Horizontal and longitudinal Convenient Analysis between Full-Cost Method and Variable Cost Method

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Abstract: The transformation of financial accounting to management accounting means a special requirement for the development of social economy to post-industrial period, also an inevitable result of the development of computer technology. Under the background of the widespread application of big data and cloud computing, China has entered the era of data economy. How should accounting provide better driving force for economic development is an important issue to be solved in current accounting reform? Management accounting framework research and system construction have already been proposed in the policy level, so management accounting method, and research with variable cost method as the core should also keep pace with the times. The purpose of this paper is to provide a way to integrate management accounting with financial accounting. The results corresponding to the two analysis methods are obtained via case design and comparative analysis. Finally, it is concluded that the two methods can be mutually converted by certain rule.

1. Introduction

From industrial society to information society, subversive changes will occur in basic human mode of thinking and cognitive perspective of the world. In the context of overall change of human society, for accounting, how to keep pace with the times, make profound reflections on basic theories and technical methods and seek the path of social development reform has become the main objective of the current accounting academic research [1]. Regardless of internal or external reporting accounting, the core thinking should be maximization of corporate value. The formation of accounting should be aimed at value maximization. With the human society entering the postindustrial period, the traditional financial accounting can no longer meet the economic entity requirements of prediction and decision-making. With the application of cloud computing and big data technology, plus the arrival of digital age, people have increasingly high expectations for internal reporting accounting, with transformation of financial accounting to management accounting proposed on the agenda. The promulgation of "13th Five-Year Plan" and "13th Five-Year Plan for National Finance" marks the beginning of management accounting reform. The "13th Five-Year Plan" requires strengthening the construction of management accounting guidance system to promote extensive application of management accounting and improve management efficiency of accounting work. At present, management accounting system has not yet been established in China. Management accounting contents are basically derived from the translation and processing of western management accounting textbooks in the 1980s. Limited by professional level of translators and their insufficient accessible information, management accounting contents show interpretations out of context, incomplete understanding and even error. Over the 40 years of reform and opening up, academic research on financial accounting has been very extensive and fruitful, but there are relatively few academic researches on management accounting. The current research is mainly on the macro level of framework construction and system construction. There are no more than 300 papers on management accounting from 2006 to 2013. The research topics consist of management control systems, cost accounting and management, decision-making methods, general issues of management accounting, externally oriented management accounting, application of information technology and other related issues [2]. The researches focus on organizational control and performance evaluation as well as cost allocation. The research on variable cost method and full cost method is only at the method introduction level, like "The Application Status and Countermeasure Research on China's Variable Cost Method" (Li Jin , 2015, Modern Marketing), "Application of Variable Cost Method in Cost Management" (Zhang Xiaodong, 2016, Commercial Modernization), "New Model for Variable Cost Method Research -Activity Cost Method for Control" (Wu Shaowu, 2012, Communication of Finance and Accounting) "The Application of Variable Cost Method in China" (Huang Danxin, 2015, Accounting Learning). There are few studies on the analysis of the substantive causes of the difference between variable cost method and full cost method. The innovation point of this paper is to establish a model, analyze its influencing factors, establish an effective relationship between variable cost method and full cost method, support the current research of management accounting methods, thus making due contribution to the construction of management accounting system.

2. Theoretical Analysis and Research Hypothesis

Full cost method is also called "total cost method" and "absorption cost method". The theoretical basis lies in the principle of cost compensation. The product cost component items of full cost method include material, labor and manufacturing costs, and manufacturing costs are not distinguished as variable or fixed. Proponents of full cost method believe that although fixed manufacturing costs are not directly related to product, they are inevitable in product production, so it should be compensated by the product. The research hypothesis is that product cost is equal to the sum of direct material cost, direct labor cost and manufacturing cost; income minus the cost of goods sold is gross profit, and gross profit then minus the period expense is the profit.

Variable cost method, also known as "straight-line cost method", represents a new model designed by management accounting to reform the traditional costing model of financial accounting. Its theoretical basis is that there is no change in material costs and labor costs, while manufacturing costs are classified as volatile and fixed according to habits, and only volatile fixed costs is calculated in product cost. Under this method, fixed manufacturing costs are treated as period expense. Its research hypothesis is: income minus volatile costs equals to contribution margin. Profit is the total marginal contribution minus the fixed expenses; production and sales are assumed to be balanced; unit price and unit variable expenses are constant during a certain period of time.

Both methods have respective advantages and disadvantages. Full cost method complies with the reporting requirements of internationally accepted accounting standards, while variable cost method does not meet the requirements of internationally recognized accounting standards. The unit cost under full cost method is closely related to the total fixed manufacturing cost. It will mislead decision makers, make them have a misconception that company profit concerns production volume, thus massively producing products and resulting in arrear of inventory. Variable cost method can provide more accurate information, according to which, enterprise profits have nothing to do with fixed manufacturing costs, sales volume is the contributing factor of profit. Therefore, there is such a phenomenon in which variable cost method provides accurate information on cost from the perspective of decision-making, but variable cost method should be adjusted to full cost method from the perspective of reporting, so the two sets of systems coexist. The purpose of this paper is to establish a communication mechanism between the two methods, suggest an easy way to transit from internal management to external reporting so that the dual needs of internal management and external reporting are met.

3. Establishment of the Two Method Models

To analyze the relationship between the two methods, the first thing is to design the model, respectively, basic model, vertical comparative analysis model and horizontal comparative analysis model.

3.1 Establishment of Basic Model

3.1.1 Establishment of Variable Cost Method Model

Under this method, fixed production cost is regarded as period expense. Calculation of its profit is carried out in two steps. First, the variable part is deducted to obtain contribution margin, and then the fixed part is further deducted to obtain the profit. The process is as follows:

Profit = income - variable production cost of sold products - variable non-production costs of sold products - fixed production costs - fixed non-production costs

Profit is expressed in mathematical formulas as follows:

 $P_{VC} = PX - b_1 X - b_2 X - a_1 - a_2 = (P - b_1 - b_2) X - (a_1 + a_2) = (P - b) X - a = TCM - a = cm/unit \times X - a$ (1)

Note: P_{VC} represents the profit under variable cost method, P is the unit price, b_1 is unit variable production cost, b_2 is unit variable non-production cost, X is sales volume, a_1 is fixed production cost, a_2 is fixed non-production cost, a is fixed total cost, b is unit variable cost, TCM is the total contribution margin, and *cm/unit* is unit contribution margin. The implication relative to *Formula* (1) is that the balance of contribution margin after deduction of fixed expenses forms the enterprise profit under variable cost method.

3.1.2 Establishment of Full Cost Method Model

Full cost method, also known as comprehensive cost method, calculates fixed manufacturing cost in product cost in addition to variable production cost. Its profit calculation procedure is: income - sales cost of the sold product - period expense. To make a comparative analysis with variable cost method, cost of goods sold is decomposed into two parts: fixed production cost and variable production cost.

The model derivation process is as follows:

Profit = income - cost of goods sold - period expense

$$P_{AC} = PX - [b/dQ_0(b_1 + f_0) + Q_1b_1 + a_1 - c/dQ_1(b_1 + f_1)] - (b_2X + a_2)$$

$$= PX - [b/dQ_0b_1 + Q_1b_1 - c/dQ_1b_1 + b/dQ_0f_0 + a_1 - c/dQ_1f_1] - b_2X - a_2$$

$$= PX - (b/dQ_0 + Q_1 - c/dQ_1) \times b_1 - b_2X - a_1 - a_2 + c/dQ_1f_1 - b/dQ_0f_0$$

$$= PX - (b_1 + b_2)X - (a_1 + a_2) + c/dQ_1f_1 - b/dQ_0f_0$$

$$= PX - bX - a + c/dQ_1f_1 - b/dQ_0f_0$$

$$P_{AC} = P_{VC} + (c/dQ_1f_1 - b/dQ_0f_0)$$
(2)

Note: b/dQ_0 is initial inventory, c/dQ_1 is inventory at the end of the period, Q_1 is production volume of the period; X is sales volume of the period, b_1 is unit variable production cost, b_2 is unit variable non-production cost; b is unit variable cost, a_1 is fixed production cost, a_2 is fixed non-production cost, a is fixed cost f_0 is initial unit fixed cost of production, f_1 is the current and final unit fixed cost of production; P_{AC} represents dependent variable, i.e. profit at full cost.

The economic meaning of *Formula (2)* is that the profit calculated under full cost method is the difference between the profit under variable cost method plus fixed manufacturing expenses of final inventory and fixed manufacturing expenses of initial inventory.

3.2 Establishment of Longitudinal Model

3.2.1 Longitudinal Analysis Model of Profit and Loss under Variable Cost Method

The so-called longitudinal analysis is to make profit and loss analysis in chronological order. According to *Formula 1*, the analysis is as follows. P_{VC} represents the profit under variable cost method. The sales volume of the two periods, X_2 and X_1 , are substituted into *Formula (1)*, with differences shown as follows:

Note: $\triangle P_{VC}$ is the profit difference between the two periods, $\triangle X$ is the difference in sales, P-b=cm/unit indicates unit contribution margin.

The economic meaning is: the influencing factors of profit difference under variable cost method are unit contribution margin and sales volume variation. Moreover, as the premise of variable cost

method is that *p* and *b* are constant for a certain period of time, the unit contribution margin can be regarded as a constant, and the influencing factor only includes sales volume variation ΔX .

In further analysis of *Formula* (3), $\triangle P_{VC} = cm/unit \times \triangle X_{n \sim n-1}$. When $\triangle X > 0$, that is, when $X_n > X_{n-1}$, $\triangle P_{VC} > 0$; when $\triangle X < 0$, that is, when $X_n < X_{n-1}$, $\triangle P_{VC} < 0$.

3.2.2 Longitudinal Analysis Model of Profit and Loss Under Full Cost Method

According to *Formula 2*, the analysis is as follows. P_{AC} represents the profit under full cost method, the data of the two periods are substituted into *Formula 2*, and the difference is calculated as follows:

 $\Delta P_{AC} = [(p-b) X_2 - a + c/dQ_2 f_2 - b/dQ_1 f_1] - [(p-b) X_1 - a + c/dQ_1 f_1 - b/dQ_0 f_0]$

Because final inventory of the previous period is equal to initial inventory of the next period, the fixed production expenses $Q_1 f_1$ included in the final inventory of the previous period are equal to the fixed production costs of the initial inventory of the next period. Then the difference between profit and loss of periods n-1 and n is:

$$\Delta P_{AC} = cm/unit \times \Delta X + c/dQ_n f_n - 2b/dQ_{n-1} f_{n-1} + b/dQ_{n-2} f_{n-2} = \Delta P_{vc} + c/dQ_n f_n - 2c/Q_{n-1} f_{n-1} + b/dQ_{n-2} f_{n-2}$$
(4)

The economic meaning is that the difference between profit and loss of any two periods under full cost method consists of two parts in terms of amount, namely, variation of contribution margin and the sum of fixed production cost of final inventory of the period n plus the fixed production cost of initial inventory of the period n-1, with fixed production cost of double initial inventory of the period n deducted. Or, it can be understood as:

The variation amount of contribution margin added up to the difference in fixed production costs of final and initial inventory of the period n and subtracted the fixed production cost of final and initial inventory of the period n-1. According to the above (4), $\triangle P_{AC} = \triangle P_{VC} + c/dQ_n f_n - 2c/dQ_{n-1}f_{n-1} + b/dQ_{n-2}f_{n-2}$. Then, further analyze the law under different conditions.

Case 1: When the production volume is consistent in the periods n and n-1. f_i is a constant represented by f, f_i indicates unit fixed production cost of a certain period of time, then is simplified as:

$$\Delta P_{AC} = \Delta P_{VC} + (c/dQ_n - 2c/dQ_{n-1} + b/dQ_{n-2}) \times f$$

$$\Delta P_{AC} = (c/dQ_n - 2c/dQ_{n-1} + b/dQ_{n-2}) \times f$$
(5)

That is, this case is only affected by the initial and final inventory of the two periods.

 $c/dQ_n + b/dQ_{n-2} > 2Q_{n-1}$, $\triangle P_{AC}$ is above zero; $c/dQ_n + b/dQ_{n-2} < 2Q_{n-1}$, $\triangle P_{AC}$ is below zero.

(2) Assume that sales volume X is different, $\triangle P_{AC}$ is also affected by variation in *TCM*.

That is: $\triangle P_{AC} = \triangle P_{VC} + c/dQ_n f_n - 2c/dQ_{n-1} f_{n-1} + b/dQ_{n-2} f_{n-2}$, same as (4).

Case 2: When the production volumes of periods n and n-1 are not the same, f_i is a variable.

Assuming that sales volume X is consistent, simplification based on *Formula 4* is as follows:

$$\Delta P_{AC} = c/dQ_n f_n - 2c/dQ_{n-1} f_{n-1} + b/dQ_{n-2} f_{n-2}$$

(6)

The meaning is: the difference between profit and loss of the two adjacent periods under full cost method is the difference between final and initial fixed production costs of the two periods; or it can be understood as the balance of final fixed production cost of the period plus fixed production cost of initial inventory of the previous period, with double fixed production costs of initial inventory in the period deducted.

Assuming that the sales volume X is inconsistent, then formula on profit and loss difference is (4).

3.3 Establishment of Horizontal Analysis Model Under the Two Methods

Horizontal analysis is to analyse difference between the profit and loss under the two methods based on a certain period. Based on the basic *Formulas 1* and 2, with D_n to indicate the difference between profit and loss in a certain period, then analysis is as follows:

(1):
$$P_{VC} = (p-b) X - a$$

(2): $P_{AC} = (p-b) X - a + (f_1c/dQ_1 - f_0b/dQ_0)$

Then:
$$P_{AC} - P_{VC} = D_n = f_1 c / dQ_1 - f_0 b / dQ_0$$
 (7)

3.3.1 When the production volume is consistent between the periods

When the production volume is consistent between the periods $f_0 = f_1$, i.e. f_1 is a constant, $D_n = (c/dQ_1 - b/dQ_0) f$ When $/dQ_1 > b/dQ_0$, $D_n > 0$, $P_{AC} > P_{VC}$

3.3.2 When the production volume is different between periods

When the production volume is different between periods, i.e. D_n demands further analysis of the quantitative relationship between c/dQ_n and b/dQ_{n-1} , initial and final inventory as well as the size of f_n and f_{n-1} .

4. SUMMARY AND ANALYSIS OF TWO METHOD MODELS

4.1 Summary and Analysis of Basic Model

There are three basic models: the models under variable cost method and full cost method and the simplified model of full cost method.

4.1.1 Basic model under variable cost method

$$P_{VC} = TCM - a = cm/m \times X - a \tag{8}$$

4.1.2 Basic model under full cost method

$$P_{AC} = P_{VC} + c/dQ_n f_n - b/dQ_{n-1} f_{n-1}$$
⁽⁹⁾

(1) When the production volume is consistent, $f_n = f_{n-1}$, $\Rightarrow P_{AC} = P_{VC} + f (c/dQ_n - b/dQ_{n-1})$ (10)

Influencing factors: X, c/dQ_n , b/dQ_{n-1}

(2) When the production volume is different, *Formula* (9) is applicable.

4.2 Summary and Analysis of Longitudinal Model

The longitudinal analysis model includes *Formulas* (11) - (14) as follows:

4.2.1 Analysis of longitudinal model of variable cost method

$$\Delta P_{VC} = \Delta TCM = \Delta X \times cm/unit \tag{11}$$

(1) When n, n-1 periods have consistent sales volume, $\triangle X = 0$, $\triangle P_{VC} = 0$

(2) When n, n-1 periods have different sales volumes, *Formula* (11) is applicable.

In the longitudinal analysis, fixed cost is an irrelevant factor, and the relevant factor is ΔX , i.e. sales volume variation.

4.2.2 Analysis of longitudinal model of full cost method

$$\Delta P_{AC} = \Delta P_{VC} + c/dQ_n f_n + b/dQ_{n-2} f_{n-2} - 2b/dQ_{n-1} f_{n-1}$$
(12)

(1) When n, n-1 periods have consistent sales volume and different production volumes, $f_n \neq$

 $f_{n-2} \neq f_{n-1}$, f_i is a variable, $\triangle P_{VC} = 0$

Then (11) is transformed into

 \wedge

$$P_{AC} = c/dQ_n f_n + b/dQ_{n-2} f_{n-2} - 2b/dQ_{n-1} f_{n-1}$$
(13)

2) When two adjacent periods have different sales volumes and consistent production volume,

$$f_n = f_{n-2} = f_{n-1} \text{ is a constant replaced by } f, \text{ and } (11) \text{ is transformed into}$$

$$\triangle P_{AC} = \triangle P_{VC} + c/dQ_n f + b/dQ_{n-2} f - 2b/dQ_{n-1} f \Rightarrow$$

$$\triangle P_{AC} = \triangle P_{VC} + (c/dQ_n + b/dQ_{n-2} - 2b/dQ_{n-1}) f. \qquad (14)$$
The influencing factors are $\triangle X, c/dQ_n, b/dQ_{n-2}, b/dQ_{n-1}$.

(3) When n, n-1 periods have different sales volumes and production volumes.

 $\Delta P_{AC} = \Delta P_{VC} + c/dQ_n f + b/dQ_{n-2}f_{n-2} - 2 b/dQ_{n-1}f_{n-1}$ (15)

Formula(11) is applicable.

4.3 Analysis of Horizontal Model

There are two horizontal models as follows:

4.3.1 Horizontal model under the same production volume

When production volume of each period is consistent, f is a constant and *Formula* (16) is applicable as follows:

 $D = \Delta P_{AC} - \Delta P_{VC} = (c/dQ_n - b/dQ_{n-1}) \times f$ (16)

indicates quantity difference.

4.3.2. Model under variation of production volume

When the production volume of each period is different, $f_n \neq f_{n-1}$, f_i is a variable, and (17) is applicable.

 $D=P_{VC} - P_{AC} = Formula \ 2 - Formula \ l = c/dQ_n f_n - b/dQ_{n-1} f_{n-1}$ (17) Note: The above formulas are sorted separately and have no correspondence with the third part.

5. CASE ANALYSIS

To verify model establishment in part III and model analysis in part IV, two cases are given.

5.1 Case Analysis under Different Production Volumes

The relevant information is shown in Tables 5-1 and 5-2 below, as follows:

symbol	description	value	symbol	description	value
a_1	fixed production cost	24,000 yuan	Р	unit price	28 yuan
a ₂	fixed non-production cost	3,000 yuan	b_1	unit variable production cost	12 yuan
b/dQ_0	initial inventory in period 1	0 pieces	b_2	unit variable non- production cost	3 yuan
Q_1	production volume in period 1	10,000 pieces	c/dQ_1	the end of period 1	2,000 pieces
Q_2	production volume in period 2	12,000 pieces	c/dQ_2	the end of period 2	5,000 pieces

Table 5-1 Basic data sheet

Table 5-2 relationship table between initial and final inventory

Unit:	10.	,000	pieces
		,	

item	period 1	period 2
initial	0	0.2
current production volume	1	1.2
final	0.2	0.5
sold	0.8	0.9

5.1.1. Analysis of profit and vertical difference in each period under variable cost method

(1) The profit in period 1 is known according to (1) in section 4.1.1 of part IV.

 $P_{VC^1} = \text{cm/unit} \times X_1 - a = (18 - 12 - 3) \times 0.8 - (2.4 + 0.3) = 7.7$

(2) According to (1) in section 4.1.1 of part IV, the profit in period 2 is $P_{VC^2} = 13 \times 0.9 - 2.7 = 11.7 - 2.7 = 9$

(3) The difference between the profit of period 2 and period 1 is:

In the first method, direct calculation is made according to 5.1.1 and 5.1.1(2), $\triangle P_{VC} = 9 - 7.7 = 1.3$

In the second method, according to (3) in section 4.2.1 of part IV, the same conclusion can also be obtained, namely $\triangle P_{VC} = \triangle X \times \text{cm/unit} = (0.9-0.8) \times 13=1.3$

5.1.2. Analysis of profit and vertical difference in each period under full cost method

According to (2) in section 4.1.2 $P_{AC=}P_{VC}+c/dQ_nf_n - b/dQ_{n-1}f_{n-1}$ (1) In period 1: $c/dQ_n=0.2$, $f_n=2.4/1=2.4$; $b/dQ_{n-1}=0$, $f_{n-1}=0$. $P_{AC} = P_{VC} + 0.2 \times 2.4 = 7.7 + 0.48 = 8.18$ (2) In period 2: $c/dQ_n=0.5$, $f_n=2.4/1.2=2$; $b/dQ_{n-1}=0.2$, $f_{n-1}=2.4$. $P_{AC}^2 = P_{VC}^2 + 0.5 \times 2 - 0.2 \times 2.4 = 9 + 1 - 0.48 = 9.52$

(3) Longitudinal analysis on period 2 and period 1

There are two methods for calculating the difference in profit. The first method is to make direct calculation based on the above results, $\triangle P_{AC}=9.52$ -8.18=1.34; the second method is based on (4) in Section 4.2.2

 $\triangle P_{AC} = \triangle P_{VC} + c/dQ_n f_n + b/dQ_{n-2} f_{n-2} - 2b/dQ_{n-1} f_{n-1}$ The calculation composition is shown in Table 5.3 below.

Table 5-3 Calculation of initial and final inventory overheads

item	period 1	period 2
initial b/dQ_0f_0	0	$0.2 \times 2.4 = 0.48$
final c/dQ_1f_1	$0.2 \times 2.4 = 0.48$	$0.5 \times 2 = 1$

 $\triangle P_{AC} = 1+0 - 2 \times 0.48 + \triangle P_{VC} = 0.04 + (0.9-0.8) \times 13 = 0.04 + 1.3 = 1.34$ It is consistent with the directly calculated result

It is consistent with the directly calculated result.

5.13. Analysis of profit and loss differences between the two methods

The horizontal analysis process under the two methods is as follows:

(1) Determination of the difference between profit and loss in period 1:

(1) According to the above calculation (1) of section 5.1.2 and (1) of section 5.1.1 in Case 1,

difference can be directly obtained.

 $P_{AC^{1}} - P_{VC^{1}} = D_{AC \sim VC} = 8.18-7.7 = 0.48$

(2) According to (12) in Section 4.3.2 of Part IV,(12) is substituted

 $D = P_{AC} - P_{VC} = c/dQ_n f_n - b/dQ_{n-1} f_{n-1}$ $\therefore f_1 = 2.4/1 = 2.4, f_0 = 0, c/dQ_1 = 0.2, b/dQ_0 = 0$ $\therefore D = 0.2 \times 2.4 = 4.8$

It can be seen that the two methods have the same result.

(2) Determination of the difference between profit and loss in period 2

(1) According to the above calculation (2) of section 5.1.2 and (2) of section 5.1.1 in Case 1,

difference can be directly obtained.

 $P_{AC^2} - P_{VC^2} = D_{AC \sim VC} = 9.52 - 9 = 0.52$

(2) According to (11)

 $D = c/dQ_n f_n - b/dQ_{n-1} f_{n-1}$ $\therefore c/dQ_2 f_2 = 0.5 \times 2 = 1, b/dQ_1 f_1 = 0.2 \times 2.4 = 0.48$ $\therefore D = 1 - 0.48 = 0.52$

It can be seen that the two methods have the same result.

5.2 Case Analysis under the Same Production Volume

The relevant information of a company is as follows:

Table 5-4 Production and sales volume Unit: 10,000 pieces

item	period 1	period 2
initial	0	0.2
production volume	1	1.2
final volume	0.2	0.5
sold	1	0.9

Production volume of both period 1 and period 2 are 12,000 pieces. Other data show different cases with the same production volume.

As the production volume is consistent, f=2.4/2=1.2

5.2.1 Analysis of Profits and Vertical Differences of Each Period under Variable Cost Method

(1) For P_{VC} in period 1, according to (1) in 4.1.1,

 $P_{VC^1}=(p-b) X - a = (28-15) \times (1.2-0.2) - (2.4+0.3) = 13 \times 1-2.7 = 10.3$

 $(2)P_{VC^2}$ in period 2 is calculated as follows:

 $P_{VC^2} = (28-15) \times 0.9 - 2.7 = 9$

(3) Difference $\triangle P_{VC}$ between the two periods

(1) According to the above calculation, $\triangle P_{VC}=9-10.3=-1.3$

(2) According to (3) in 4.2.1, $\triangle P_{VC} = \triangle X \times \text{cm/unit} = (0.9-1) \times (28-15) = -0.1 \times 13 = -1.3$

It can be seen that the two calculation results of are the same.

5.2.2 Analysis of Profits and Vertical Differences in Each Period under Complete Cost Method

The analysis according to F(9) in 4.1.2 and (13) in 4.2.2 is as follows:

$$P_{AC} = P_{VC} + (c/dQ_n - b/dQ_{n-1}) \times f$$
⁽¹⁸⁾

$$\Delta P_{AC} = \Delta P_{VC} + \left(c/dQ_n + b/dQ_{n-2} - 2b/dQ_{n-1} \right) f_{\mathcal{A}}$$
⁽¹⁹⁾

The specific data of the two periods are shown in Table 5-5 as follows:

Table 5-5 Calculation of fixed production cost of initial and final inventory of each period

item	period 1	period 2
fixed production cost of initial inventory $(b/dQ_{n-1}f_{n-1})$	$0 \times 0 = 0$	$0.2 \times 2 = 0.4$
fixed production cost of final inventory $(c/dQ_n f_n)$	$0.2 \times 2 = 0.4$	$0.5 \times 2 = 1$

Note: The production volume is consistent, so
$$f=2.4/1.2=2$$

(1) Period 1: $P_{AC^1} = P_{VC^1} + (0.4-0) = 10.3 + 0.4 = 10.7$

(2) Period 2: $P_{AC^2} = P_{VC^2} + (1-0.4) = 9+0.6=9.6$

(3) Differences between the two periods.

The first method is to make direct calculation according to the calculation results (1) and (2) in 5.2.2: P_{AC} =9.6-10.7=-1.1

The second method is to make substitution to (10) in 4.2.2: P_{AC} =-1.1

The two methods have consistent difference calculation results.

5.2.3 Analysis of differences in profit and loss between the two methods

The profit and loss of the same period under full cost method and variable cost method are calculated as follows:

(1) Determination of the difference in period 1

(1) Make direct comparison according to the results of profit and loss in period 1 under the two methods in 5.2.

(2) The result can also be obtained by substituting (11) in 4.3.1 into the formula: $D = P_{AC} - P_{VC} =$

$$(c/dQ_n - b/dQ_{n-1}) f$$

: $f=2, f_0=0, c/dQ_1=0.2, b/dQ_0=0$

 $D = (0.2-0) \times 2 = 0.4$

It can be seen that the two methods have consistent results.

(2) Determination of the difference in period 2

(1) Make direct comparison to obtain the difference according to the results of period 2 in 5.2.

D=9.6-9=0.6

(2) The difference can also be obtained by substitution of (11) in 4.3.1: $D = P_{AC} - P_{VC} = (c/dQ_n - C)$

 b/dQ_{n-1}) f

: $f=2, c/dQ_2=0.5, b/dQ_1=0.2$: $D=(0.5-0.2) \times 2=0.6$

It can be seen that the two methods have consistent results.

6. Conclusion and Prospects

According to the previous modelling, factor analysis and case analysis, this paper establishes longitudinal analysis model under the two methods, as well as horizontal comparative analysis model between the two methods, followed by verification. Variable cost method, which can directly reflect performance of sales personnel, is widely favoured by internal managers. However, according to the requirements of international accounting standards, enterprises should report profits according to full cost method. If a company determines profit separately by two methods, it will aggravate the workload of the financial staff. Hence, how to relieve workload of the accounting staff becomes more urgent. Financial accounting can be integrated with management accounting because their information sources are consistent with the same ultimate goal. Management accounting, as the extension and development of financial accounting, represents deepening of financial accounting content [3]. There exists internal relation between variable cost method and full cost method. It is only that the relation has different manifestations under different situations. Sometimes, there is effect from sales volume, but sometimes no such effect. Sometimes, there is effect from unit variable cost, and sometimes it is demonstrated as irrelevant factor. Sometimes, fixed cost becomes an influencing factor, but sometimes it is demonstrated as a constant. Specific issue needs specific analysis. The further development of computerized accounting and accounting software makes model setting and application more convenient. By establishing a horizontal difference analysis model, this paper achieves timely and rapid conversion from internal management to external reporting. Of course, this paper also has some shortcomings. It assumes that the fixed production costs and non-production costs in each period are constant in the short term. However, they are actually variable in the long run. [4]. This paper fails to study the circumstances with varied unit price, unit variable cost and fixed cost, and in-depth studies will be made in the future. The transformation of financial accounting to management accounting has become inevitable. Financial personnel should have quality and ability required for the transformation. The corporate governance structure should provide support in system and organizational structure for the transformation. The arrival of the data era makes the transformation easier and more operational. Enterprises must participate in the transformation of management accounting to be involved in the great revolution in the era of data economy.

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