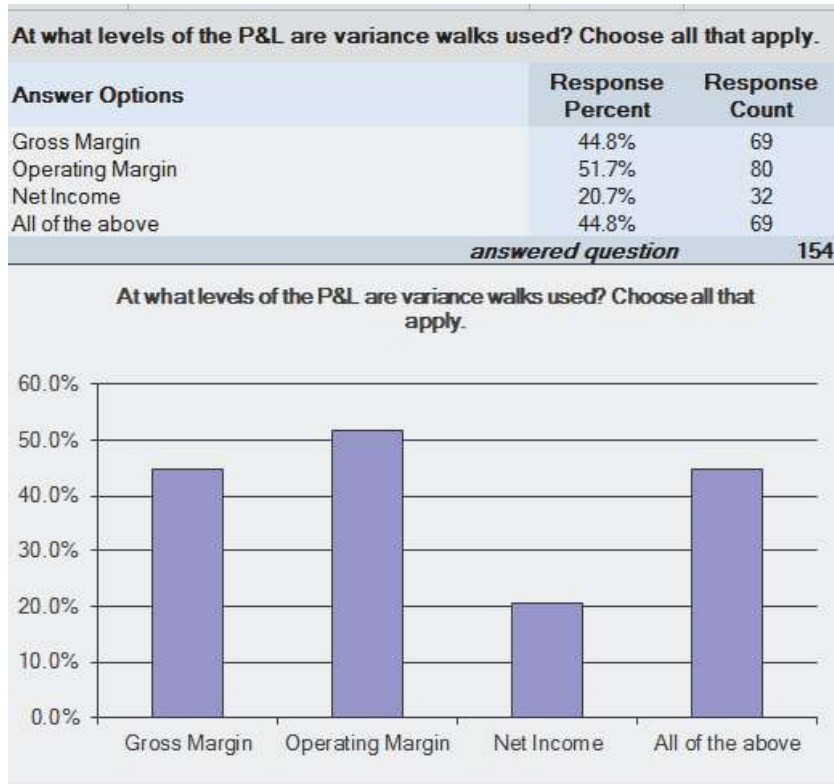
Executives analyzing operational firm performance typically want to understand how the firm is performing based on one or more key performance indicators or KPIs. Chief among these KPIs are gross margin, operating margin, and of course, net income.

Variance walks are used with all three of these KPIs by large portions of the respondents. As Figure 3 below shows, most business professionals use variance walks in at least two KPIs. Survey responses add up to more than 154 total responses because most survey participants indicated that they used variance walks in at least two of the following: gross margin, operating margin, and net income. In fact, nearly half of all survey participants used variance walks in all three of the P&L KPIs.

Not surprisingly, fewer respondents used variance walks in analyzing net income than in gross margin and/or operating margin. This may seem contradictory given the fact that net income is arguably often viewed as the critical KPI (along with cash flow) from a shareholder’s perspective. The reality is from an operational and business review framework the focus is on execution risk and drivers of profitable growth with emphasis on gross margins (internally contribution margins) and operating margins. As we referenced before data availability and integrity within an IT system that can be easily accessed is crucial.

Note that we do not specifically have cash flow in Figure 3. We did find from our open-ended questions that approximately 60% of our sample companies do routinely do cash flow variances. The vast majority of the difference simply responded “No.” This is surprising given the growing emphasis on Free Cash Conversion in a lower growth environment. We would say that in IR presentations even when a business presents “walks,” “bridges,” “waterfalls,” and/or “floating bars” it is on operating margin. We know of very few that present cash variances during IR presentations. See appendix 3 for a cash flow variance walk from Pentair. There is one truth that cash flow is harder to forecast typically than margin due to the fact that you need to right on both the balance sheet and income statement. Simply, there are more places to go wrong and some may be in the uncontrollable arena.

FIGURE 3



Which of the following variances do you commonly calculate? Cost is the inflation/deflation associated with input prices (e.g., labor and material).

The generally accepted primary drivers of margins at the operating income level of a P&L (the most highly used from Figure 4 are price, volume, mix, cost, productivity and FX. Cost certainly can be different from price (e.g., price inflation of -2% due to competitive top line competitive pressure at same time the business faces material price increases from a shortage or negotiations that have increased wage rates). It is also generally recognized that productivity has to be in real terms, otherwise supplier management initiatives like negotiating lower prices would be considered productivity which is not correct. That may be good supplier management but belongs in the cost bucket of variances.

In Figure 4 it is not surprisingly almost 95% of survey respondents indicated that they calculated volume variances, while 87% said they calculated price variances. As we referenced before in the MD&A section of a Form 10K the SEC would in general be expecting such a breakdown. A critical, oft forgotten operational reason for knowing the price and volume variances is the incremental value of pricing power (the old 1% change in prices being more valuable than a 1% increase in volume, with the contribution margin being a determinant of the true differential). The implication is a price increase falls directly to operating margin but a volume increase has associated variable cost thus only incremental contribution margin (always less than price) flows to operating margin. Despite that, comments from many survey respondents suggested that volume is seen as being an easier lever to control than price and volume can have longer term value than price (e.g., after-market growth). All of the Data Analytics that attempt to optimize price would be found in the price bucket. The comments of the survey indicated that systematic bias often occurred in volume variances (on the high side). Other variance buckets varied typically without any long-term bias.

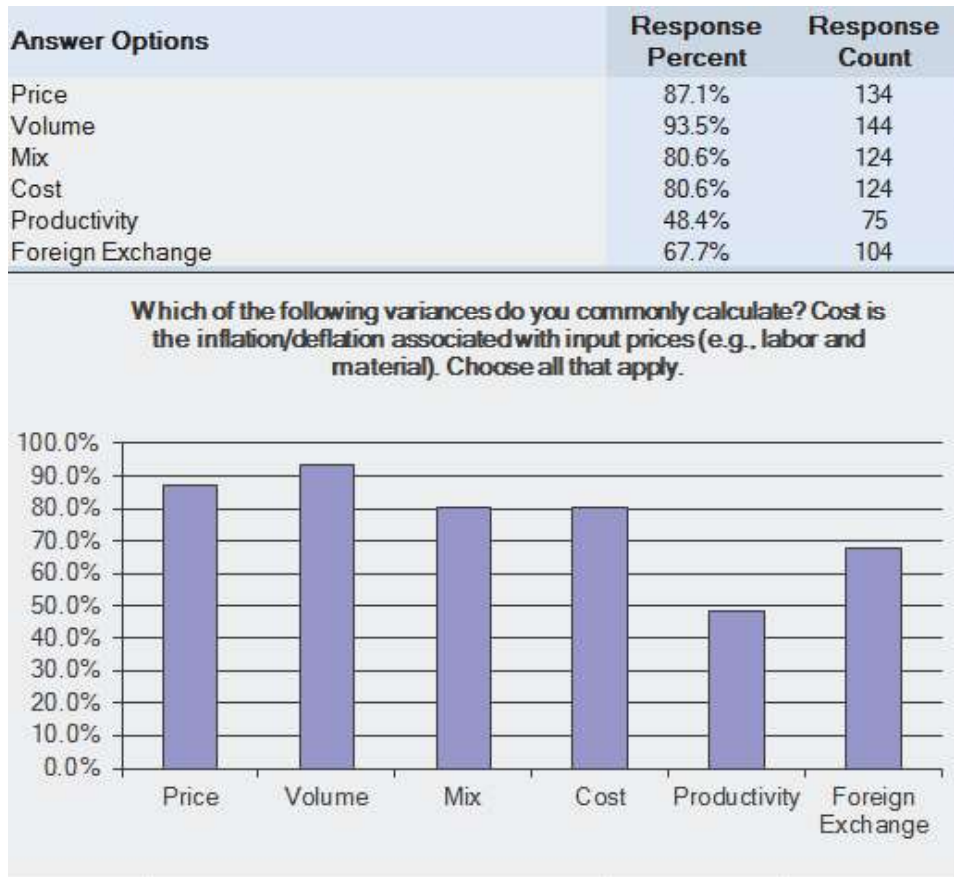
Outside of price and volume, most survey respondents also indicated that they used variance analysis when examining results related to mix, supply chain costs, and foreign exchange results. Many respondents commented about the difficulty and divergent methods of properly calculating mix variances and as suggested before the importance of data availability on a product line basis for success. Foreign exchange gains and losses on a translational level go into FX variances and unfortunately often become an excuse for management misses.

Our primary surprise was the response rate on productivity variances. This may be due to cost variances being in nominal terms (as opposed to taking cost out the correct thing to do). Productivity variances should be reasonably within your control and would represent the summation of all initiatives on improvements in processes and procedures. Some businesses will breakdown productivity into variable and fixed (base) cost to really isolate who is contributing or not. To isolate the impact of lean manufacturing success and/or failure would require a true productivity variance without cost embedded.

Another surprise was the comment that many felt these variances are independent which could not be further from the truth. Because in variance analysis we have a known beginning and end point any change in basic assumptions will shift the allocation of the \$ to a particular variance bucket.

An excellent example of showing P&L KPIs with the associated Operating Margin Walk and pricing variance is found in Appendix 4 from Petrobras.

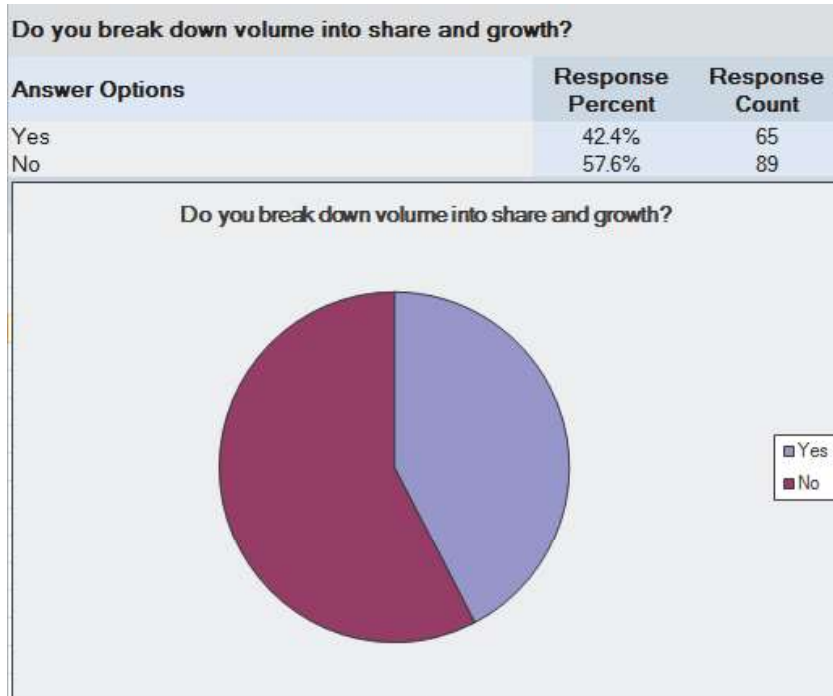
FIGURE 4



Do you break down volume into Share and True Growth variances?

As Figure 5 indicates over 57% of respondents do not breakdown volume variances into share and true growth. This is a surprise to us given the wide spread calculation of volume variances in Figure 4. From our experience, this is a missed opportunity (assuming appropriate data is accessible) because a business can have a positive volume variance but be losing share. The other reality is if the overall market has positive growth you can join in the rise (given the tide can raise all boats) but be losing share and you may be compensating sales with variable comp. for the tide and not true incremental growth. Similar to why cost and productivity have to be separated in Figure 5 (you may have very successful lean manufacturing that drives the entire cost variance yet you end up compensating the supply chain team for positive results when none exist. This concept of breaking down the variance into share and true growth is also critical for working capital variances in cash flow on A/R.

FIGURE 5



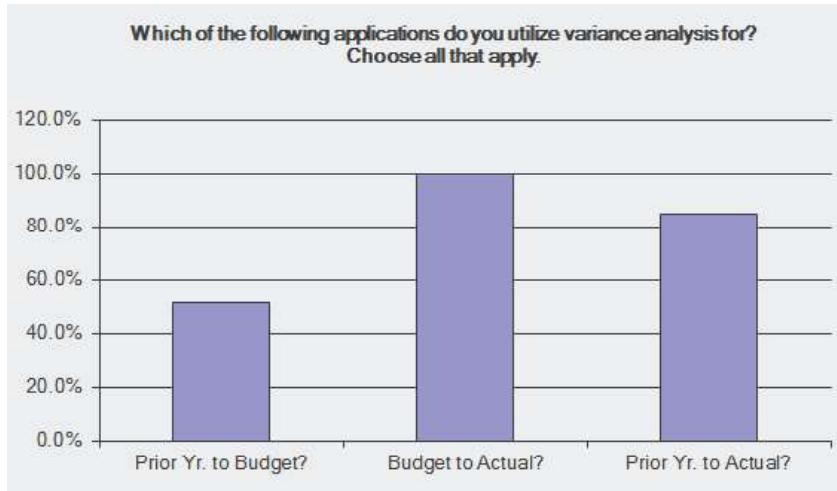
Which of the following applications (Pr. Yr. to Budget, Budget to Actual, Pr. Yr. to Actual) do you utilize variance analysis for?

This question we believe is critical for any business that is simultaneously concerned with planning, meeting commitments and growth. Prior Year to Budget is planning, Budget to Actual is meeting commitments and Prior Year to Actual is growth. We refer to this a “3-Up Walk.” Year could easily be a month, Qtr. or any period of relevant time. Figure 6 presents the data. We knew from our experience that internally that Budget to Actual would be widely used and the 100% is not surprising (this is rarely shared with Wall Street in IR presentations). Careers in business, in particular for General Managers can be made and lost when it comes to meeting commitments variances. Prior Year to Actual over 80% is also expected and is typical for those that use variance analysis and walks in IR presentations. The reason is this is what growth is all about.

What did surprise us is that only approximately 50% of respondents used variance analysis in the Prior Year to Budgeting framework. This is a potentially large missed opportunity from a risk management perspective. In fact, pro-active risk management can be intimately linked into this form of variance. The reason is by seeing what percentage a variance bucket is to the whole V for the year can indicate a risk or potential pain point. For example, if you were in a competitive market and your price variance was 70% of the V in a Prior Year to Budget framework odds are you have a risky plan. If you did not perform the variance analysis and just lined up the P&Ls associated with prior year and budget there is no human mind we know that could see thru all of the math and tell you the 70% number. Risk would be embedded within the plan. As part of a pre-mortem process always consider variance analysis. Missed Opportunity!

See appendix 5 and 6 for a generic numerical example of the “3-Up Walk” and a Pro Forma Pentair OM Walk.

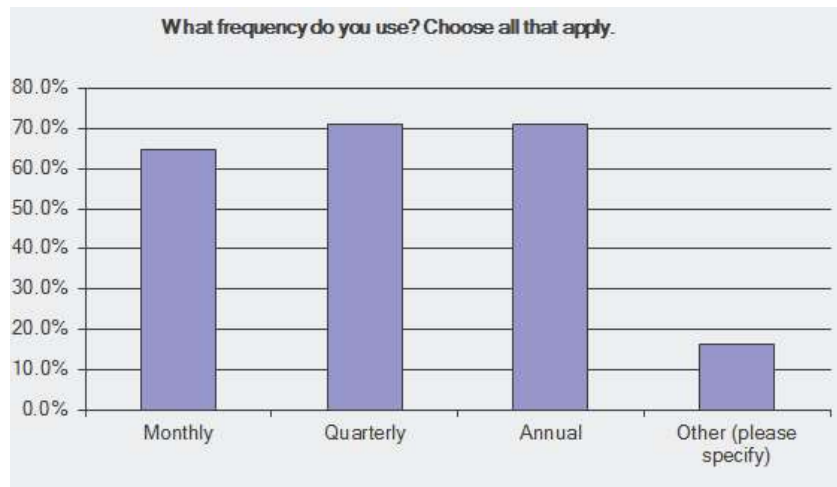
FIGURE 6



What frequency to you use analyzing variances?

Reflecting similar discrepancies in variance use, respondents indicated significantly different frequency for their calculation of variance walks. Figure 7 demonstrates that while 71% and 72% indicated that they performed variance analysis on a quarterly and annual basis respectively, 65% also computed variances on a monthly basis. An additional 17% of finance professionals indicated that they computed variance analysis on either a daily basis or an on-demand basis. Our experience indicates that the frequency of variance analysis applications had increased since the global financial crisis of 2008-09. Another major factor respondents reported in the increasing frequency is the use of real time data (naturally, depending on the industry) in particular in POS environments. This would certainly be true with sales variances but not likely in a total cost framework.

FIGURE 7



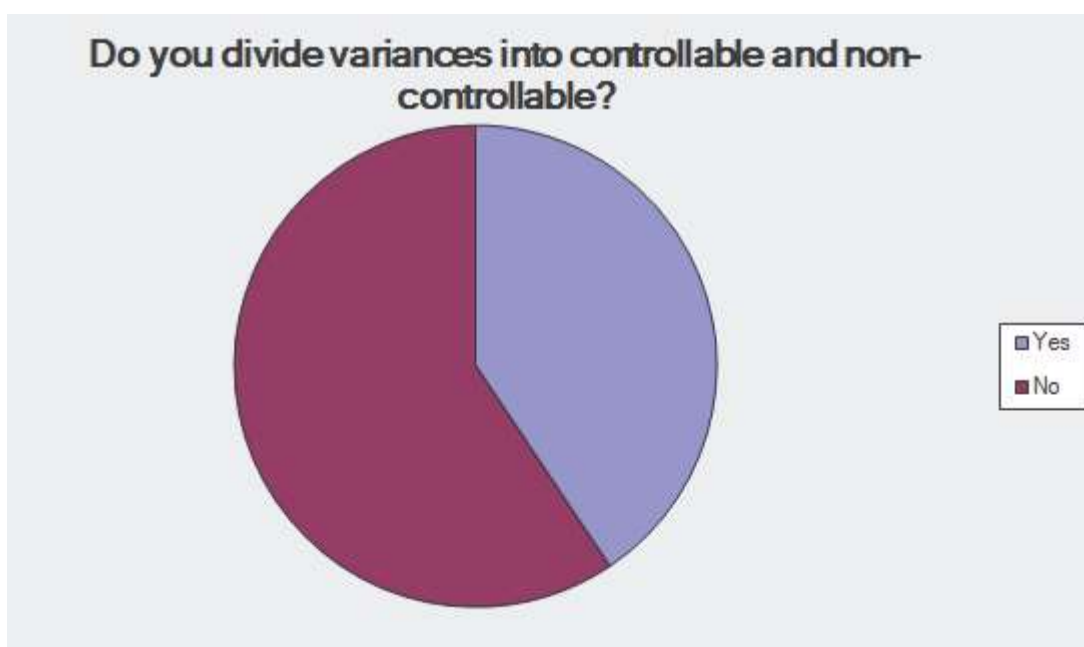
Do you divide variances into controllable and non-controllable?

While most of the corporate finance world is using variance analysis in some form, there are considerable differences in how it is calculated and presented internally and externally. The differences in variance buckets (price, volume, etc.) and frequency are two instances of the differing practices in industry. Presentation of variance by controllable versus non-controllable factors is a third aspect where

practices differ sharply between firms. All public (and private) businesses today as part of any operational and/or business review routinely discuss Risks and Opportunities (R&Os). The SEC requires a “Risk Factors” section of macro and micro risks the business faces. Enterprise Risk Management (ERM) require from the BOD level that processes be in place to identify, measure, analyze and handle (mitigation as an option) risks that could negatively impact on management’s ability to meet its strategic objectives. As such clearly articulated controllable and non-controllable variances should be always identified. It is true that to some degree reasonable people can differ on the degree of controllable or not and this is often a subjective qualitative discussion around residual risk (after controls are in place).

Figure 8 below, reveals that 41% of survey respondents indicated that they break out variances by controllable and non-controllable factors, but roughly 59% do not. This should not be taken that 59% are not evaluating R&Os. We do find this surprising given the discussion above on ERM and “Risk Factors.” Our recommendation of this breakdown should in no way imply we expect a risk aversion relative to the true corporate risk appetite as defined in ERM (See Appendix 7 for example of BHP Billiton and their use of EBIT waterfall with external (uncontrollable) and controllable variances).

FIGURE 8

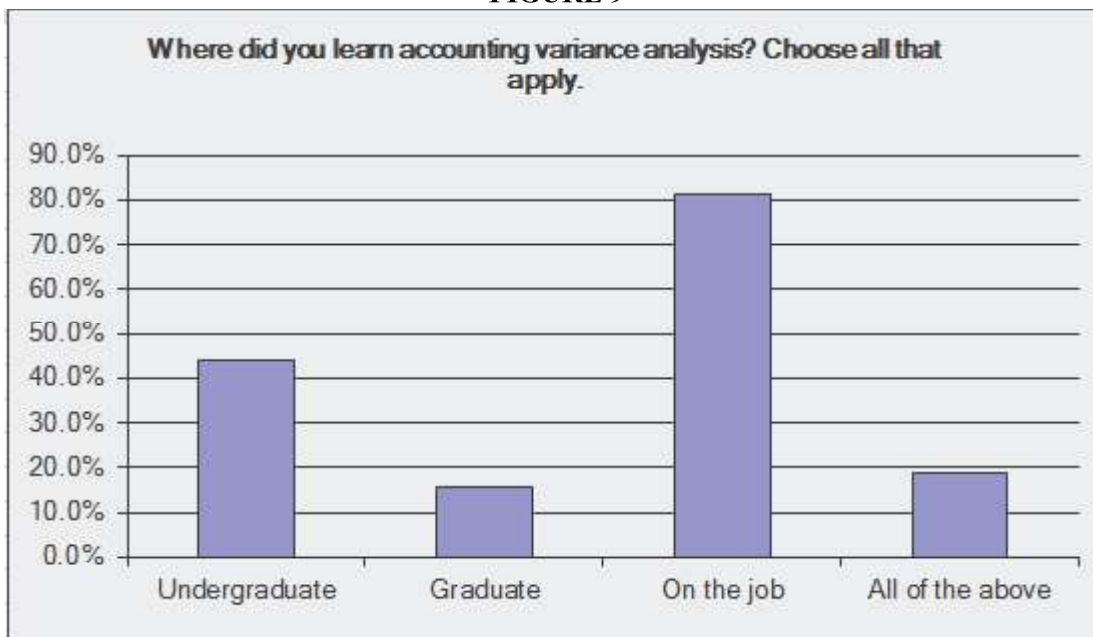


Where did you learn accounting variance analysis?

Interestingly, despite the widespread use of variance analysis and its reported importance, relatively few financial professionals reported learning the concept during college. Figure 9 demonstrates that 43% indicated that the topic was covered during their undergraduate education (most likely in a cost or management accounting environment) while just 15% said it was covered in graduate school. The vast majority of respondents indicated that their exposure was primarily on the job (which could also be an entry-level and/or financial corporate education program). Corporate entry-level finance programs with 2 year rotational assignments we are aware of devote significant more time to variance analysis than in a university setting. In fact, most finance professionals receive their introduction to operational reviews on the job not in a university setting. Conine and McDonald [] have posited a grey zone in the academic world as to appropriate discipline(s) should be responsible for the pedagogy of variance analysis and have felt that given the cross functionality of budgeting and variance analysis that is really is not learned until on the job without an experiential exercise to enforce the learning. Experiential learning has a much

higher rate of learning retention than lectures, problem sets and/or cases which may also explain the fact learning really did not occur until on the job.

FIGURE 9



CONCLUSIONS

Accounting Variance Analysis has been shown via surveys to be of high importance to FP&A organizations via extant surveys. There is near unanimity that variance analysis is an important tool for business decision-making. However, there is a dearth of evidence that we believe exists as how variance analysis is really applied in FP&A organizations. Our survey of FP&A organizations found that while variance analysis is viewed as a very valuable tool, supporting what others have found, there is significant variation on its actual use. Our analysis also was directed to the use of a tool within variance analysis often referred to as “walks,” “bridges,” “waterfalls,” and/or “floating bars.”

Our belief is that accounting variance analysis is a tool best utilized in planning, meeting commitments (i.e., execution) and/or growth variances. Understanding variances can enhance a company’s competitive advantage, demonstrate effective risk management, and increase the probability of meeting commitments all of which may have linkages to creating and sustaining shareholder value. Data availability and integrity within an IT system is a given for variance analysis to have practical value.

To maximize the benefit of variance analysis in the framework of planning, meeting commitments and/or growth variances (again recognizing planning is ex ante and with incomplete information while meeting commitments and growth are ex post) we offer the following suggestions for FP&A to consider in implementing this tool:

- Understand the leading generic and custom indicators of your business knowing their correlations to each other may vary over time,
- Understand your value stream and plan with a diverse cross-functional team that asks tough questions while thinking about a wide range of outcomes as opposed to point estimates. Have a process in place for coming to a consensus, but get contrarian opinion,
- Watch for systematic biases in your variance buckets by back testing,

- Consider segmenting your variances in controllable and un-controllable from a risk management perspective,
- Increase your usage of cash flow variance, always remember the old adage “If the cash does not flow, the answer is No”,
- Consider adapting a “3-Up Walk” perspective of planning, meeting commitments and growth variances, at both a gross and operating margin levels,
- Breakdown your volume variance into share and growth so you know the difference between the tide and your management’s ability to grow,
- Determine accountability for failure to perform; who has ownership of a negative variance to plan?
- Recognize that behavioral biases will be built into your forecasts and work to eliminate them,
- Provide a continuing education process around best and worst practices in variance analysis,
- Implement periodic checkpoints, allowing for quick updates and early “smoke alarms”,
- Create a stretch, as well as a hedge or contingency, in your plan,
- Link all business decisions to strategy, a goal of ERM, while balancing the short and long terms,
- Uncertainty is acceptable; surprise is not, thus communicate early, openly, and continuously. Early Misses may have time to be fixed, in particular if you have a systems profitability belief.

Of course, these suggestions are not mutually exclusive or exhaustive, and individual practitioners can certainly contribute their own unique perspective on the topic. The goal of this article has been to explore how finance professionals view variance analysis, but it would be remiss to suggest that this completes the discussion of this important topic. Variance analysis is a powerful tool for business, and one that is set to become even more powerful thanks to the rise of greater data use.

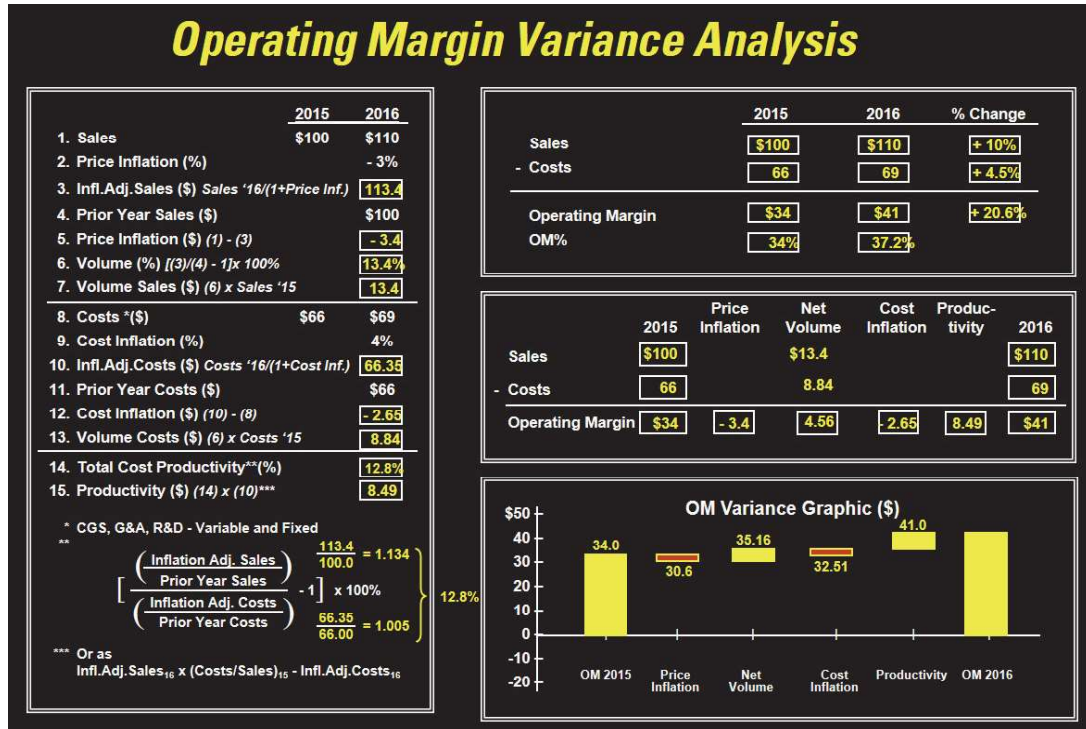
Putting some of these recommendations into practice can get messy in a matrix organization of multiple authorities and unlimited solid and dotted-line relationships with accountability to many. In such an environment, organizational clarity around structure and process is essential. Everyone must properly understand their roles and responsibilities and to whom they are responsible. FP&A’s responsibility is to help others in their sphere of influence make sound business decisions with the goal of creating shareholder value. Variance analysis is at the heart of business performance.

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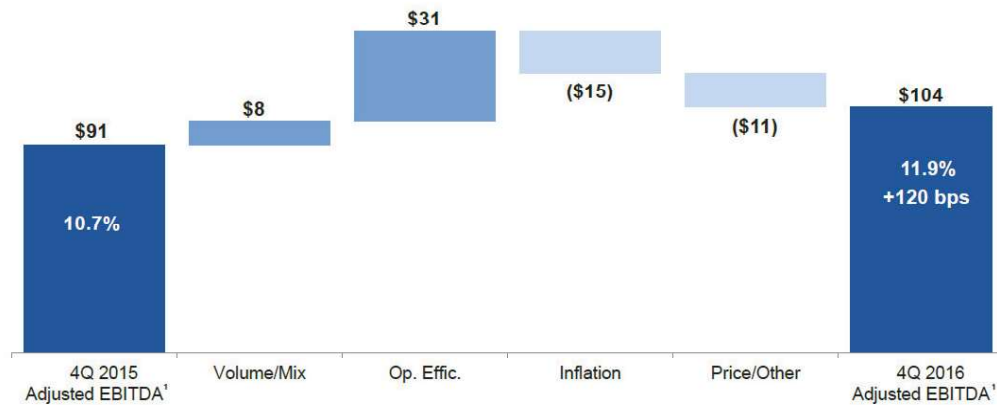
APPENDICES

APPENDIX 1
GENERIC EXAMPLE OF VARIANCE BUCKETS

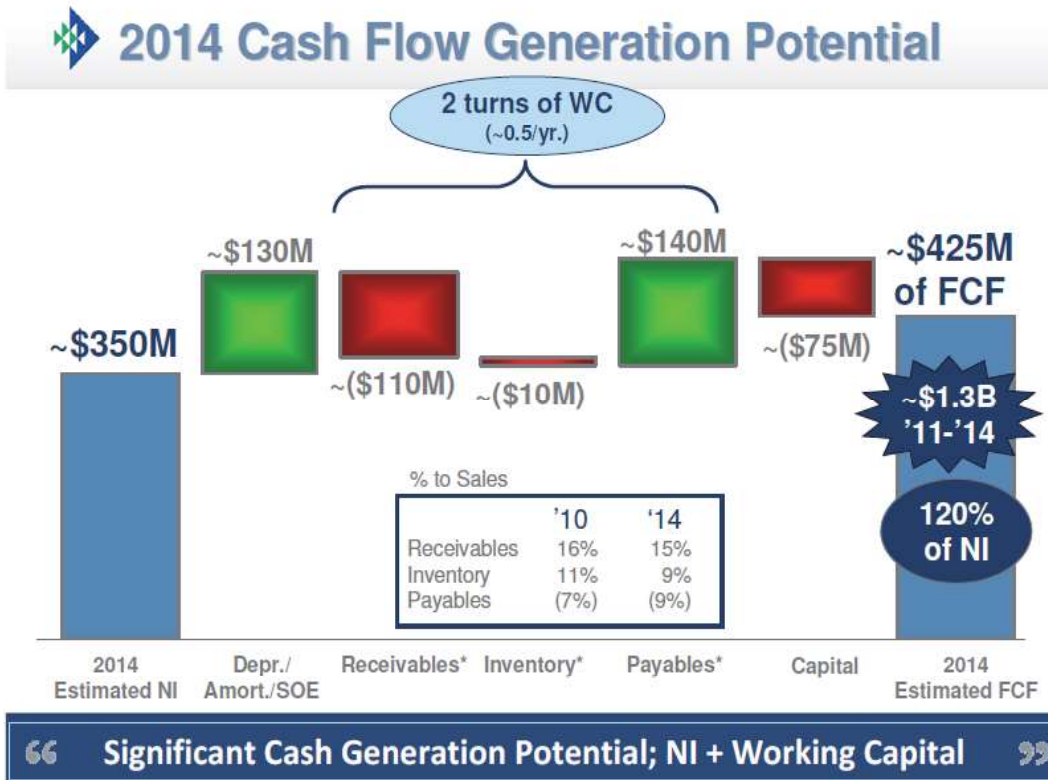


APPENDIX 2
COOPER STANDARD IR PRESENTATION WITH VARIANCE BUCKETS
(NOTE SIMILARITY TO 1 – GENERIC EXAMPLE)

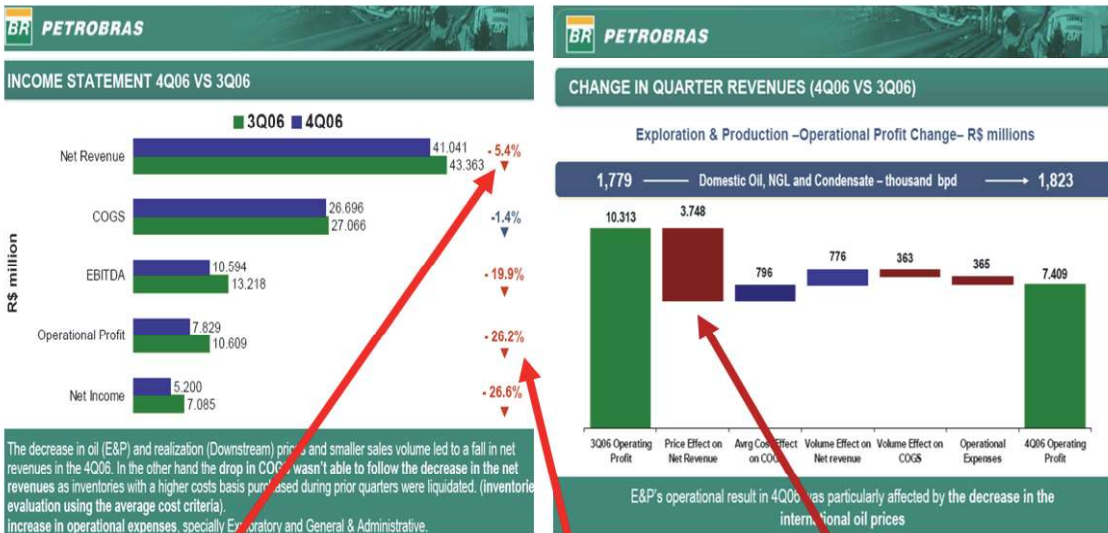
Quarter-Over-Quarter Adjusted EBITDA Bridge
(USD millions)



**APPENDIX 3
PENTAIR CASH FLOW VARIANCES**



**APPENDIX 4
PETROBRAS KPIs AND VARIANCE WALK WITH PRICE VARIANCE LINKAGE**



Net Rev is Off 5.4% while Operating Profit is Down 26% ... Note the Impact of Negative Price on Walk

**APPENDIX 5
GENERIC 3 UP VARIANCE WALK...LOOK FOR RICK IN PLANNING NOT POST**

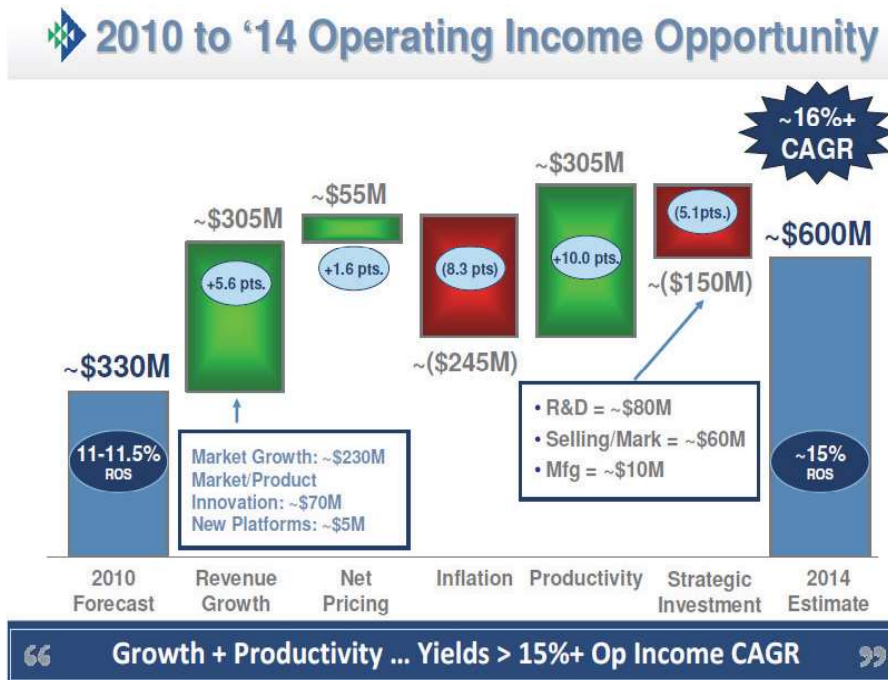
2017 "OM" Variance Analysis – Risk Perspective

		Variances (\$000s)						Comments on Plan to Actual
		Planning		Meeting Commitments		Growth		
OM	2016 Actual	100	2017 Plan	110	2016 Actual	100		
+Σ	Price*	2		-1	=*	1		Competitive pressure... failed to lock in forward price contract
	Volume*	4		-6	=*	-2		Lost anticipated national account
	Cost*	2		4	=*	6		E-Buy auction process expedited
	Productivity*	1		-1	=*	0		Driver strike in Q3
	Mix*	0		1	=*	1		Remote Diagnostics Service offered in Q4 ahead of schedule
	FX*	1		-1	=*	0		EURO did not strengthen
	= OM	2017 Plan	110	2017 Actual	106	2017 Actual	106	

Where Do We Look for the Risk ?

* This is an approximation to technically correct on the summation

**APPENDIX 6
PENTAIR PRO FORMA OPERATING INCOME WALK
(NOTE VARIANCE SIMILARLY TO GENERIC IN 1) CAN YOU SEE ANY POINT OF RICK IN PLAN?**



APPENDIX 7 BHP BILLITON UNCONTROLLABLE (EXTERNAL) AND CONTROLLABLE VARIANCES

Group EBITDA waterfall

