

Quantum assessment of losses of inventories by forensic CPAs

Insurance generally compensates claimants against losses of business profits and damages to assets. [Benny K.B. Kwok](#) discusses forensic accounting approaches to estimating the losses of inventories

When a disaster strikes and rescue and relief operations are underway, one should start counting the losses. Most companies nowadays have business continuity plans, including insurance coverage and recovery measures, to help offset losses and damage to assets comprising buildings, structures, plants, equipment, fixtures, fittings and inventories.

Forensic accountants often address the quantum of various tangibles and intangibles for businesses and litigators, including losses of inventories. This issue can be addressed through several approaches.

Direct approach

Physical inventory count

The methodologies in assessing lost inventories depend on the scope and coverage of the particular insurance policy, but quantum assessment generally starts with a direct approach by carrying out a physical inventory count (i.e. a stock take) on the date at which the assessment is required.

The assessment date may be the date at which the disaster struck or the date immediately following it. The physical inventory count refers to inspections of the existence, quantity and condition of inventories by tracing individual items from the claimants' records to the physical inventories and vice versa, so as to confirm the completeness and accuracy of those records.

Inventories may comprise raw materials, semi-finished products or finished products. Raw materials and finished products are readily identifiable, while counting semi-finished products requires the ability to measure the percentage of completion.

If it is not practicable to identify the semi-finished products with either the

components, which have gone into them, or the finished products, which will emerge from them, forensic accountants should evaluate the reliability and accuracy of the costing system in measuring the percentage of completion.

In addition, the extent of damages and obsolescence and any third party's inventories should be identified during the physical inventory count.

However, a physical inventory count by itself does not necessarily prove the ownership and valuation. The items counted should be vouched to the corresponding suppliers' invoices and delivery documents, and if applicable also to the subsequent sales records as a crosscheck for the valuation reflecting any damages or obsolescence.

Perpetual inventory system

Some claimants maintain perpetual inventory systems, comprising records of inventory movements and periodic physical inventory counts, to provide an indication of the inventories costs throughout the year. Still, forensic accountants have to evaluate the system before relying on it for the quantum assessment of lost inventories. However, not too many claimants have such perpetual inventory systems in place.

Roll-forward

A physical inventory count at the assessment date is not always practicable due to the total extinguishment of inventories, while a perpetual inventory system, even if in place, might not operate effectively.

Accordingly, alternative procedures, such as relying on a physical inventory count on another date close to the assessment date should be conducted.

Such a physical inventory count is set as a baseline for rolling forward to the assessment date, which means an inspection of relevant invoices and delivery documents tracing items

of inventories and reconciling their movements between the two dates.

Forensic accountants should also examine the sequence of the delivery documents (for both issues and receipts of inventories) in order to confirm the integrity and completeness of the inventory movements.

If the roll-forward is carried out over an extended period of time, say longer than a year, the forensic accountants should stay alert to a higher margin for errors.

Indirect approach

When inventories and their records are destroyed, the forensic accountants might adopt an indirect approach to assess lost inventories by examining the available contemporaneous documents and the relationships between inventories and other relevant observable data.

Opening inventories plus purchases are those available for sales during a particular period. Costs of sales equate to opening inventories plus purchases minus closing inventories.

Closing inventories are what remain unsold at the period end, which could represent the lost inventories at the assessment date. Gross profits represent the amount of sales in excess of costs of sales, such that:

$$\text{Gross profits} = \text{Sales} - \text{Costs of sales}$$

$$\text{Costs of sales} = \text{Sales} - \text{Gross profits}$$

$$\text{Gross profits} = \text{Sales} - (\text{Opening inventories} + \text{Purchases} - \text{Closing inventories})$$

$$\text{Sales} - \text{Gross profits} = (\text{Opening inventories} + \text{Purchases} - \text{Closing inventories})$$

$$\text{Closing inventories} = \text{Opening inventories} + \text{Purchases} - (\text{Sales} - \text{Gross profits})$$

Or:

$$\text{Closing inventories} = \text{Opening inventories} + \text{Purchases} - \text{Costs of sales}$$

As illustrated above, there are three or four variables in the equations representing the amount of closing inventories, i.e. the quantum of lost inventories at the assessment date.

As long as the available contemporaneous documents can substantiate the value of those variables, the lost inventories can be quantified by simple algebra. However, if the value of a variable is unknown, the forensic accountants should form estimates based on the relevant observable data and the assumption of a constant degree of correlation. In other words, based on the constant correlation among the variables, the forensic accountants can project the unknown variable(s) based on the observable amount(s) of the remaining variable(s).

In carrying out such a projection, three accounting ratios are particularly relevant; gross profit margin, inventory turnover and inventory turnover days.

Dividing gross profits by sales results in the gross profit margin, which reflects the percentage of gross profit in every dollar of sales and often stays relatively stable unless there are material changes to the nature of business and its operation.

The formula is set out below:

$$\text{Gross profit margin} = \frac{\text{Gross profits}}{\text{Sales}}$$

In addition, inventory turnover and inventory turnover days are two meaningful accounting ratios that can facilitate the interpretation of how efficient inventories are being sold and subsequently replenished. Dividing the costs of sales by the average or closing inventories gives the inventory turnover with the relevant formula as follows:

$$\text{Inventory turnover} = \frac{\text{Costs of sales}}{\text{Closing inventories or Average inventories}}$$

Inventory turnover indicates how many times the inventories are being turned over

in a given period and is generally important for claimants because profitability in most businesses largely depends on how efficient its inventories are being sold and subsequently replenished.

Average inventories generally refer to the sum of opening and closing inventories divided by two.

Either closing inventories or average inventories may be used as the denominator as long as the comparison remains consistent. Generally, the higher the inventory turnover, the better the profits would be, because a higher inventory turnover means inventories are being bought, sold and replenished faster.

A low inventory turnover might indicate sluggish sales and obsolete inventories. However, an excessively high inventory turnover, which differs from the industry norms, may suggest losses due to shortages and poor customer service.

A more intuitive way to view inventory turnover is to express it in days showing the average number of days required to sell the products and is represented by:

$$\text{Inventory turnover days} = \frac{\text{Closing inventories or Average inventories}}{\text{Costs of sales}} \times 365 \text{ days}$$

As an illustration, if the claimants have lost the records of sales and purchases for two years immediately before the assessment date – known as the gap period – forensic accountants can seek to reconstruct the records based on the receipts and withdrawals stated in the claimants' bank statements.

However, even if the inventories at the beginning of the gap period are known, having reconstructed the records of sales and purchases during the gap period is still not adequate in the assessment of closing inventories.

Accounting ratios can facilitate the assessment. By applying the gross profit margin and inventory turnover ratio (as calculated in accordance with the accounts and financial statements before the gap period) to the reconstructed records of sales and purchases for the gap period, forensic accountants can estimate the gross profits and ultimately the lost inventories.

By and large, the quantum of lost invento-

ries at a given point in time depends on at least nine factors:

- Nature of business;
- Nature of operations;
- Nature, type and condition of inventories;
- Demand for inventories;
- Supply of inventories;
- Cost structure;
- Storage condition of inventories;
- Financial position of business; and
- Expectation of future business.

By adopting the indirect approach of quantum assessment of lost inventories, forensic accountants assumed that each of the above nine factors are materially unchanged during the relevant time (i.e. the gap period and the period before the gap period, which form the basis for the projection in data reconstruction). If any of these assumptions is not reflective of the case circumstances, the quantum assessment is subject to adjustments.

Summary

In summary, the direct approach of forensic accountants in quantum assessment of lost inventories comprises:

- Conducting a physical inventory count on the assessment date together with the vouching to supporting documents and records;
- Relying on the claimants' perpetual inventory system together with an evaluation of the system; and
- Conducting a physical inventory count on the alternative date together with the roll-forward procedures.

Failing that, the forensic accountants, by using the indirect approach, may form the assessment by projecting the established correlation between sales, purchases, costs of sales and inventories onto the observable variables during the gap period.



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