

LIQUIDITY ANALYSIS OF VIETNAMESE LISTED FIRMS USING TRADITIONAL RATIOS AND CASH FLOW RATIOS

Pham Quang Tin^a,
Tran Thi Nga^a,
Pham Thi Kim Lanh^a

ABSTRACT

Liquidity analysis is one of the most important contents in enterprise's financial analysis. Liquidity position is commonly measured by financial ratios that are conventional ratios (based on balance sheet and income statement) and cash flow ratios. To examine whether there is a difference between traditional ratios and cash flow based ratios as a measure of liquidity of Vietnamese listed companies, estimation method and mean difference testing method are applied in the study. The result indicates that there is a statistical difference between cash flow ratio and current ratio as well as between critical needs cash coverage ratio and quick ratio of Vietnamese listed companies. Meanwhile, no statistical difference is spotted regarding interest coverage ratio of Vietnamese listed companies in both approaches.

Keywords: liquidity analysis, traditional ratios, balance sheet ratios, cash flow ratios, current ratio, quick ratio and Vietnamese listed firms.

1. INTRODUCTION

Bankruptcy analysis is a domineering subject in corporate finance in recent decades because of their meaning [1]. "Solvency is represented by the capacity of the company to cover all its obligations" either in the short term or long term [2]. Liquidity is the ability of a company to meet the short term commitments (12 months or one normal operating year). It is the ability of the company to convert its assets into cash. Liquidity management is a concept that attracts considerable attention of many companies throughout the world, especially with the current financial situations and the state of the world economy. The main concern for management is to balance between profitability, which helps increase shareholder's wealth, and liquidity, which assures smooth operations and maintains their remunerations. An organization having a proper set of liquidity management policies and procedures will enhance profits, reduce the risk of corporate failure and significantly improve its chances of survival. Liquidity plays an important role in maintaining smooth operations for firms [3]. There is a significant impact of current ratio, quick ratio and debt to total assets ratio on return on assets [4] and a relationship between liquidity management and profitability exists [3]. Failed entities, which face financial distress, have lower cash flows than healthy entities and smaller reserves of liquid assets [5]

Financial ratios are commonly used as an indicator of liquidity position of a firm. The traditional ratios using figures from balance sheet and income statement have long been familiar with financial analysts and users of financial statements. Recently, the use of cash flow based ratios has emerged and brought a new perspective to liquidity measurement. As prepared under cash basis, the cash flow statement is more likely to reveal the true picture of a company's health. There are many researches on liquidity analysis using cash flow information in the world, but only few studies in Viet Nam have used the same approach. That is why the paper chooses to investigate Liquidity position of Vietnamese listed companies using two types of ratios.

The primary objective of this study is to describe the real picture on liquidity of Vietnamese listed companies by combining both traditional and cash flow ratios. The second objective is to investigate and test the suitability of several suggested cash flow ratios by Beaver (1966) [6] and Barua & Saha (2015) [7] with listed firms in Vietnam. The third objective is to promote the use of cash flow statement in financial analysis for more thorough understanding of entities. The rest of the paper proceeds as follows. Section 2 presents the literature review and research question. Section 3 describes the research methodology and data. Empirical finding is examined in section 4. Section 5 concludes the paper.

2. Literature review

2.1. Theoretical background

2.1.1 Traditional ratios

Of all the liquidity measures, ratio analysis is the most commonly used method. Liquidity ratios demonstrate how good a company is at keeping sufficient cash flow and they are derived from balance sheet and income statement, which are prepared under accrual accounting basis. From the very first use of financial ratios, many authors have introduced and suggested the use of some common ratios. According to Bowlin (1990) [8], Maness et al. (2004) [9], Smart et al. (2007) [10], Brigham (2012) [11], Eugene et al. (2011) [12], Leach et al. (2011) [13], Brealey et al. (2012) [14], Kirkham (2012) [15], Besley et al. (2013) [16], Ross et al. (2014) [17], Smart et al. (2012) [18], Ehrhardt et al. (2016) [19], there are five main liquidity ratios listed below in table 1:

Table 1: Traditional ratios for liquidity analysis

	Ratio	Formula
1.	Current ratio	$\frac{\text{Current assets}}{\text{Total current liabilities}}$
Definition: Measuring the ability to pay short-term obligations by total current assets. This should be at least 1.		
2.	Quick ratio	$\frac{\text{Current assets} - \text{Inventory} - \text{Other short-term assets}}{\text{Total current liabilities}}$
Definition: Inventories and other short-term assets are considered to be the least liquid and need the longest time to be converted into cash, this ratio measures liquidity without these two types of current assets.		
3.	Cash ratio	$\frac{\text{Cash and cash equivalents}}{\text{Total current liabilities}}$
Definition: Cash ratio only accounts for the most liquid assets, cash and cash equivalents, which can be converted to cash with great ease.		
4.	Interest coverage ratio	$\frac{\text{Operating income} + \text{Interest}}{\text{Interest}}$
Definition: This ratio shows the firm's ability to pay interest with its operating income before interest.		

As you may have noticed, the denominator - total current liabilities is the same for the first three ratios but the nominators get smaller from current to cash ratio as the liquidity level of the assets used for paying abilities increases. These ratios tell us how much the firm's assets can ensure the firm's ability to pay short-term obligations. It depends on the users' purposes to choose the suitable ratios. In the viewpoint of short-term creditors, the higher those ratios are the better whereas it indicates less efficient use of assets under the firm's perspective. In essence, the analysis is based on the ratios which indicate the ability of firms to pay for its liabilities[15]

2.1.2. Cash flow statement and cash flow ratios

Along with conventional ratios, cash flow based ratios are getting more and more popular to financial analysts, managers and other users of financial information. Gradually, they are believed to reflect a better picture of a firm's health, especially liquidity position. Cash flow statement (CFS) reflects changes in cash and cash equivalents during a period. Cash and cash equivalents comprise of cash on hand and demand deposits, together with "short-term, highly liquid investments that are readily convertible to a known amount of cash and which are subject to an insignificant risk of changes in value" [20]. Since CFS provides information on cash inflows and outflows of a business within a given period of time, it becomes an essential tool in measuring liquidity [9]. In fact, CFS is used in financial analysis of a firm with regards to solvency, liquidity, productivity, efficiency and sufficiency [21]. Cash flow ratios as a liquidity measure is brought about and used by many researchers like Beaver (1966) [6], Kirkham (2012) [15], Atieh (2014) [22] and Barua (2015) [7]. The listed ratios below are the most common cash ratios to measure liquidity:

Table 2: Cash flow ratios for liquidity analysis

	Ratio	Formula
1.	Cash flow ratio	$\frac{\text{CFO}}{\text{Total current liabilities}}$
Definition: This measure tells us how the firm can manage to pay its liabilities from the support of earnings from its main activities. Of the firms with equal amount of average current liabilities, we would be more likely to invest in the one with higher cash flow ratio. This ratio should be at least 0.4, as suggested by Ryu and Jang [23]		
2.	Critical needs cash coverage	$\frac{\text{CFO} + \text{Interest paid}}{\text{Total current liabilities} + \text{Interest}}$
Definition: This ratio measures the company's ability to meet its obligations and pay interest. The higher it is the better.		
3.	Cash interest coverage	$\frac{\text{CFO} + \text{Interest expenses}}{\text{Interest expenses}}$
Definition: This ratio measures the company's ability to meet interest payments on its entire debt load. Any company with a cash interest coverage less than 1 bears the risk of potential default.		

2. Previous studies

Liquidity analysis is still a prominent topic in financial analysis among academic researchers who use conventional approach and/or use of cash flow ratios. The empirical result is listed below in chronological order to provide readers with the development of liquidity measurement over the years.

The research entitled “Traditional Versus Operating Cash Flow in Failure Prediction” was carried out by Laitinen in 1994 using data from 40 failed and 40 similar non-failed firms during five years before the failure. The analysis showed that, in general, accrual basic ratios may be a more stable and reliable predictor of failure than operating cash flow [24]. The research of Kirkham (2012) for the Telecommunications sector in Australia involved the comparison between the traditional ratios and cash flow ratios of 25 companies in the telecommunication sector in the period from 2007 to 2011 [15]. The ratios examined were current ratio, quick ratio, interest coverage ratio, cash flow ratio, critical needs cash coverage ratio and cash interest coverage ratio. The study revealed conflicts between traditional liquidity ratios and cash flow ratios. Incorrect decision regarding liquidity could be made if users depended solely on traditional ratios. In certain instances, a company was deemed to be liquid though it was facing cash flow problems or a company was considered illiquid when in fact it had sufficient cash flow resources. The research entitled “Liquidity management of Indian cement companies – A comparative study” showed that the traditional liquidity ratios are less than the suggested value of 1.5 and indicated that companies should maintain the percentage of inventories to current assets as low as possible [25]. The research of Atieh (2014) about the Pharmaceutical Sector in Jordan works on the comparison between traditional ratios and cash flow ratios of the seven big companies of the pharmaceutical industry in Jordan over a six-year period (2007-2012) [22]. The paper has showed some traditional ratios conducted from values in balance sheet were distinct from cash flow ratios drawn upon statement of cash flows (for example results between current ratio and cash flow ratio), but no material difference was found between interest coverage ratio and cash interest coverage ratio. A conclusion on the liquidity of the company based solely on traditional ratios could lead to incorrect decisions. As a result, the author suggested analysis based on traditional ratios to be compared with cash flow ratios before reaching any conclusion regarding financial liquidity position. Kajanathan & Velnampy investigated 2 firms in communication sector in Sri Lanka and revealed that their cash flow ratios showed better liquidity position as compared to conventional ones [26]. In the same year, Eyisi & Okpe carrying out a research entitled “The impact of cash flow ratio on corporate governance” which also supported the use of cash flow ratios (as a better tool of measuring liquidity) along with traditional ratios to help making more appropriate decisions. [27]

Barua et al. (2015) also support the use of cash flow ratios as an indicator of liquidity in their paper “Traditional Ratios vs . Cash Flow based Ratios : Which One is Better Performance Indicator ?” [7]. This study worked on non-manufacturing companies enlisted in Dhaka Stock Exchange before the year of 2000 with the aim of investigating the abilities of cash flow ratios in revealing the actual state of the company by calculating the difference between the two approaches of liquidity measurement.

$$\text{Difference (\%)} = \frac{\text{Traditional Ratio Value} - \text{Cash flow based ratio value}}{\text{Traditional Ratio Value}}$$

The findings showed that liquidity position of investigated firms was overestimated. In particular, current ratio was manipulated, as compared to cash flow ratio, by more than 78%, while quick ratio is overestimated by more than 50% as compared to critical needs coverage ratio. The authors recommended the use of traditional ratio in conjunction with cash flow based ratio to get a better indication of the financial health of an entity. The research of McGowan, Billah & Jakob named “Liquidity Analysis of selected public-listed companies in Malaysia performed” in the same year also proved significant statistical differences between the two types of ratios and suggested the use of both for a better decision-making process [28]. The study of Yeo (2016) entitled “Solvency and Liquidity in Shipping Companies” explored the financial structure of top 130 shipping firms provided by the Factiva database during the period between 2009 and 2013 [29]. The paper found that these shipping companies had a comfortable liquidity position with the overall current ratio of 2. Also, they proved there is a negative association between asset liquidity and leverage of those firms.

In Vietnam, there have been some authors attributing their researches to evaluating enterprises’ liquidity position. The research of Pham et al. (2011) working on the capital structure and liquidity position of state-owned enterprises showed that average current ratios of those companies, which equals 1.84, is at an acceptable level [30]. However, the author used the traditional ratios and none of cash flow based ratios. Up to now, very few studies in Vietnam have applied both traditional and cash flow based ratios though many international studies have given evidence on the usefulness of cash flow statements as well as financial ratios derived from it. Researchers on this field have showed the preference for the use of cash flow based ratios in measuring liquidity [7] [15] [22]. Given that liquidity measure for listed companies in Vietnam has been solely based on the conventional approach, there is no basic to compare the use of liquidity measure for both methods. Furthermore, liquidity should be considered in particular areas and countries together with current economic conditions. The authors try to find out the usefulness of cash flow ratios in supporting better decisions for users of financial reporting in the case of Vietnam. The paper addresses this gap by exploring liquidity analysis of Vietnamese listed firms using traditional ratios and cash flow ratios and draw a conclusion on which is a better indication of liquidity of Vietnamese listed companies.

3. Research hypothesis, research method and research data

3.1. Research hypothesis

In order to answer the research question: “Is there any difference between traditional ratios and cash flow based ratios as a measure of liquidity of Vietnamese listed companies?” this study is carried out to test the general hypothesis:

H0: There are statistical differences between traditional and cash flow ratios as a measure of liquidity of Vietnamese listed companies

For the purpose of evaluating liquidity of those companies in details, H0 is divided into the following specific hypotheses:

H01: There is a statistical difference between cash flow ratio and current ratio of Vietnamese listed companies (cash flow ratio and current ratio formulas in appendix 1)

H02: There is a statistical difference between critical needs cash coverage ratio and quick ratio of Vietnamese listed companies (critical needs cash coverage ratio and quick ratio formulas in appendix 1)

H03: There is a statistical difference between cash interest coverage ratio and interest coverage ratio of Vietnamese listed companies (cash interest coverage ratio and interest coverage ratio formulas in appendix 1)

3.2. Research method and research data

3.2.1 Research method:

The paper uses descriptive statistics to show differences between the conventional and cash flow based ratios as measures of liquidity of listed firms in Vietnam

Paired Samples Test is applied to make the foundation of acceptance or rejection for the research hypothesis (H01, H02, and H03). The testing value is calculated by the following formula (1.01).

$$T = \frac{\bar{d}}{S_D} \sqrt{n} \quad (1.01)$$

$$\bar{d} = \frac{\sum_{i=1}^n d_i}{n}; \quad S_D = \sqrt{\frac{\sum_{i=1}^n (d_i - \bar{d})^2}{n-1}}$$

di: the different value of each pair observation
n: total observation

T value will be compared with the value of Student distribution to make conclusion about acceptance or rejection the research hypothesis.

In addition, to analyze the difference of selected ratios that used to reflect the liquidity of Vietnamese listed firms, the study employs Paired Differences testing. The different value is measured by the below formula (1.02).

$$\Delta = \bar{d} \pm t_{(n-1)}^{\alpha/2} \frac{S_D}{\sqrt{n}} \quad (1.02)$$

3.2.2. Data collection:

Data used is panel data of 254 Vietnamese listed firms during the 5-year period 2011-2015 obtained from Ho Chi Minh Stock Exchange database. There are totally 1,270 observations of 10 industries with Industrials accounting for the highest proportion, 28.7% and Information Technology the least proportion, only 2.4% (table 3). In short, data size and data structure satisfy the requirements of methods used in this study (appendix 2).

Table 3: The industry sector structure of listed firms in the research (from 2011 to 2015)

Industry sectors	Frequency	Percent (%)
Financial	55	4.3
Consumer Staples	155	12.2
Consumer Discretionary	150	11.8
Materials	205	16.1
Health Care	45	3.5
Real Estate	155	12.2
Utilities	65	5.1
Industrials	365	28.7
Information Technology	30	2.4
Energy	45	3.5
Total	1,270	100.0

4. Empirical results

4.1. Descriptive statistics results

Table 4: Liquidity measure of Vietnamese listed firms based on traditional ratios in the years 2011 - 2015

Year	2011	2012	2013	2014	2015
Current ratio	2.13	2.1846	3.02	2.36	3.11
Quick ratio	1.37	1.4204	2.13	1.50	2.36
Cash ratio	0.47	0.5151	0.54	0.54	0.59
Interest coverage ratio	363.60	66.5011	473.90	133.28	393.86

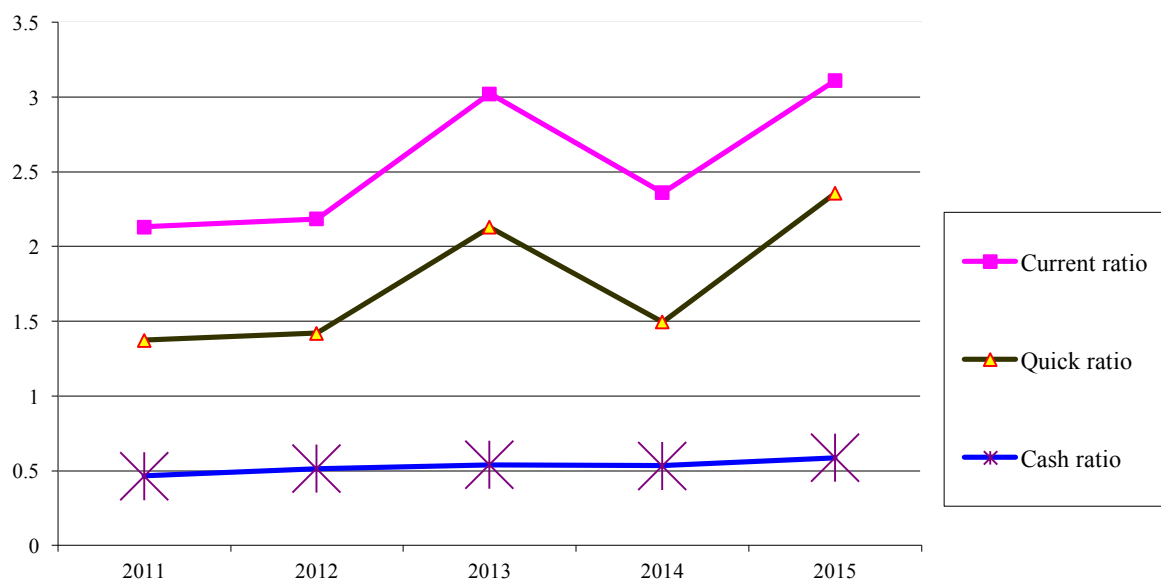


Figure 1: Liquidity measures of Vietnamese listed firms based on traditional ratios between 2011 and 2015

Table 4 (detail in appendix 3) and figure 1 show values of current ratio and quick ratio of Vietnamese listed firms fluctuated from 2011 to 2015 while cash ratio was increasing except a light fall in the year 2014. In the five selected years, 2015 appears to be the best year for measuring liquidity of Vietnamese listed firms. Current ratio ranges from 2.13 to 3.11, higher than the proposed value of 2 by Maness & Zietlow (2004) [9] and Lasher (2008) [31]. It means on average current assets of these companies are more than twice as high as their current liabilities. Quick ratio stays between 1.37 and 2.36 and cash ratio receives values from 0.47 to 0.59. Through the years, ratios alter but they have highest values in 2013 and 2015.

Table 5: Liquidity measure of Vietnamese listed firms based on cash flow in the years 2011 – 2015

Year	2011	2012	2013	2014	2015
Cash flow ratio	0.27	0.34	0.48	0.43	0.29
Critical needs ratio	0.24	0.30	0.26	0.35	0.21
Cash interest coverage ratio	269.44	26.19	393.80	364.57	208.60

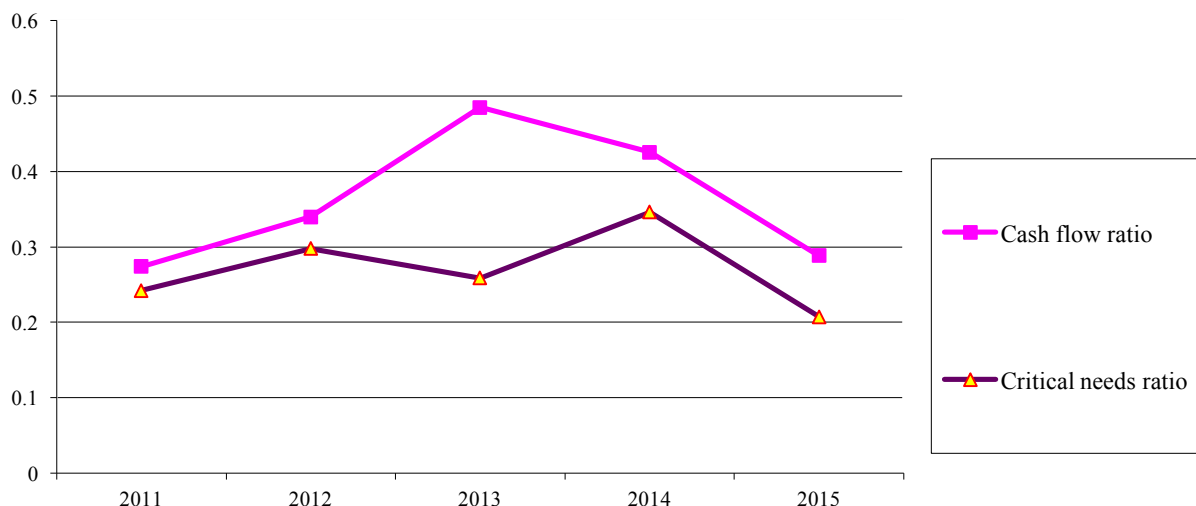


Figure 2: Liquidity measure of Vietnamese listed firms based on cash flow in the years 2011 – 2015

Cash flow based ratios on liquidity are showed in table 5(as detail in appendix 4) and demonstrated in figure 2. Cash flow ratio ranges from 0.27 to 0.48. Critical needs ratio is between 0.21 and 0.35. As compared to traditional current and quick ratios, they show weaker liquidity positions of the selected companies. The finding is similar to the results of Atieh (2014) and Barua & Saha (2015). Atieh (2014) shows the differences between traditional and cash flow ratios (current ratio- cash ratio; quick ratio-critical needs ratio) with the higher value being traditional ones [22]. In the study of Barua & Saha (2015), current and quick ratios are also found to be overestimated by more than 78% when comparing against cash ratio and critical needs ratio [7].

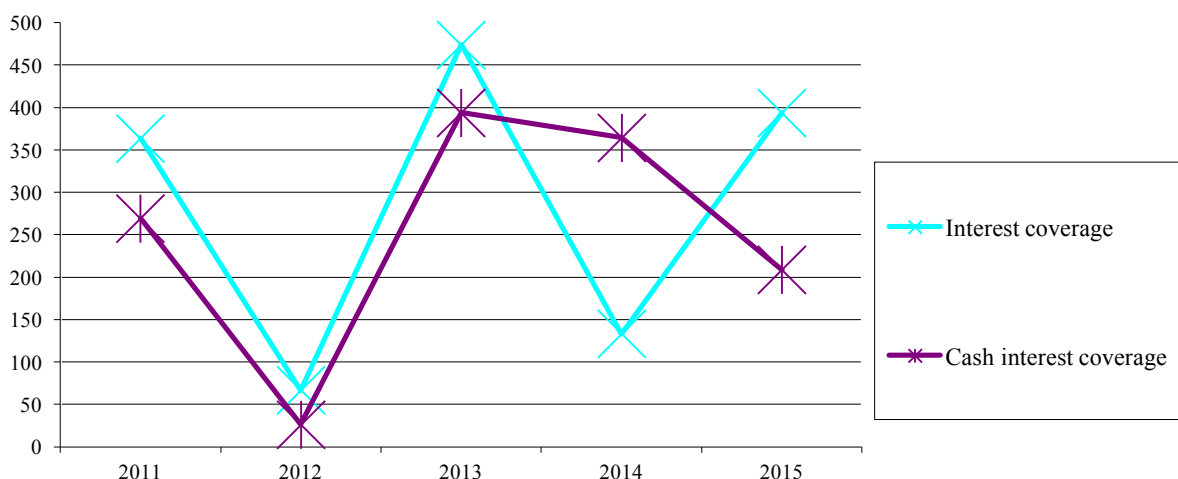


Figure 3: Traditional and cash flow based interest coverage ratios

As indicated in tables 4, 5 and figure 3, the values of interest coverage ratios under two approaches are far different. Traditional interest coverage ratio is higher than cash interest coverage ratio except in 2014. The ratios have lowest value in 2012 at 66.50 and 26.19 for traditional and cash based ratios, respectively. 2013 is deemed to be the comfortable year for chosen firms in terms of interest payment. Income from operation activities is 473.89 times higher than interest expense and net cash flow from operating activities is 393.8 times higher than interest expense in this year.

4.2. Mean differences analysis between traditional ratios and cash flow based ratios

Table 6: Mean differences between traditional ratios and cash flow based ratios

Liquidity	Traditional ratios		Cash flow based ratios	
	N	Mean	N	Mean
Current ratio & Cash ratio	1270	2.56	1268	0.36
Quick ratio & Critical needs ratio	1270	1.75	1268	0.27
Interest coverage ratios	1270	286.57	1185	252.86

There are some differences between two ways of evaluating liquidity of the firms. As for current, quick ratios and interest coverage ability, traditional ratios show favorable results in comparison with cash flow based ratios. Generally, traditional ratios reflect more favorable liquidity position of Vietnamese listed firms over selected years.

Table 7: T-test results on traditional ratios and cash flow based ratios

Liquidity measure		Differences			t	Sig
		Mean	95% Confidence Interval of the Difference			
			Lower	Upper		
Pair 1	Current ratio – Cash ratio	2.20051	1.81827	2.58276	11.294	***
Pair 2	Quick ratio – Critical needs ratio	1.48578	1.09096	1.88061	7.383	***
Pair 3	Interest coverage ratio – Cash interest coverage ratio	34.18936	-74.24521	142.62393	.619	

***, **, * significance levels at 1%; 5%; 10%

Table 7 (as detailed in appendix 5) shows us the T-test results on differences between the traditional and cash flow based ratios as a measure of liquidity. At the significance level of 1%, there are 2 tests showing the differences between the two kinds of ratios. For pair 3, given the sig. values of 0.536, respectively being higher than 0.05, we reject H03. This means there is no difference in the value of interest coverage ratios calculated by the two approaches. For pair 1 and pair 2, sig. value is $0.000 < 0.05$, so H01 and H02 are accepted. In other words, there are statistical differences between current ratio and cash ratio as well as between quick ratio and critical needs ratio. With 95% confidence interval, the difference shows that mean current ratio is higher than mean cash ratio by 2.20051, with the lowest difference being 1.81827 and highest difference being 2.58276. Quick ratio is generally 1.48578 higher than critical needs ratio, with the lowest difference of 1.09096 and highest difference of 1.88061. The findings show similar results to study of Atieh (2014) [22] and Barua & Saha (2015) [7] for supporting the use of cash ratio and critical needs ratio as another approach for current and quick ratios.

5. Conclusion:

Liquidity analysis is a basic financial analysis of external users when they want to know about the company’s ability to continue its business in the future. Whenever the company has difficulties in meeting its short-term obligations, it is in the risk of insolvency. The under-emphasis of liquidity analysis role can lead to serious mishaps for firms like losing business partners or opportunities for long-term development [32]. The research result proves that liquidity measured by current ratio of Vietnamese listed firms from 2011 to 2015 is quite good, being higher than the suggested value of 2. In addition, the traditional ratios represent a stronger liquidity position for these firms in comparison with that based on cash flow based ratios. Although the difference in debt coverage ratio and interest coverage ratio of Vietnamese listed companies in two approaches cannot be found, the statistical difference between cash flow ratio and current ratio as well as between critical needs cash coverage ratio and quick ratio are proved to exist. The mean difference between values of these two paired ratios encourages the use of cash flow based ratios in liquidity analysis. As Corina has argued (2013), a firm only faces bankruptcy when it loses the ability of payment, not when it is unlikely to make profit [33]. Managers should consider the pros and cons of having relaxed availability of cash and liquid assets to support short-term obligations. Managerial decisions on liquidity based solely on conventional ratios can be risky, thus both types of ratio should be taken into account in the decision making process. To creditors, it is extremely important that they can collect debts, so we suggest them to be prudent by paying more attention to the use of cash flow based ratios over traditional ones.

In this paper, we implicitly consider perfect substitutions of conventional ratios with modern ratios while in fact, it is not the case. The limitation of the paper is the small number of surveyed companies. If the research can extend the number of observed firms, the finding will be more objective.

Appendix 1: Formulas used

	Traditional ratios	Cash flow ratios
1	Current ratio = $\frac{\text{Current assets}}{\text{Total current liabilities}}$	Cash flow ratio = $\frac{\text{Cash from operations}}{\text{Total current liabilities}}$
2	Quick ratio = $\frac{\text{Current assets} - \text{Inventories} - \text{Other current assets}}{\text{Total current liabilities}}$	Critical needs coverage = $\frac{\text{Cash from operations} + \text{Interest paid}}{\text{Total current liabilities} + \text{Interest paid} + \text{Dividends}}$

3	Cash ratio = $\frac{\text{Cash and cash equivalents}}{\text{Total current liabilities}}$	
4	Interest coverage ratio = $\frac{\text{Earnings from operations} + \text{Financial expenses}}{\text{Financial expenses}}$	Cash interest coverage ratio = $\frac{\text{Cash from operations} + \text{Financial expenses}}{\text{Financial expenses}}$

Appendix 2:

Industry sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Financial	55	4.3	4.3	4.3
	Consumer Staples	155	12.2	12.2	16.5
	Consumer Discretionary	150	11.8	11.8	28.3
	Materials	205	16.1	16.1	44.5
	Health Care	45	3.5	3.5	48.0
	Real Estate	155	12.2	12.2	60.2
	Utilities	65	5.1	5.1	65.4
	Industrials	365	28.7	28.7	94.1
	Information Technology	30	2.4	2.4	96.5
	Energy	45	3.5	3.5	100.0
	Total	1270	100.0	100.0	

Appendix 3:

Descriptive

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Current ratio	2011	254	2.1306	1.72610	.10831	1.9173	2.3439	.22	15.71
	2012	254	2.1846	2.14332	.13448	1.9198	2.4495	.14	21.68
	2013	254	3.0226	14.39527	.90324	1.2437	4.8014	.31	229.78
	2014	254	2.3601	2.37058	.14874	2.0671	2.6530	.35	23.26
	2015	254	3.1094	9.52686	.59777	1.9322	4.2867	.40	145.10
	Total	1270	2.5615	7.88770	.22133	2.1272	2.9957	.14	229.78
Quick ratio	2011	254	1.3728	1.46637	.09201	1.1916	1.5540	.08	11.33
	2012	254	1.4204	1.96291	.12316	1.1778	1.6630	.09	18.71
	2013	254	2.1302	12.48964	.78367	.5868	3.6735	-.14	198.72
	2014	254	1.4954	1.90390	.11946	1.2602	1.7307	.11	16.98
	2015	254	2.3559	9.43673	.59211	1.1898	3.5220	.06	145.08
	Total	1270	1.7549	7.13717	.20027	1.3620	2.1478	-.14	198.72
Interest coverage ratio	2011	239	363.5976	3070.09564	1.98588E2	-27.6171	754.8122	-51.96	38339.33
	2012	238	66.5011	295.48907	19.15371	28.7679	104.2344	-148.56	2482.15
	2013	241	473.8960	4892.00309	3.15122E2	-146.8613	1094.6534	-309.11	74151.75
	2014	236	133.2779	1533.70817	99.83590	-63.4098	329.9656	-6042.83	21679.87
	2015	233	393.8610	3073.76271	2.01369E2	-2.8844	790.6064	-125.85	34030.67
	Total	1187	286.5705	3015.12718	87.51455	114.8699	458.2711	-6042.83	74151.75
Cash ratio	2011	254	.4650	.82409	.05171	.3632	.5669	.00	8.08
	2012	254	.5151	1.19865	.07521	.3670	.6632	.00	12.07

	2013	254	.5401	1.31427	.08246	.3777	.7025	.00	11.54
	2014	254	.5350	1.27107	.07975	.3779	.6921	.00	14.47
	2015	254	.5870	1.38668	.08701	.4157	.7584	.00	15.41
	Total	1270	.5285	1.21377	.03406	.4616	.5953	.00	15.41

**Appendix 4:
Descriptive**

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Cash flow ratio	2011	252	.2739	.89009	.05607	.1635	.3843	-3.19	7.37
	2012	254	.3400	.80433	.05047	.2406	.4394	-2.77	5.64
	2013	254	.4849	2.86936	.18004	.1303	.8394	-2.59	43.77
	2014	254	.4256	1.57856	.09905	.2305	.6206	-1.61	20.27
	2015	254	.2885	.94644	.05939	.1716	.4055	-4.13	6.02
	Total	1268	.3627	1.61654	.04540	.2736	.4518	-4.13	43.77
Critical needs coverage	2011	252	.2423	.53175	.03350	.1763	.3083	-2.09	4.54
	2012	254	.2978	.52737	.03309	.2326	.3629	-2.67	3.20
	2013	254	.2588	.50682	.03180	.1962	.3214	-2.25	4.52
	2014	254	.3461	1.38047	.08662	.1755	.5166	-1.49	20.27
	2015	254	.2074	.60984	.03826	.1320	.2827	-3.35	4.04
	Total	1268	.2705	.78735	.02211	.2271	.3139	-3.35	20.27
Cash interest coverage ratio	2011	237	269.4407	2585.76139	1.67963E2	-61.4582	600.3395	-605.07	36012.33
	2012	238	26.1874	383.98346	24.88995	-22.8464	75.2212	-4044.58	2118.20
	2013	241	393.7990	4626.41306	2.98013E2	-193.2570	980.8550	-1.02E4	60113.91
	2014	236	364.5656	3731.36357	2.42891E2	-113.9566	843.0877	-4096.25	52310.33
	2015	233	208.6032	1548.91577	1.01473E2	8.6771	408.5292	-216.55	17937.73
	Total	1185	252.8587	2991.93324	86.91460	82.3349	423.3825	-1.02E4	60113.91

**Appendix 5:
Paired Samples Test**

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Current ratio – Cash ratio	2.20051	6.93809	.19484	1.81827	2.58276	11.294	1267	.000
Pair 2	Quick ratio – Critical needs ratio	1.48578	7.16640	.20125	1.09096	1.88061	7.383	1267	.000
Pair 3	Interest coverage ratio – Cash interest coverage ratio	34.18936	1902.54379	55.26822	-74.24521	142.62393	.619	1184	.536

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Pham Quang Tin^a,

^aUniversity of Economics, the University of Danang,

Tran Thi Nga^a,

^aUniversity of Economics, the University of Danang,

Pham Thi Kim Lanh^a

^aUniversity of Economics, the University of Danang,