Sales and Production Volume Variances in Standard Costing

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Abstract:

In this paper we discuss the choice of a numeraire for the calculation of the sales volume variance. The sales volume variance seeks to report the effect of the actual sales volume being different from the budgeted sales volume. If different numeraires are possible, then different values for the sales volume variance will exist for a given deviation between planned and actual sales levels. We observe from the explicit or implicit materials in various common cost accounting textbooks that at least three numeraires are in evidence of use. These are: sales revenue; contribution margin and full-cost margin. The objective of this paper is to compare the effects of using the different numeraires. We also discuss the interrelationship between sales volume variances and production volume variances as two of the numeraires lead to the reporting of the production volume variance while the use of the contribution margin as a numeraire leads to a situation where the production volume variance cannot exist. In order to illustrate these concepts in an accessible form we present a case study. The case study demonstrates the results that are obtained when three different managers, each using a different numeraire, report on the results of a company where sales volume has missed the budget by a substantial amount. Given the strategic importance of making realistic sales forecasts and achieving sales targets, then this issue of reporting the effect of deviations from targets is of major importance.

Keywords: Production volume variances; Sales volume variances; Standard costing variances.

Introduction

Sales-related variances are critical to the management of any organization. It is difficult to imagine any control area where there is such a high degree of variability, and so serious an effect on the operating income. Sales-related variances would include sales price, sales volume, sales mix, sales quantity, market size and market share variances. It is the purpose of this paper to examine the basis upon which the calculation of sales volume variances is done, and to consider their interaction with production volume variances.

As a related topic we would wish to show the importance of reconciliation in the presentation of variance reports. Reconciliation ensures that a set of variances that has been calculated comprehensively explains how the organization got from its original plan (the static budget) to its actual results.

Modern management techniques such as activity-based-costing have made significant strides in improving our planning and reporting in many instances. However, a substantial number of organizations still rely on standard cost variances as a main part of their control function, so this topic is important.

Choice of a Numeraire

A "numeraire" is a basic standard by which values are measured (Random House 2008). When standard costing sales volume variances are calculated it is necessary to select a numeraire: a value that will be placed on a volume change to measure its effect. Horngren et al (2009) in what is one of the most widely used cost accounting texts, suggest that any change in sales volume should be evaluated at the rate of the budgeted contribution margin (Ch 14). In so saying, they are being totally consistent with the marginalist approach upon which their entire book is based. In an earlier chapter (Ch. 8) they explain how the production volume variance is calculated.

However, there is a problem: if the variable cost model is consistently used for planning and control (and for calculation of the sales volume variance), then the production volume variance never happens. The production volume variance only ever exists where some full-cost model is flexed. In a consistently variable cost reporting system the fixed costs appear "below the line" of contribution margin and they are not flexed. The only variance that can be calculated for a fixed cost line is a comparison between actual fixed cost and budgeted fixed cost: i.e. a spending variance. Clearly the information in Horngren et al's chapters 14 and 8 is somewhat inconsistent, though equally clearly the authors are aware of the root causes of the production volume variance.

> "Managers should always be careful to distinguish the behavior of fixed costs from how fixed costs are allocated to products. In particular, managers should not use the unitization of fixed overhead costs for planning and control decisions, where it is important to understand how

> fixed costs behave. When forecasting fixed costs managers should concentrate on lump-sum costs." (Horngren, 2009, p. 271).

The approach used by Horngren et al is consistent with the very detailed exposition of standard cost variance analysis that is put into a strategic context by Govindarajan and Shank (1989). While this article covers virtually every aspect of profit variance calculation in a seamless whole, it is based exclusively on the marginalist approach: sales variances are assumed to affect the organization at the rate of the contribution margin and the production volume variance is not discussed.

Hilton et al (2006) have a broader approach. Not only do they use the contribution margin approach, but they also use sales revenue to calculate sales volume variances. Each of the sales variances is calculated using first the sales revenue, and then the contribution margin (Hilton, 2006, pp.714-721).

In earlier versions of their text (for example Hilton, 2001, p.731) they also refer to the possibility that sales variances could be calculated on the basis of the gross margin. Clearly it is this last calculation that would cause a production volume variance to be possible.

When illustrating and explaining the calculation of the production volume variance they note that it is the result of using a single cost system for more than one purpose:

> "The volume variance provides a way of reconciling two different purposes of the cost-accounting system. For the cost-management purpose, the cost accounting system recognizes that fixed overhead does not change as production activity varies…..For the product-costing purpose…budgeted fixed overhead is divided by planned activity to obtain a pre-determined (or standard) fixed overhead rate" (Hilton, 2006, p. 701) (original emphasis).

At this point we would have some sympathy with students who expressed confusion, as virtually no guidance is offered as to which of the competing methods of calculating sales variances is "correct". We would like to suggest that each has merit, and that the important thing is to get across to students the situational factors that make each important, and the implications for reporting.

So, there are (at least) three numeraires (revenues, contribution margin and full-cost margin) for the sales volume variance. Each will give a totally different number to represent the same facts. In order to interpret these meaningfully we should be clear as to the merits of each as well as its mechanics.

Firstly we can say that Hilton's revenue-based approach is appropriate to some users of variance reports. At this point we might ask our students to imagine that they are eavesdropping on a conversation between two salesmen (and, yes, we think we mean salesmen, not salespersons). Do they boast of how much contribution margin they made last week? No, they would boast about sales revenues, or even units sold, but never contribution margin: it's just not a

language that they speak. It would be a waste of time to report sales variances to such employees in any terms other than dollar revenues or in units. There are many users of accounting information to whom revenue-based reporting is as sophisticated as they are prepared to tolerate.

Secondly, we can say that the contribution margin approach is normatively correct. If you want to know the effect of an additional sale or a sale forgone, the contribution margin is the first approximation of the effect on the bottom line. However, we are not aware of any strong evidence that the contribution margin approach for calculating sales variances is used in practice.

Thirdly we can say that there is some evidence that a full-cost approach is used in practice, so it could be described as "positively" justified. We would cite published case studies. The Polysar Case, for example (Harvard Business School Case 187-098, in Anthony & Govindarajan, 1995) clearly shows a very large volume variance (it is, in fact, a major focus of that case), which can only have happened where a fixed cost has been flexed; likewise the Solartronics Case (Anthony & Govindarajan, 2007). Additionally, anecdotally, from personal observation of cost systems in practice, we would report the flexing of a variety of full cost concepts, including both gross margin, and full standard margin.

Furthermore, the influence of GAAP based financial accounting may explain why a full cost model is used. Typically GAAP would expect inventory to be valued at full cost, including its fair share of allocated production overhead. Those organizations that are unwilling to tolerate multiple versions of the income statement (one for external reporting using full cost, another for internal control using variable cost) will probably end up using full cost inventory valuation throughout, and therefore find that their variances also reflect a full cost approach.

So, if each has merit, our task would seem to be explaining the effects of choosing any of the three. The two things we should like to concentrate on are (1) how does the choice of numeraire for sales variances affect their dollar amounts, and (2) how does that choice affect the production (and other) volume variances reported.

Rigourous use of reconciliation between the static budget and the actual results through the medium of variances would be some guard against loose thinking in this area. It is not possible, for example to calculate contribution-margin based sales variances, and production volume variances, and accurately use these variances to reconcile between the static budget and the actual results. An attempt to show reconciliation for such a situation would demonstrate the futility of the exercise.

To illustrate these concepts we present a case study. It is an armchair case, designed to illustrate three different approaches to the sales volume variance, and their interaction with other volume variances.

Tottenham Inc. Case:

Tottenham Inc. was established at the beginning of 2008 to manufacture and sell widgets. The budget for January 2008 was set at 10,000 widgets to be produced and sold. The standard cost per widget and budget for January 2008 are presented in table 1.

The actual results for January are also presented in table 1. As can be seen, it is not a pretty sight. A budgeted operating income of $22,000 has somehow become an actual loss of $22,600.

At a meeting on Friday 7th February the results were discussed by the company's management team. They all knew that the production start-up had been more difficult than expected. Whereas they had expected to get 20 days of production in January, only 10 days of production had actually been possible. To make matters worse, late delivery of raw materials had disrupted production even when the plant was operational. The sales team had also had its difficulties. They reported that overall demand was down, due to unsettled world conditions, and they had failed to sell all the widgets that had been produced. Everyone hopes that the start-up and materials availability problems are now solved, and it is expected that overall demand will also got back up to normal within the next month or two.

Henry, the General Manager, was first to speak. "We all know that the numerically controlled milling machines took longer to set up than we had expected, and that this delayed the production start-up. What is not clear to me is why"

Table 1: Tottenham Inc. January 2008

	Standard Per unit	Budget January 2008	Actual January 2008
Production:		10,000	4,000
Sales:		10,000	3,500
Sales revenue:	$12.00	$120,000	$ 38,500
Direct material:	3.00	30,000	11,780
Direct labour:	2.00	20,000	10,450
Variable manufacturing Overhead	1.00	10,000	5,720
Fixed manufacturing Overhead	2.50	25,000	26,900
Cost of production:	8.50	85,000	54,850
Less: Inventory 500 @ $8.50		nil	4,250
Full manufacturing Cost of goods sold:	8.50	85,000	50,600

Selling and administrative expense:			
Variable:	0.50	5,000	2,300
Fixed:	0.80	8,000	8,200
Total:	1.30	13,000	10,500
Cost of goods sold:	9.80	98,000	61,600
Standard margin:	$ 2.20		
Operating profit:		$ 22,000	
(Operating loss):			$ (22,600)

Ian, the Production manager was quick to respond. "It wasn't our fault. Oliphant's, the milling machine suppliers guaranteed that it would take only 8 days to run the new machines in. In the event, the computers that controlled the machines could not stand the high temperatures and high humidity in the production area so they kept malfunctioning. We retrofitted each station with its own air conditioner to keep the computers running, but that put us way behind schedule. Oliphant's say that the milling machines were fine, it was the computers that were faulty, and that was not part of their contract. The computer suppliers say that their equipment was never intended to run in the equivalent of a steam bath, and they refused to take responsibility. We will just have to write that off to experience. I might add that if you had followed my original proposal and bought the installation as a turnkey operation it would have been the contractor's problem, not ours. We may have saved about $5,000 by letting the sub-contracts out separately, but we lost in the end. I don't like to say I told you so, but I did! Now we have an embarrassing result. The budget was for 10 days of set-up and 20 days of production. We actually had 20 days of set-up and 10 days of production.

Henry was not convinced. "Even if what you say is true it does not tell the whole story. Procurement, which is one of your areas of responsibility, was supposed to have enough raw materials on hand for 20 days of production this month. When I was in the plant last week the milling machines were standing idle because they had no raw materials to work on. Is that good planning?"

Ian: "Head office have given strict instructions that all production units will operate on a JIT basis, so as to reduce inventory of raw materials. With this being a start-up situation, procurement did not have as good an understanding of the suppliers as they might have had. The lead time was a bit longer than anticipated".

Henry next turned his attention to the Marketing Manager. "John, its no use sitting there grinning at Ian's discomfort. Sales effort was well below par".

John sat up with a start. "Well that wasn't our entire fault. We have just heard the sorry story of the production problems from Ian. There was also the problem of the forecasts of demand being way off. The sales forecasts were the ones used in the original decision to buy this equipment and make this product. No one could have forecast that we would be at war by now. If they had

reworked the forecasts, maybe this plant would not be justified, and we would be out of work now. The forecast was for total demand of 1 million widgets, and we were expecting to pick up 1% of that market. My best guess is that the total demand in January was 500,000, so it's not surprising we missed our target. Don't blame us."

"I will blame you if you are at fault" responded Henry. "If your salespeople had been doing their job, why was there inventory of 500 units at the end on the month? If they had been pushing the product hard enough it would all have moved."

"Some of that was a quality problem" said John. "A whole order had been shipped out to Bramwind Developments, but they sent them back because they would not fit the couplings on site. You can't call that a sales problem: ask Ian"'

"Is that true Ian?"

"Well, partly true. The customer specified the order wrongly, so it wouldn't fit. If it had been correctly ordered it would have fit perfectly. I thought the salespeople were there to stop that sort of mistake. Anyway, we sent them a replacement straight away and they seem happy enough now. Besides, that order was only for 300 units and the end-of-month inventory was 500 units. We haven't had any other complaints".

"Well" said Henry "I am sure we have all learned a lot from January's mistakes. I expect that the budget reports will show us who was actually responsible when we get them. By the way Keith, the actual financial statements were in the package you distributed, and we have the budget from last year's planning documents. At what point will we be getting a something like a list of variances?"

"Oh, well, hmm, well, oh dear" said Keith, the Controller. "I'll be working on them this weekend. I'm not sure what you want though"'

Well it's obvious isn't it?" chimed in Ian and John. "We need a statement of the original budget and a set of variances that explains how we got from there to this enormous loss, together with some identified responsibilities for the variances."

"I've never done that before" said Keith "but I'm sure it's in my management accounting textbook".

"I have some ideas on how to do that" said Ian "I'll be working on it this weekend. There are a number of concepts I learned in my economics, degree that make it pretty straightforward".

"So will I" said John, not to be outdone "we covered that on my MBA, and I did a training course that touched on it last year too."

"Good" said Henry. "See if you can get something for me to look at by Monday"'

With that Friday's meeting broke up.

On Monday 10th February Henry was delighted to see that all three managers had produced variance analysis reports. His joy, however, turned to sadness when he realized that each report told a different story. Although some items were similar, key numbers were different. Now he was really confused.

Table 2: Controller's Variance Report for January 2008:

Budgeted operating profit:			$22,000
Volume variances:			
Sales volume variance:	6,500 @ $3.00	$19,500 U	
Production volume variance:	6,000 @ $2.50	15,000 U	
Selling & general administration Expense volume variance:	6,500 @ $0.80	5,200 U	34,500 U
(Net loss) (at standard margin) for actual sales:			(12,500)
Price & efficiency variances:			
Sales price variance:		$ 3,500 U	
Direct material price variance:	620 F		
Direct material efficiency variance:	400 U	220 F	
Direct labour rate variance:	950 U		
Direct labour efficiency variance:	1,500 U	2,450 U	
Variable manufacturing overhead spending variance:	970 U		
Variable manufacturing overhead efficiency variance:	750 U	1,720 U	
Fixed manufacturing overhead spending variance;		1,900 U	
Variable selling & administrative expense spending variance:		550 U	
Fixed selling & administrative expense spending variance:		200 U	
Total:			10,100
(Operating loss):			$(22,600)

Table 3: Calculation of Variances:

	Actual	Price/Spending Variances	Flexible Budget Based on Inputs	Efficiency/PV Variances	Flexible Budget Based on Outputs	Volume Variances	Static Budget
Revenue	$38,500	$ 3,500 U	$42,000	n/a	$42,000	$78,000 U	$120,000
Material	11,780	620 F	12,400	400 U	12,000	18,000 F	30,000
Labour	10,450	950 U	9,500	1,500 U	8,000	12,000 F	20,000
Var. M O/H	5,720	970 U	4,750	750 U	4,000	6,000 F	10,000
Fixed M O/H	26,900	1,900 U	25,000	15,000 U	10,000	15,000 F	25,000
Cost of goods manufactured	54,850	3,200 U	51,650	17,650 U	34,000	51,000 F	85,000
Inventory	(4,250)		(4,250)		(4,250)	(4,250)F	
Manufacturing cost of goods sold	50,600	3,200 U	47,400	17,650 U	29,750	55,250 F	85,000
Selling & administrative expense:							
Variable	2,300	550 U	1,750	n/a	1,750	3,250 F	5,000
Fixed	8,200	200 U	8,000	5,200 U	2,800	5,200 F	8,000
	10,500	750 U	9,750	5,200 U	4,550	8,450 F	13,000
Cost of goods Sold	61,100	3,950 U	57,150	22,850 U	34,300	63,700 F	98,000
Operating profit (loss)	(22,600)	7,450 U	15,150	22,850 U	7,700	14,300 U	22,000

Table 4: Marketing Manager's Variance Report for January 2008:

Budgeted sales revenue:			$120,000
Less: sales volume variance:	6,500 @ $12.00		78,000 U
Actual sales @ standard price:	3,500 @ $12.00		42,000
Less: standard cost of goods sold:	3,500 @ $ 9.80		34,300
Standard margin on actual sales:	3,500 @ $ 2.20		7,700
Less: variances:			
Production volume variance		$15,000 U	
Selling & general expense volume variance		5,200 U	
Other price and efficiency variances		10,100 U	30,300 U
(Operating loss)			$(22,600)

Table 5: Production Manager's Variance Report for January 2008:

Budgeted operating profit		$22,000
Less: sales volume variance	3,500 @ $5.5	35,750 U
(Operating loss) @ standard for actual sales		(13,750)
Less: other price and efficiency variances		10,100 U
(Operating loss)		$(23,850)

The Controller has reported the sales volume variance as $14,300 U. The Marketing manager has reported the sales volume variance as $78,000 U. The Production Manager has reported the sales volume variance as $37,500. Apparently, each has chosen a different numeraire by which to evaluate the sales volume variance.

Both the Controller and the Marketing Manager reported a production volume variance of $15,000 U, but the Production manager did not report any production volume variance.

Both the Controller and the Marketing Manager reported a volume variance related to selling and general administrative expense of $5,200 U. Again, the Production manager does not report this variance at all.

On the bright side, all three seem to agree that there were price and efficiency variances of $10,100 U in total. In table 4 the calculations for the variances in the controller's report are shown.

As a final touch, the Production Manager seems to have a different perspective on the actual loss: instead of the $22,600 reported by the financial accounting system, he shows the loss as $23,850.

Tottenham Inc. Teaching Note

Tottenham Inc. is about understanding sales volume variances and production volume variances and their interaction. The case is not about variance calculations, as all the variances and their calculations are provided.

The focus is to get students thinking about the theoretical underpinnings of the way variances are calculated and reported. In this respect the case is supplemental to the material presented in most textbooks. It is only suitable, therefore, where students have already been exposed to basic variance calculation and interpretation. The author has used it successfully in both an undergraduate cost accounting course and in an honours level control course (both of which had a cost/managerial accounting pre-requisite).

Strategic cost management (including activity-based-costing) has lent many new insights into appropriate control processes, many of which downplay the importance of controls based on standard costs and variances. However, many organizations still use variances as they remain a principal control (sometimes the only one). Management accountants therefore still need to understand variance analysis.

Teaching objectives

1: that there are several ways of calculating the sales volume variance, and that each has some legitimacy;

2: that the numeraire chosen for a sales volume variance will affect the dollar value of that variance and also the existence or otherwise of the production volume variance;

3: That the classification of a variance as sales volume or production volume does not necessarily imply that the sales or production area was responsible for it.

4: that reconciliation of the static budget with the actual results is an important part of ensuring that variances are reported in a way that is internally consistent.

Suggested assignment questions

1: Why is the operating profit reported by the production manager different from the operating profit reported by the other two managers?

2: What is the numeraire chosen by each of the managers to report the sales volume variance?

3: What are the advantages and disadvantages of each of the three sales volume variance calculations?

4: Why do the Controller and the Marketing Manager report a production volume variance, but the Production Manager does not?

5: Who was responsible for the discrepancy between the static budget operating profit and the actual loss?

Analysis

1: Why is the operating profit reported by the production manager different from the operating profit reported by the other two managers?

Operating profit reported by the Controller and the marketing manager: $22,600.

Operating profit reported by the Production manager: $23,850.

Difference: $1,250.

The Controller and the Marketing Manager are using a full cost model to value inventory. Inventory is 500 units, and is valued at $8.50 per unit, being variable cost $6, plus allocated fixed production cost $2.50. Total inventory value: $4,250.

The Production Manager is using a variable cost model to value inventory. Inventory is 500 units, and is valued at variable cost of $6. Total inventory value: $3,000.

Difference between the two: $4,250 - $3,000 = $1,250. This represents fixed production cost that is carried forward as inventory in a full-cost model, but not in a variable cost model: 500 * $2.50 per unit = $1,250.

2: What is the numeraire chosen by each of the managers to report the sales volume variance?

Each of the three reports aims to measure the effect of the change in sales volume. Budgeted sales were 10,000 units; actual sales were 3,500 units; so each is evaluating the effect of failing to sell 6,500 units.

The Controller has used a full-cost standard margin:
$2.2 per unit * 6,500 units = $14,300 U.

The Marketing Manager has used the sales revenue per unit:
$12 * 6,500 units = $78,000 U.

The Production Manager has uses the contribution margin per unit:

Selling price		$12.00
Less: variable costs		
direct material:	$3.00	
direct labour:	$2.00	
variable manufacturing overhead:	$1.00	
variable selling & administrative expense:	$0.50	
	$5.50	
contribution margin =		$ 6.50 per unit

$6.50 * 6,500 units = $35,750 U.

3: What are the advantages and disadvantages of each of the three sales volume variance calculations?

The advantage of the Controller's calculations is that they are consistent with the full-cost model generally used for inventory valuation and for external reporting. The disadvantages are that this results in a sales volume variance that actually has very little meaning (in what way does the standard margin of $2.2 represent the benefit of sale?), and that this choice results in a substantial production volume variance being reported ($15,000 U), and it is difficult to explain the production volume variance to users of variance information.

The advantage of the Marketing Manager's calculations is that the concept of more sales revenue vs. less sales revenue is meaningful to many users of variance information (in ways that standard margins and contribution margins are not). The disadvantages are that the revenue is only part of the picture: neither

the variable nor the fixed costs are brought into the calculation, and that, as with the Controller's calculations, this results in the reporting of a substantial production volume variance.

The advantage of the Production Manager's calculations is that the contribution margin is a very good measure of the change in operating profit that we would expect from this change in volume. The disadvantages are that it is not a good fit with the full-cost model used for inventory valuation and external reporting (hence the need to revise the reported operating loss), and that variable costing is seldom used as the basis for published financial statements.

4: Why do the Controller and the Marketing Manager report a production volume variance, but the Production Manager does not?

Because the Controller and the Marketing Manager both flex a full-cost budget, they treat fixed production costs of $2.5 per unit as falling by the discrepancy between the budgeted production and the actual production (10,000 – 4,000 = 6,000). This $15,000 (6,000 * $2.5) is reported as a production volume variance. It is the fixed production overhead that should have attached to the production that was planned, but not produced.

5: Why do the Controller and the Marketing Manager report a volume variance related to the General and Administrative Expense, but the Production Manager does not?

Because the Controller and the Marketing Manager both flex a full-cost budget, they treat the selling and general fixed expense of $0.80 per unit as falling by the amount of the discrepancy between planned and actual sales (10,000 – 3,500 = 6,500) This $5,200 (6,500 * $0.80) is reported here as a selling & general administrative expense volume variance. It is the selling & general expense that should have attached to the 6,500 units of sales that were planned, but did not happen.

The existence of this variance is a result of flexing the budget at the standard margin per unit level. If the budget were flexed "higher up" (say at the production cost level) this variance would not appear.

6: Who was responsible for the discrepancy between the static budget operating profit and the actual loss?

Clearly the causes of all these variances are many and confused, including:

Poor forecasting;
Poor installation planning;
Poor procurement;
Poor sales effort;
Poor sales support for customers' orders.

It would be heroic to try to pin the responsibility on any of these to the exclusion of any others. Variances can quantify deviations from the plan, and they can indicate the general area where the effect is reported: they are not able to pinpoint causes.

Conclusion

Many organizations have embraced the modern Japanese management techniques of target costing and Kaizan costing (for a description of which see McWatters et al, 2008). However an equally large number of organizations still operate control systems that are based on the use of budgets, standard costing and the reporting of standard cost variances where actual results are different from the budget ("Standard costs are usually the foundation of many firms' control systems" Chalos, (1992) p.42).

In calculating standard costing variances it is desirable to agree on definitions so that the user can interpret their meaning without ambiguity. We would suggest, from the material presented in this paper that there is, as yet, no firm agreement about the way a sales volume variance is to be calculated. Three possibilities exist, and there is some justification for each of them. The choice of a numeraire for the calculation of the sales volume variance includes the following:

Firstly comes the use of the contribution margin. This can be defended on its normative characteristics. The unit contribution margin is a first approximation of the effect on the bottom line of a change in volume of activity of one unit of output. If we sell one more units we expect the operating income to rise by the amount of one unit of contribution margin (or if we sell one unit fewer it will fall by one unit of contribution margin). It is therefore a normatively correct report in that it is what we should do to best report the effect of a sales volume change. However, despite its normative superiority, there is evidence that the other two approaches are also used in practice.

The second numeriare is the sales dollar. The effect of sales units being higher than those budgeted is shown in terms of the additional sales revenue earned. This is defensible on the grounds that it is very understandable, particularly by those employees who do not have a deep understanding of accounting. This approach can be defended positively: because it is understandable, some companies report their slaes volume variances this way.

The third numeraire is the standard margin. This is really neither fish, fowl, nor good red herring. It fails to meet the test of normative justification s it does not explain the effect of the volume change on operating income, and it fails to meet the test of understandability as would be the case of the sales dollar approach. However it is a very good fit with the GAAP approach to the two related ideas of income measurement and inventory valuation. As with the sales dollar approach it can be defended on a positive basis as it is in evidence of use.

One of the pieces of evidence of the existence of the sales dollar and the standard margin approach is that organizations are known to report the existence of a production volume variance. While this is seldom adequately explained in

the textbooks, the production volume variance can only ever happen where the fixed production overhead has been “flexed” as if it were a variable cost. This never happens when the contribution margin is used as the numeraire for calculating the sales volume variance.

This leaves us with a pedagogical conundrum. Which method of calculating the sales volume variance should we teach? In turn, this is part of a wider question as to what we should teach in the business school. Should we teach from a normative perspective, telling students what we think is the right way to do things, without the benefit of our perspectives being validated by practice? Alternatively should we teach students what is actually in use by practitioners, and ignore the existence of better methods? Or should we try to teach both known practice and how to improve practice by adopting better models? If we choose this third approach, where, in this world of expanding knowledge, will professors and students ever get the time to do justice to it all?

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