Liquidity: An Alternative Model

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Abstract:

There are at least two approaches to determine the liquidity position of business organisations – the traditional and liquidity ratio models. The traditional approach of measuring corporate/institutional financial liquidity is taught in college accounting and business classes and is used by practitioners. The limitations of this model may not have been well understood. This paper reviews the existing approaches and presents an alternative model for the determination of the liquidity position of business enterprises. The proposed alternative liquidity ratio model takes into consideration elements that are not incorporated in the existing approaches. This new alternative model will provide more accurate information regarding the financial liquidity of an organisation. It may help management to make better decisions at the operational as well as the strategic financial decision levels.

Introduction

Analysis of financial data commonly employs various techniques to emphasise the comparative and relative importance of the data presented and to evaluate the financial position of a business enterprise. The key ratios commonly used for analysing the internal performance of a company can be categorised into four groups: Liquidity, profitability, solvency, and cash flow ratios. Information derived from these types of analyses is usually blended to determine the overall financial position of a business firm. No one type of analysis supports overall findings or serves all types of users.

Ratios are usually expressed as a percent or as times per period. The following ratios are usually discussed in financial accounting texts (Weygandt, Kieso & Kimmel, 2005) and taught in accounting classes. (1) Liquidity ratios measure a firm's ability to meet its current obligations. They may include ratios that measure the efficiency of the use of current assets and current liabilities. (2) Profitability ratios measure the earning ability of a business enterprise. Profitability ratios measure the income or operating success of a business enterprise for a given time period. A business enterprise's income affects its ability to obtain debt and equity financing, its liquidity position and its ability to grow. (3) Solvency ratios are designed to measure the ability of the business enterprise to survive over a long period of time. Both long-term creditors and stockholders are interested in a company's long-term solvency, particularly its ability to pay interest as it comes due and to repay the debt at maturity (Weygandt, Kieso, and Kimmel, 2005). (4) Cash flow ratios can also indicate liquidity, borrowing capacity or profitability. Although not widely used, cash flow ratios can be useful in determining the adequacy of cash and cash equivalents. The usage of cash flow ratios is dependent upon the critical needs of cash.

This paper will first briefly outline the way liquidity ratios are currently taught in business and accounting classes and how these ratios are used to evaluate the liquidity of a business enterprise. Secondly, it presents an alternative model of computing liquidity and suggests that this alternative may be useful and helpful in situations where the conventional models produce misleading results. In some cases, using several models for liquidity analysis and comparing the results obtained may provide more helpful and accurate information for financial decisions.

The current ratio is probably the best known and most often used of the liquidity ratios. Liquid ratios are used to evaluate the business enterprise's ability to pay its short-term debt obligations such as accounts payable, (payment to trade creditors or suppliers) and accrued expenses such as wages and taxes. Other short-term notes payable to the bank may also be included here. Using measures to assess a business's ability to pay its current liabilities is called current position analysis. Such analysis is of special interest to short-term creditors. Analysis of a business enterprise's current position normally includes, determining the working capital, the current ratio, and the quick ratio. The current and quick ratios are most useful when analysed together and compared to previous periods and to other businesses in the industry. The ratios provide information relating to an organisation's liquidity position – improving or deteriorating from

year to year. The industry average also provides a benchmark guide for business enterprises that want to assess their liquidity positions in terms of the industry average.

The excess of the current assets of a business over its current liabilities is called net working capital. The net working capital is often used in evaluating a company's ability to meet current maturing debts. It is especially useful in making monthly or other period-to-period comparisons for a business enterprise.

There are three major elements in a balance sheet – assets, liabilities and owners' equity. The asset element is divided into two categories, current assets and non-current assets. The current assets are usually composed of working capital items – cash, accounts receivable, inventory, prepaid expenses, including short-term investments. The liabilities of a business enterprise may be composed of current liabilities and non-current liabilities. Current liabilities such as accounts payable and short-term loans, are part of the working capital items. The current portions of the balance sheet are assets and liabilities that connect to cash within 12 months or one year. Current assets divided by current liabilities make up the current ratio.

The Traditional Liquidity Model

There are two well known formulas for computing liquidity ratios: Current Ratio and Quick Ratio.

Current Ratio (CR) is a ratio between current assets and current liabilities $\left(\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}\right)$ (Weygandt, Kieso, and Kimmel, 2005). This ratio indicates the amount of current assets an organization has that can be used to finance its current liabilities when they are due. An organization is said to be liquid when the amount of current assets are greater than the amount of current liabilities or the Current Ratio is greater than 1.00. It means that there are enough cash and other current assets that can be converted to cash to pay for the current liabilities that are required to be paid when due. In other words, it measures the short-term ability of the enterprise to pay its maturing obligations and to meet unexpected needs for cash. Short-term creditors such as bankers and suppliers are particularly interested in assessing liquidity.

There is one item in current assets that is considered to be less liquid, that is, difficult to be converted to cash. This item is inventory. By removing inventory from current assets, the approach is then called Quick Ratio $\left(\text{Quick Ratio} = \frac{\text{Current Assets - Inventory}}{\text{Current Liabilities}}\right)$ (Weygandt, Kieso, and Kimmel, 2005). Quick Ratio is a more conservative measure of organisation liquidity than Current Ratio.

The current ratio has its limitations because it uses the year-end balances of current assets and current liabilities. These year-end balances may not be representative of an organisation's current position during most of the year. A ratio that partially helps to overcome this problem is the ratio of cash provided by operating activities to average current liabilities. This is referred to as the current cash debt coverage ratio. This formula uses cash provided by operating activities instead of a balance sheet amount at one point in time. It is believed that this may provide a better representation of liquidity.

Besides the current ratio, quick-asset ratio and the current cash debt coverage ratio, several other measures can be used to help determine the business enterprise's short-term debt paying ability, which include the receivable turnover ratio, the average collection period, the inventory turnover ratio and average days in inventory. These ratios, based on the traditional approach, are computed separately.

Liquidity may also be measured by how fast certain current assets can be turned into cash. Low values of the above ratios may at times be compensated for if some of the company's current assets are highly liquid. For example, how liquid is accounts receivable? The ratio used to assess the liquidity of accounts receivable is called the receivable turnover ratio. This ratio measures the number of times receivables are collected during the year. The receivable ratio is calculated by dividing net credit sales by average net receivables during the entire year. Further, the receivable turnover ratio can be converted into an average collection period in days. This is done by dividing the receivable turnover ratio into 365 days.

Liquidity may also be measured by how quickly inventory is sold and turned into cash. The inventory turnover ratio measures the number of times on average the inventory is sold during the period. Its purpose is to measure the liquidity of the inventory. This ratio is computed by dividing the cost of goods sold by the average inventory during the period. A variant of the inventory turnover ratio is the days in inventory.

Days in inventory measures the average number of days it takes to sell the inventory (Weygandt, Kieso, and Kimmel, 2005).

Taken together, all these liquidity measures can provide information about the liquidity position of a business enterprise. However, it will require the computation of several ratios. If there is a manipulation of working capital items, such as building up of inventory, lenient credit terms to increase sales (may lead to heavy bad debts and losses), organized delays in billing by trade creditors during the financial year end, disposal of assets, incurrence of long-term debts/borrowings to fund current operations, and so on; information generated by these ratios may not be clear-cut and may sometimes be misleading. Correct interpretations of these ratios may be made more difficult. Unchecked manipulative activities such as those mentioned above may lead organisations into long-term working capital difficulties.

Hawawini and Viallet (1999) in their book entitled *Finance for executives: Managing for value creation* introduced the use of Liquidity Ratio as a measure of an organisation's liquidity performance. According to Hawawini and Wiallet, an organisation is liquid when it has enough long-term financing to support its working capital requirements (WCR). If insufficient or no long-term funds are available to finance its working capital requirements, then an organisation will be facing a serious liquidity problem. Having a large working capital requirement is not a problem as long as there is a large amount of long-term funds available to finance it. The liquidity ratio performance model presented by Hawawini & Viallet is:

$$\text{Liquidity Ratio} = \frac{\text{NLF}}{\text{WCR}}$$

where Net Long-term Financing or *NLF = (Long-term Debt + Equity) – Net Fixed Asset*. And, Working Capital Requirement or *WCR = (Accounts Receivable + Inventory + Prepaid Expense) – (Accounts Payable + Accrued Expenses)*.

The Liquidity Ratio introduced by Hawawini and Viallet is an improvement to the traditional approach, which requires the computation of several ratios (current ratio, quick ratio, current cash debt coverage ratio, receivable turnover ratio, average collection period, inventory turnover ratio, and days in inventory) in order to obtain a reasonable amount of information to decide an organisation's liquidity position. In addition, the traditional approach does not take into consideration long-term debt and equity financing of working capital. Although the liquidity ratio model is an improvement, it falls short of taking into consideration the possibility of manipulation of credit policy. Accounts receivable turnover and payable turnover are not included in the model. What if the organisation implements an aggressive working capital policy? That is, expanding the length of credit beyond the normal period. This is one way of increasing sales. As a result of such a policy, the rate of accounts receivable turnover will slow down. It takes a longer period to collect the accounts receivable which may result in more losses due to bad debts.

Another problem is when the organisation implements a policy of handling accounts payable conservatively. That is, paying accounts payable as soon as possible with, of course, long-term funds. This kind of policy will cause the payable turnover rate to increase. What happens when accounts receivable turnover is low and accounts payable turnover is high? The problem here is that cash to be collected from accounts receivable is not coming fast enough to meet the accounts payable requirements. On the other hand, liquidity of an organisation can be improved if collections of receivables are faster than paying of accounts payable. It appears that this problem is not adequately addressed by the Liquidity Ratio model introduced by Hawawini and Viallet.

An Alternative Model

Having outlined both the traditional liquidity model, and Hawawini and Vialett's Liquidity Ratio models, the following sections present an alternative to the above approaches. For the purpose of this paper, this alternative model is called the Alternative Liquidity Model (ALM). It is different from Hawawini and Vialett's model in that the Alternative Model incorporates receivable turnover (RT) and payable turnover (PT) into the equation. The components of the ALM are presented below.

$$\text{ALM} = \left(\frac{\text{NLF-CDFA}}{\text{WCR}}\right)\left(\frac{\text{RT}}{\text{PT}}\right)$$

Where

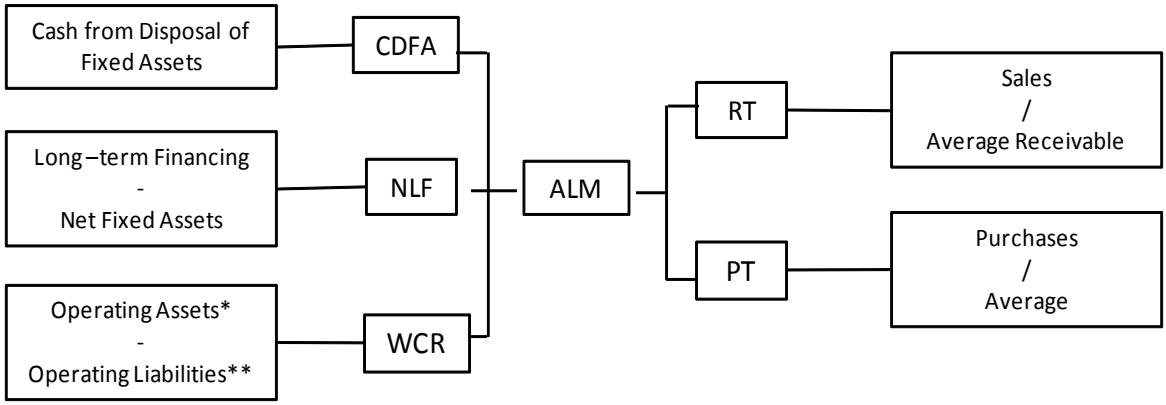
NLF = Net Long-term Financing

CDFA = Cash from Disposal of Fixed Assets
WCR = Working Capital Requirement
RT = Receivable Turnover
PT = Payable Turnover

Note: Cash from disposal of fixed assets is removed from net long-term financing because this cannot be continued year after year. An organisation cannot continue to sell its fixed assets to fund short term operations.

Organisations with an ALM equal to or greater than 1.00 are considered to be liquid while a less than 1.00 is considered as not liquid. The higher the ALM the more liquid is the organisation. The smaller the ALM, the less liquid is the business enterprise.

There are five major elements to the ALM (NLF, WCR, CDFA, RT and PT) and there are eight sub-elements (Long-term financing, Net fixed assets, operating assets, operating liabilities, sales, average receivables, purchases, and average payables). The following diagram shows the elements and sub-elements of ALM.



*Operating Assets = Accounts Receivable + Inventory + Prepaid Expenses

**Operating Liabilities = Accounts Payable + Accrued Expenses. Not including short-term loans

Understanding the elements of the ALM model is important because they show the ability of a business enterprise to finance its short term obligations. Besides, it helps management in making operational as well as strategic financial decisions that affect the liquidity of the organisation. Looking at ALM, several operational financial decisions can be made. ALM can be improved by changing:

- NLF or WCR. Management should decide, where the source of cash will come from. Is it by increasing NLF or by decreasing WCR? Note that cash is the difference between NLF and WCR.*
- Receivables and payables. Do we need to increase receivable turnover or decrease payable turnover? Increasing receivable turnover can be done by speeding up the collection of receivables by giving incentives in the form of cash discounts, etc. Decreasing payable turnover can be done by negotiating with suppliers on the terms of payment.

*WCR (working capital requirement) = CA (current assets) – CL (current liabilities - short-term loan) – Cash

NLF (net long term financing) = LTF (long term financing) – FA (fixed assets). Therefore NLF-WCR = Cash.

The strategic financial decisions that affect the organisation's liquidity are:

- What is the size of the working capital? Should the organisation invest more or less in working capital?
- What proportion of the working capital should be funded by short-term financing and what proportion is to be funded by long-term financing?
- Should the business enterprise invest more in fixed assets in order to increase productivity?

Here is a hypothetical example to illustrate how the different models discussed in this paper work:

An organisation has revenue (sales) of $50.00. Its purchasing expenses are $40.00. The following are the items of its balance sheet:

Balance Sheet

Current Assets		*Current Liabilities*	
Cash	$ 3.00	Accounts Payable	$ 6.00
Accounts Receivable	25.00	Short-term loan	2.00
Inventory	18.00	Long-term loan	23.00
Fixed Assets	5.00	Equity	20.00
Total Assets	$51.00	Total Liability and Equity	$ 51.00

Using the above hypothetical example, the computations of liquidity performance under the different models are shown follow:

Traditional models

Current Asset/Current liabilities

Current Ratio = (3 + 25 + 18) / (6 + 2) = 5.75

(Current Assets – Inventory)/Current Liabities.

Quick Ratio = (3 + 25) / (6 + 2) = 3.5

Liquidity Ratio Model

$$\text{Liquidity Ratio} = \frac{\text{NLF}}{\text{WCR}}$$

Long-term Financing or *NLF = (Long-term Debt + Equity) – Net Fixed Asset*. And, Working Capital Requirement or *WCR = (Accounts Receivable + Inventory + Prepaid Expense) – (Accounts Payable + Accrued Expenses)*.

Liquidity Ratio = ((23 + 20) – 5) / ((25 + 18) – 6) = 38 / 37 = 1.03

Alternative Liquidity Model

$$\text{ALM} = \left(\frac{\text{NLF-CDFA}}{\text{WCR}}\right)\left(\frac{\text{RT}}{\text{PT}}\right)$$

ALM = [(Long-term debt + Equity – Fixed assets)-CDFA]/[Accounts Receivable + Inventory – Accounts payable] x [(Sales/Accounts Receivable) / (Purchase expenses/Accounts payable)]

ALM = [(23.0 + 20.0 – 5.0)-0.0]/[25.0 + 18.0-6.0] x [(50.0/25.0)/(40.0/6.0)]

ALM = (1.03) x ([50 / 25) / (40 / 6]) = (1.03) x (2 / 6.67) = 0.31

[Note: CDFA is assumed to be zero. There is no disposal of fixed assets. All of the above ratios must be equal to or greater than 1.00 to be said to be liquid]

Using the traditional liquidity model (Current Ratio and Quick Ratio), the organisation appears to be very liquid with Current Ratio of 5.75 and Quick Ratio of 3.5. The current ratio shows that the business has $5.75 to cover each dollar of debt when due. The quick asset ratio indicates that there is $3.50 to cover its current debt obligations if the organisation is required to pay them immediately. However, the Hawawini and Viallet Model shows that the liquidity ratio is only 1.03 – just sufficient to cover its debt obligations. When the ALM is used, it reveals a serious problem of liquidity. The liquidity ratio of ALM is only 0.31. The reason for the organisation not being liquid is because the time period to collect cash from accounts receivable is longer than the time period allowed to pay the accounts payable. Besides, there is not much long-term financing available to fund the working capital requirement, and cash available is too small to compensate for the required working capital.

There are several operational as well as strategic financial decisions that the organisation could make

to improve the very small ALM: Decrease the amount of receivables by tightening the credit terms, reduce the level of inventory, negotiate with suppliers for spreading the period of payments, increase NLF either through long-term loans or additional capital, and/or reducing fixed assets. Reducing fixed assets to improve ALM should be done with caution since that could weaken the sustainability of the organisation because fixed assets are needed to keep the business enterprise operating over the long term.

From the hypothetical example above, the application of the different models in computing the liquidity ratio ends up with three different ratios, from a very optimistic outcome (5.75 and 3.50) using the traditional models to a very poor liquidity ratio using the model presented in this paper, 0.31. The Hawawini and Viallet's model shows the liquidity ratio to be a little above 1.00. The issue is: Which one of the above models is a better model for analysing the Liquidity ratio of business enterprises?

The traditional approach is simple. Just simply using the current and quick asset ratios may not be sufficient to get a clear picture of the liquidity position of a business enterprise. Other ratios such as the accounts receivable turnover ratio, the collection period in days, the inventory turnover ratio, inventory turnover ratio in days, and the current cash debt coverage ratio need to be computed to get a full picture of the liquidity situation. The ratios generated using all the above do not take into consideration the using of long term debt, equity or disposal of non-current assets to finance the working capital requirements. If a business organisation is using the latter to cover its liquidity requirements, the traditional approach may not be adequate to uncover the actual business liquidity situation or problem.

The liquidity ratio model presented by Hawawini and Viallet partially addresses this problem, but the weakness is its failure to incorporate the *receivables turnover* and the *payables turnover* into the formula. In addition, this approach does not remove the *cash from disposal of fixed assets* from the equation. Ideally, only cash generated by the business operating activities should be included in the computation of the liquidity ratio.

ALM approach is basically a refinement of Hawawini and Viallet's model. It addresses the weaknesses of this model by incorporating the *receivable turnover*, *payable turnover* and removing *cash from the disposal of fixed assets* from NFL (Net Long-term Financing). By comparing the three approaches to analyse the liquidity position of a business enterprise, the ALM is more comprehensive and useful because it incorporates a number of elements which other approaches do not.

Summary and Conclusion

It is the purpose of this paper to present an Alternative Liquidity Model for the analysis of the liquidity position of business organisations. To set the background for the presentation of the Alternative Liquidity Model, the traditional approach was briefly outlined. This approach uses the current asset and the quick acid ratios. These two ratios alone are inadequate in addressing the liquidity issue completely. Other ratios (receivable turnover ratio, the collection period in days, the inventory turnover ratio, inventory turnover ratio in days, and the current cash debt coverage ratio) must be called upon to provide additional information on the liquidity of a business enterprise. The ratios computed using the above approach do not incorporate other elements such as the use of long term debt, equity or disposal of non-current assets to finance the working capital requirements. Therefore, this approach may not be the best approach to generate reasonably good information for decision-making on the liquidity position of business organisations.

The liquidity ratio model introduced by Hawawini and Viallet helps to address some of the issues not addressed by the traditional approach. This model is an improvement on the traditional approach, but it falls short of taking receivable turnover, payable turnover and cash from disposal of fixed assets into the equation. Changing or manipulating the credit collection and creditor payment periods can have an impact on the liquidity position. Further, an injection of cash from the sale of fixed assets also influences the liquidity ratio.

The ALM incorporates all the major impacting elements into the equation. It is a refinement of the liquidity ratio model. This alternative liquidity model provides a better indicator of an organisation's liquidity performance than the traditional and liquidity ratio models. It provides more accurate information and shows all major elements that affect organisation liquidity.

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