

CHAPTER SIX : RESEARCH FINDINGS I

6.1 Introduction

The first section this chapter explained the descriptive statistics of the whole study. Then it shows the nature of the comparison of the variables between Islamic and conventional banks. The next section describes the variables which compare Islamic banks before and after the crisis period. It follows by the section that made descriptive statistics of comparison between conventional banks before and after the crisis period. In addition the chapter analysed the 1st findings of the study, in this sense, the discussions on the pooled, Islamic and conventional banks findings is made. All the research questions developed in chapter one were answered in this chapter. The final section summarized the chapter.

6.2 Descriptive Statistics (Whole Study)

The summary statistics of all the variables for the whole study (Islamic and conventional banks) in Table 6.1 revealed that capital ratio (measured as equity over total assets) is 12.04%. This shows that the banking sector was adequately capitalized throughout the investigation. The assets quality measured through growth of gross loans, shows that the bank loans in Malaysia on average, grew by 271% from 2000 to 2016. This is significant growth, which is in line with the increase in bank size as indicated by growth in asset base. At the same time NPLs ratio (not reported) stood at 5.29 during the study period. This indicates a high quality of assets held by the banks as despite the tremendous growth in loan the banks keep their NPLs low. The bank's efficiency ratio (measured by total expenses over total revenue) indicated the banks in Malaysia during the period under investigation to be less efficient as the average ratio

stood at 131%. The earnings quality of the banks measured by interest earning ratio shows the banks earns a competitive returns on their financed loans as the ratios stood at average of 132.4%.

Furthermore, on average, the banks had a liquidity ratio (measured through LCR and NSFR) of 115% and 102% respectively during the period of study. This shows that all the banks have adequate liquidity (based on Basel III recommendation) to withstand financial shocks. The market concentration shows an average of 874. This means that the market is competitive for the whole banks study. The Malaysian economy grew by 4.98% on average over the period between 2000 and 2016 as shows by the GDP growth. On the other hand, inflation rate was 2.29% on average over the same period. However, banks profitability as measured by ROAA, was lower than the rate at which prices were increasing. Banks ROAA is 1.24% on average although some of the banks recorded as high as 7.92% and others as low as -8.39% (i.e., bank Islam in 2006). The average z score (insolvency risk) for all the banks stood at 14% (minimum 7.73% and maximum 27.36%). This indicates that all banks were financially stable during the period of the study.

Table 6. 1: Descriptive Statistic (Whole Sample)

Latent Variable	Items	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
Capital Adequacy Ratios	EQNL	-3.2	8365.33	77.1	402.58	16.65	327.81
	EQTA	-1.9	99.92	12.08	11.312	4.19	22.59
	CRISK	0	1395.13	87.73	122.89	5.83	44.48
Assets Quality Ratios	GGL	-96.89	77515.22	271.53	3789.63	17.57	335.99
	RILIL	7.92	17500	215.54	858.81	16.41	316.36
	TE/TR	-1248.26	5363.13	131.02	244.32	17.917	382.778
Management Efficiency Ratios	PE/NI	-615.04	4806.9	99.97	318.04	9.04	109.28
	OH/TA	-0.018	26.01	0.82	1.16	18.32	394.42
	IER	-568.22	27816.89	132.4	1173.51	23.53	556.06
Earnings Quality Ratios	OI/AS	-0.21	19.58	3.58	2.29	2.09	8.11
	NII/GR	-3.78	258.04	27.62	18.89	3.75	39.29
Inflation	INF	0.58	5.44	2.29	1.13	1.18	1.49
Gross Domestic Product	GDPG	-1.51	8.86	4.98	2.26	-1.61	2.75
	GDPG	-3.28	5.49	3.06	2.08	-2.08	3.74
Concentration	HHI	752	1207	874.13	106.82	1.3	1.33

Latent Variable	Items	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
Liquidity Ratios	LCR	0.42	2148.95	115.55	141.47	6.57	78.83
	NSFR	38.42	538.4	102.98	51.72	4.94	32.08
	ROAA	-8.39	7.92	1.24	1.13	-2.5	25.31
	ROAE	-564.63	141.09	13.8	28.09	-16	333.11
Profitability Ratios	NIM	0.19	7.15	2.22	0.73	1.07	5.14
Insolvency Ratio	Z Score	7.73	27.36	14.38	5.43	1.01	0.23

6.2.1 Comparison of Profitability between Islamic and Conventional Banks

Table 6.2 shows the average values of bank specific factors and macroeconomic factors for Islamic and conventional banks in Malaysia separately. Capital adequacy ratio (CAR) of conventional banks is better (i.e., 13.55%). The mean difference between the two categories of banks is significant at 1% (i.e., p-value 0.000). On the other hand, Islamic banks loan growth is higher (i.e. 696%) than that of conventional banks which was only grown by 98% during the period under study. The mean figures are all significant. With regards to efficiency measured by total expenses over total revenue, though overall, both banking categories are not efficient. The results show Islamic banks to be less efficient with the average ratio of 182% than conventional banks who has the ratio of 108%. The average interest-earning ratio for Islamic banks is better (i.e., 258%) than conventional banks (i.e., 78%) and the mean difference between the two is significant at a 10% level. Both banking systems enjoyed similar GDP growth and inflation during the period under investigation and the mean figures were not statistically different. Concentration ratio shows both banking sectors are perfectly competitive. However, Islamic banks are more diversified with 836 HHI than conventional banks who have 891 HHI. The mean difference is significant as 1% level.

As for the liquidity, both the banks have the required threshold for NSFR as set by the Basel III (i.e. above 100%) Accord. However, Islamic banks have lower LCR (i.e., 82%) against at least 100% required (recommended by Basel III) than conventional banks. The mean difference in favor of conventional banks is statistically significant at

1% level. In terms of profitability (measured by ROAA and ROAE), the results show conventional banks to be more profitable than Islamic banks. The mean difference is statistically significant at 1% level. With regards to the insolvency risks measured through z score, both banking sector are solvents (no earning risk that may lead to insolvency) and the t ratio is not significant.

Table 6. 2: Descriptive Statistics: Islamic and Conventional Banks

Latent Variables	Items	Islamic banks		Conventional bank		Mean Difference	T Statistics	P values
		Mean	Std. Deviation	Mean	Std. Deviation			
Capital Adequacy Ratios	EQNL	21.79	102.56	100.00	475.04	-78.21	-2.137	0.033
	EQTA	8.68	8.03	13.55	12.19	-4.87	-4.768	0.000
	CRISK	63.28	36.19	9840.00	144.08	-9776.72	-3.143	0.002
Asset Quality Ratios	GGL	695.97	6570.97	97.74	1593.99	598.23	1.664	0.097
	RILIL	138.42	209.47	250.10	1022.49	-111.68	-1.385	0.167
	TE/TR	182.28	425.06	108.73	75.98	73.55	3.306	0.001
Management Efficiency Ratios	PE/NI	110.75	283.31	95.29	332.20	15.46	0.529	0.597
	OH/TA	1.05	1.98	0.72	0.46	0.328	3.155	0.002
	IER	258.11	2127.26	77.74	81.16	180.37	1.676	0.094
Earning Quality Ratios	OI/AS	3.18	1.96	3.75	2.40	-0.57	-2.69	0.007
	NII/GR	14.35	11.92	33.25	18.49	-18.9	-12.141	0.000
Inflation	INF	2.41	1.20	2.24	1.10	0.17	1.622	0.105
Gros Domestic Products	GDPG	4.82	2.30	5.05	2.24	-0.23	-1.113	0.266
	GDPC	3.09	2.15	3.05	2.05	0.04	0.17	0.865
Concentration	HHI	836.42	76.53	890.58	113.85	-54.16	-5.684	0.000
	LCR	82.06	59.18	130.02	162.74	-47.96	-3.725	0.000
	NSFR	104.84	43.43	102.17	54.98	2.67	0.565	0.572
Liquidity Ratios	ROAA	0.76	1.37	1.44	0.95	-0.68	-6.601	0.000
	ROAE	9.16	47.30	15.71	13.50	-6.55	-2.484	0.013
	NIM	2.42	0.83	2.13	0.68	0.29	4.235	0.000
Insolvency Ratio	Z Score	14.88	5.64	14.14	5.33	0.74	1.443	0.150

6.2.2 Comparison of Profitability of Islamic Banks Before and After Crisis

Table 6.3 shows the average values of bank specific factors and macroeconomic factors for Islamic banks in Malaysia separately before and after the crisis period. Capital Adequacy Ratios (CAR) of Islamic banks in Malaysia are better (i.e., 45.16% and 10.32%) before the 2008 financial crisis period. The mean difference between the two periods is significant at 10% level (i.e., p-value 0.070 and 0.085 respectively). The assets quality measured through loan growth is higher before the crisis (i.e., 3122%) compared to the after the crisis which was only 19.76%. With regards to efficiency

measured by total expenses over total revenue; though both before and after the crisis, Islamic banks are not efficient with the ratio of over 290% before the crisis and over 139% after the crisis. The results show after crisis, the banks are able to reduce their cost. The average interest (profit) earnings ratio as a measure of earnings quality for Islamic banks after the crisis is better (i.e., 336%) as compared to the before the crisis (i.e., 67%). The mean difference between the two is significant at 5% level. Islamic banking system enjoyed low inflationary trends after the crisis (i.e., 2.06%) compared to before the crisis (i.e., 3.28%). The reduction in the inflationary trend for Islamic banks after the crisis is among the factors that burst their profitability. The GDP growth for Islamic banks is better prior to the crisis (i.e., 5.49%) period. The concentration ratio shows a significant concentration for Islamic banks prior to the crisis (i.e., 2,302). On the other hand, after the crisis, the Islamic banking sector becomes perfectly competitive (i.e., 1,218).

Comparison of the banks liquidity shows that Islamic banks short term liquidity measured through LCR falls below the required threshold (i.e. 98.18%). On the other hand, the long term liquidity measured through NSFR shows the banks has sufficient liquid assets (i.e. 119.9%). However, after the crisis both short as well as long term liquidity of the Islamic banking sector falls below the required threshold (i.e. 75.84% and 98.76% respectively). An increase in the overall ROAA (i.e., 2.19%) and ROAE (i.e., 95.86%) after the crisis suggests that the banks are able to stay focus on their main activities (i.e., intermediation) after the crisis. Thus, they were able to generate more returns to their depositors and shareholders. With regards to the stability of earnings measured through z score, the overall Islamic banks z score prior to the crisis is -4.59 while after the crisis, the score changed significantly to 19.04. This indicated a weak or

volatile earning capacity for Islamic banks prior to the crisis and a stable earning after the crisis.

Table 6. 3: Descriptive Statistics of Islamic banks before and after the crisis

Latent Variables	Items	Mean	Std. Deviation	Mean	Std. Deviation	Mean Difference	T Statistics	p values
		Before-Crisis		After Crisis				
Capital Adequacy Ratios	EQNL	45.16	195.41	12.98	5.50	32.18	1.826	0.070
	EQTA	10.32	14.32	7.96	3.00	2.36	1.734	0.085
	CRISK	31.76	31.20	75.94	29.83	-44.18	-8.643	0.000
Asset Quality Ratios	GGL	3122.38	13965.85	19.76	27.04	3102.62	2.475	0.014
	RILIL	168.50	399.94	128.06	67.00	40.44	1.08	0.282
	TE/TR	290.78	792.95	139.60	40.14	151.18	2.109	0.036
Management Efficiency Ratios	PE/NI	129.89	282.27	103.22	284.52	26.67	0.551	0.582
	OH/TA	1.48	3.64	0.88	0.37	0.60	1.802	0.073
	IER	66.85	44.93	335.56	2520.16	-268.71	-0.745	0.457
Earning Quality Ratios	OI/AS	4.32	2.52	2.82	1.60	1.50	4.333	0.000
	NII/GR	19.36	17.07	12.55	8.82	6.81	3.35	0.001
Inflation	INF	3.28	1.57	2.06	0.79	1.22	6.783	0.000
Gross Domenstic Products	GDPG	5.49	1.36	4.55	2.54	0.94	2.436	0.016
	GDPC	1.46	3.25	3.74	0.88	-2.28	-7.148	0.000
Concentration	HHI	2302.49	1771.20	1218.22	174.25	1084.27	6.71	0.000
	LCR	98.18	82.78	75.84	46.01	22.34	2.224	0.027
Liquidity Ratios	NSFR	119.99	73.75	98.76	19.04	21.23	2.954	0.004
	ROAA	0.20	2.19	0.94	0.94	-0.74	-2.948	0.004
	ROAE	-6.61	95.86	13.94	9.40	-20.55	-2.348	0.020
Profitability Ratios	NIM	2.40	0.88	2.44	0.81	-0.04	-0.278	0.781
Insolvency Ratio	Z Score	-4.59	22.32	19.04	8.69	-23.63	-9.881	0.000

6.2.3 Comparison of Profitability of Conventional Bank Before and After Crisis

Table 6.4 shows the average values of bank specific factors and macroeconomic factors for conventional banks in Malaysia separately before the crisis (i.e., from 2000-2008) and after the crisis (i.e., 2009-2016). Unlike the Islamic bank's results explained above, the Capital Adequacy Ratios (CAR) of conventional banks in Malaysia are better (i.e., 149% and 15.33%) after the crisis. The mean difference between the 2-sub period is significant at 1% level (i.e., p-value 0.044 and 0.003 respectively). The loan growth as a measure of assets quality is higher after the crisis (i.e., 182%) compared to the

before crisis which was only 11.55%. With regards to efficiency measured by total expenses over total revenue, though both before and after the crisis, conventional banks are not efficient with the ratio of over 106% prior to the crisis and over 110% after the crisis. The results show that, after the crisis, the banks incurred more expenses. The average interest-earning ratio for conventional banks after the crisis is high (i.e., 93.84%) as compared to before the crisis (i.e., 61.39%), and the mean difference between the two periods is significant at 1% level.

Conventional banks enjoyed low inflationary trends after the crisis (i.e., 2.10%) compared to before the crisis (i.e., 2.39%). The GDP growth for conventional banks like that of Islamic banks explained above is better prior to the crisis (i.e., 5.46%) period. Concentration ratio measured by HHI shows that conventional banks before and after the crisis enjoyed a competitive environment (i.e., 1,082 and 1,150 respectively).

The reduction in the overall ROAA (i.e., 1.25%) and ROAE (i.e., 13.14%) after the crisis suggests that the banks overall are not efficient in terms of handling the cost after the crisis. Thus, it leads to the reduction in returns to their depositors and shareholders. With regards to the insolvency risks measured through z score, the overall conventional banks z score prior and after the crisis is good, though, after the crisis, the score is higher and significant at 10% level.

Table 6. 4: Descriptive Statistics of Conventional banks Before and After the crisis

Latent Variables	Items	Mean Before-crisis	Std. Deviation	Mean after crisis	Std. Deviation	Mean Difference	T statistics	P values
Capital Adequacy Ratios	EQNL	52.16	111.62	149.20	658.13	-97.04	-2.025	0.044
	EQTA	11.73	8.64	15.33	14.67	-3.59	-2.947	0.003
Asset Quality Ratios	CRISK	43.17	28.91	152.51	185.58	-109.35	-8.111	0.000
	GGL	11.55	36.87	182.58	2244.80	-171.03	-1.047	0.296
	RILIL	136.44	289.00	374.15	1439.53	-237.71	-2.234	0.026
Liquidity Ratios	LCR	126.17	111.90	133.81	200.84	-7.64	-0.464	0.643
	NSFR	102.07	53.19	102.27	56.80	-0.20	-0.036	0.971
Management Efficiency Ratios	TE/TR	106.55	103.51	110.87	30.44	-4.33	-0.563	0.574
	PE/NI	85.16	210.07	105.22	419.05	-20.06	-0.597	0.551
	OH/TA	0.72	0.34	0.71	0.55	0.01	0.178	0.859
Earning Quality Ratios	IER	61.39	67.39	93.84	90.05	-32.44	-4.029	0.000
	OI/AS	4.69	2.58	2.83	1.77	1.85	8.227	0.000
	NII/GR	33.43	20.67	33.07	16.11	0.36	0.193	0.847
Inflation	INF	2.39	1.34	2.10	0.76	0.29	2.608	0.009
Gross Domestic Products	GDPG	5.46	2.03	4.65	2.36	0.81	3.658	0.000
	GDFC	2.39	2.63	3.70	0.86	-1.31	-6.678	0.000
Concentration	HHI	1081.99	72.47	1150.16	64.39	-68.17	-9.850	0.000
Profitability Ratios	ROAA	1.63	1.15	1.25	0.65	0.37	3.947	0.000
	ROAE	18.32	16.88	13.14	8.28	5.18	3.834	0.000
	NIM	2.26	0.70	1.98	0.62	0.28	4.056	0.000
Insolvency Ratio	Z Score	20.56	14.83	21.79	5.98	-1.23	-1.063	0.288

6.3 Summary of Descriptive Statistics

The above section explained the descriptive statistics conducted on seven different data classifications (i.e., pooled study, Islamic and conventional banks, as well as before and after the crisis for both Islamic and conventional banks studies). As for the pooled data, the statistics show that for the period under study, Malaysian banks have enough liquidity. Both LCR and NSFR are above 100% threshold. However, the banks are found to be inefficient which leads to low profitability by banks. With regards to the comparison between Islamic and conventional banks, the section described that Islamic banks have low short term liquidity measured by LCR (i.e., 82%) against the threshold of 100%. On the other hand, conventional banks have excess than required LCR. Before the crisis period, Islamic banks are found to have inadequate short term liquidity measured by LCR (i.e., the ratio is <100%). At the same time, banks are characterized with the high operating expenses in both periods. However, a different result was found with regards to the conventional banks both before and after the crisis period as the banks are found to have more than required liquidity which ultimately undermines their overall profitability measured through ROAA.

6.4 Factors that Determines Liquidity, Profitability and Insolvency Risks (Pooled, Islamic and Conventional Banks Samples)

6.4.1 Introduction

In order to achieve the objectives of the research, the analysis was conducted in three steps: (i) assessment of the structural model which described the relationships between endogenous and exogenous variables (Latan, 2018). (ii) assessment of the factors that determines the liquidity (iii) to test whether liquidity mediates the relationship between the factors that determines the liquidity, profitability and

insolvency risks and finally (iv) assessment of the multi-group analysis (MGA) to assesses any significant difference between the path coefficients for Islamic and conventional banks as well as before and after the crisis periods.

6.4.2 Result and Discussion (Pooled, Islamic and Conventional Banks)

The coefficient of determination (R^2) is the index that should be assessed in the structural model for each endogenous variable in this study. The R^2 reflects the power of construct variances in determining the goodness of fit against the manifest items (Chin, 1998; Götz et al., 2010). The R^2 in table 6.6 shows that the model's explanatory power for all the three samples (i.e., Pooled, Islamic and conventional banks) has a moderate predictive ability for the dependent variable because it is above 0.33 (33%). This means it is in line with the recommendation by Chin (1998), except profitability in pooled and conventional banks studies models which has a weak predictive ability (Chin, 1998). The weak R^2 (i.e., less than 0.33) for liquidity in pooled study and profitability in pooled and conventional bank studies may be due to the exclusion of some necessary measures of factors that determines the liquidity and profitability in these models. This means that liquidity and profitability studies in these models (i.e., those that have weak predictive ability) should include all possible liquidity and profitability measurements to produce strong explanatory power in the regression.

The structural coefficient estimates among the latent variables (LVs) for each model are also presented in table 6.6. The R^2 value estimates the amount of variance in the endogenous variables explained by all the exogenous variables linked to it (Hair et al., 2013). In PLS structural model, the individual path coefficients can be interpreted as standardized beta coefficients of ordinary least squares regressions (Henseler et al., 2009). The effect on the endogenous construct is more substantial if one path coefficient

is greater than another. For example, the CAR for all samples shows that it is the most important exogenous construct in predicting the endogenous construct (table 6.6 CAR=0.54). The path coefficient can be defined as the changes estimated in the endogenous construct for a unit change in an exogenous construct. For example, the CAR (X) in the pooled sample has a $\beta = 0.54$. This means that one unit increase in X variable is associated on average with 54% unit increase in M (banks liquidity).

The analysis will be discussed in five stages: (i) the relationships between bank specific factors and macroeconomic factors with banks profitability and insolvency risks, (ii) the relationships between bank specific factors and macroeconomic factors with liquidity, (iii) the relationships between banks liquidity and profitability and insolvency risks, (iv) the multi-group comparison is conducted to examine the significant difference between the path coefficients for the Islamic and conventional banks and (v) the mediation effect. Prior to the analysis, the measurement model is used to measure the collinearity among the endogenous and exogenous variables. Table 6.5 shows that no multicollinearity issue was detected, all Variance Inflation Factor (VIF) values are within the acceptable threshold of less than five (5).

Table 6. 5: Assessment of the Collinearity (Islamic and Conventional Banks)

Bank category	Whole Study			Islamic banks			Conventional banks		
	Liquidity	Profitability	Insolvency risks	Liquidity	Profitability	Insolvency risks	Liquidity	Profitability	Insolvency risks
CAR	1.077	1.578	1.512	1.269	2.039	2.023	1.272	1.882	1.87
Asset Quality	1.211	1.401	1.211	2.738	3.379	3.053	1.228	1.251	1.251
Efficiency	1.101	1.111	1.101	3.025	3.461	3.193	1.267	1.276	1.269
Earning Quality	1.157	1.188	1.158	1.206	1.207	1.207	1.156	1.165	1.156
Inflation	1.335	1.351	1.335	1.172	1.176	1.172	1.436	1.461	1.443
GDP	1.318	1.367	1.321	1.179	1.276	1.237	1.527	1.947	1.553
Concentration	1.249	1.269	1.251	1.157	1.597	1.402	1.421	2.679	1.499
Liquidity	-	1.541	1.451	-	1.974	1.883	-	1.581	1.581
Profitability	-	-	-	-	-	-	-	-	-
Insolvency risk	-	1.519	-	-	1.577	-	-	2.394	-

6.4.3 Result and Discussion of Factors that Determine Liquidity, Profitability and Insolvency Risks (Pooled, Islamic and Conventional Banks)

Table 6.6 shows the Model A and B of the PLS-SEM significance estimates for the factors that determines liquidity (Panel A) and the bank's profitability and insolvency risks (Panel B). The PLS path modeling measures the Beta (β) coefficient, standard error and statistically significant values using resampling from the bootstrapping procedures for a number of samples of 5000 for all samples.

The research divided the analysis into three, namely, pooled, Islamic banks and conventional banks. Then, further compares the sub-divided analysis into before and after crisis for each banking system. Though according to the PLS-MGA suggested to pool that data, by doing separate analysis between pre and post crisis some differences were noticed between the variables, thus, the research find in appropriate and more thoroughly to conduct an analysis for both pooled, Islamic and conventional banks both before and after the 2008 financial crisis. This way, the overall findings of the research will be more robust.

Table 6. 6: Results of the Factors that Determine Liquidity, Profitability and Insolvency risks (Pooled, Islamic and Conventional Banks)

	Pooled			Islamic Banks (Group 1)			Conventional Banks (Group 2)		
	coef. (β)	Std.error	Critical ratio	coef. (β)	Std.error	Critical ratio	coef. (β)	Std.error	Critical ratio
Panel A									
CAR -> Liquidity (C1)	0.547	0.08	6.842***	0.657	0.24	2.738***	0.615	0.084	7.355***
Asset Quality -> Liquidity (C2)	-0.012	0.079	0.152	0.404	0.375	1.077	0.122	0.097	1.259
Efficiency -> Liquidity (C3)	0.025	0.073	0.34	-0.287	0.232	1.234	-0.04	0.078	0.511
Earning Quality -> Liquidity (C4)	0.019	0.084	0.231	0.024	0.087	0.274	0.009	0.12	0.072
Inflation -> Liquidity (C5)	0.001	0.038	0.034	0.001	0.062	0.011	-0.067	0.045	1.494
GDP -> Liquidity (C6)	-0.051	0.038	1.335	-0.152	0.081	1.868*	-0.129	0.049	2.639***
Concentration -> Liquidity (C7)	-0.039	0.039	1.006	-0.279	0.126	2.218**	-0.222	0.047	4.78***
Panel B									
CAR -> Profitability (F1)	-0.099	0.17	0.58	0.173	0.323	0.536	-0.423	0.243	1.74*
Asset Quality -> Profitability (F2)	-0.058	0.24	0.24	-0.04	0.143	0.28	-0.139	0.075	1.864*
Efficiency -> Profitability (F3)	0.211	0.273	0.773	-0.613	0.276	2.226**	0.313	0.395	0.793
Earning Quality-> Profitability (F4)	0.267	0.227	1.179	-0.127	0.198	0.641	-0.128	0.255	0.502
Inflation -> Profitability (F5)	0.061	0.059	1.039	0.007	0.1	0.074	0.009	0.074	0.118
GDP -> Profitability (F6)	0.034	0.061	0.568	0.072	0.123	0.582	-0.057	0.084	0.68
Concentration -> Profitability (F7)	0.078	0.08	0.969	-0.096	0.098	0.984	0.037	0.1	0.365
CAR -> Z Score (F8)	0.21	0.057	3.702***	-0.08	0.153	0.521	0.072	0.047	1.54
Asset Quality -> Z Score (F9)	0.353	0.351	1.005	-0.543	0.505	1.076	0.001	0.036	0.029
Efficiency -> Z Score (F10)	-0.079	0.13	0.605	0.529	0.408	1.297	0.054	0.052	1.056
Earning Quality -> Z Score (F11)	-0.142	0.077	1.837*	-0.049	0.094	0.517	-0.061	0.055	1.111
Inflation -> Z Score (F12)	-0.101	0.031	3.224***	-0.054	0.06	0.89	0.086	0.045	1.93*
GDP -> Z Score (F13)	0.174	0.037	4.7***	0.131	0.065	2.02**	0.405	0.049	8.294***
Concentration -> Z Score (F14)	-0.11	0.047	2.319**	0.311	0.119	2.621**	0.702	0.032	22.245***
Panel C									
Liquidity -> Profitability (F15)	-0.065	0.09	0.721	-0.045	0.114	0.398	-0.045	0.106	0.425
Liquidity -> Z Score (F16)	-0.244	0.042	5.74***	-0.237	0.102	2.329**	0.005	0.044	0.102
R Square(R2) – Liquidity	0.302			0.478			0.356		
R Square (R2) – Profitability	0.134			0.431			0.209		
R Square (R2)- Z Score	0.332			0.352			0.573		

6.4.4 Result of Research Question 1: Factors that Determine Bank's Profitability and Insolvency Risks (Pooled, Islamic and Conventional banks)

The discussion of results will start with the first research question: “What is the effect of bank specific factors and macroeconomic factors on the profitability and insolvency risks of Islamic and conventional banks in Malaysia?”. The relationships (as summarized in table 6.7) between the bank specific factors and macroeconomic factors and profitability and insolvency risk (Group 1 hypotheses) for the three samples, i.e., Pooled, Islamic and Conventional banks seem to have mixed results in terms of significance values. Most relationships for the pooled, Islamic and conventional banks samples in profitability model are insignificant, except for only CAR and Assets Quality for conventional banks and efficiency for Islamic banks. Thus, the findings contradicts

the concept and hypotheses developed in this study. CAR and Asset quality for conventional banks study revealed a significant negative relationship with bank's profitability, which is contrary to this research concept and hypothesis (i.e., hypotheses F1 and F2). Thus, hypothesis F1 and F2 is rejected. However, the findings is consistent with previous studies (Wasiuzzaman & Tarmizi, 2010;, and Iqbal, 2012).

Table 6. 7: The summary results for group 1 hypotheses (Profitability and Insolvency Risks)

Hypothesized path	Pooled	Islamic banks	Conventional
F1: CAR -> Profitability	Not Supported (-)	Not Supported (+)	Supported (-)
F2: Asset Quality -> Profitability	Not Supported (-)	Not Supported (-)	Supported (-)
F3: Efficiency -> Profitability	Not Supported (+)	Supported (-)	Not Supported (+)
F4: Earning Quality -> Profitability	Not Supported (+)	Not Supported (-)	Not Supported (-)
F5: Inflation -> Profitability	Not Supported (+)	Not Supported (+)	Not Supported (+)
F6: GDP -> Profitability	Not Supported (+)	Not Supported (+)	Not Supported (-)
F7: Concentration -> Profitability	Not Supported (+)	Not Supported (-)	Not Supported (+)
F8: CAR -> Z Score	Supported (+)	Not Supported (-)	Not Supported (+)
F9: Asset Quality -> Z Score	Not Supported (+)	Not Supported (-)	Not Supported (+)
F10: Efficiency -> Z Score	Not Supported (-)	Not Supported (+)	Not Supported (+)
F11: Earning Quality -> Z Score	Supported (-)	Not Supported (-)	Not supported (+)
F14: Inflation -> Z Score	Supported (-)	Not Supported (-)	Supported (+)
F13: GDP -> Z Score	Supported (+)	Supported (+)	Supported (+)
F12: Concentration -> Z Score	Supported (-)	Supported (+)	Supported (+)

The results indicate that for the period under study, the bank's profitability would not necessarily increase when the bank has high capital ratios and high asset quality for the conventional banks. Notwithstanding, specifically for the Islamic banks, an increase in the bank's expenses reduces the profitability. This is consistent with this study's hypothesis (i.e., hypothesis F3) and efficiency structure concept. Thus, hypothesis F3 is accepted. Conventional banks assumes that factors other than high assets quality and high capital buffer are the factors that drive the bank's profitability, while for Islamic banks, only decrease in the operating expenses (i.e., inefficiency ratio) increased banks profitability.

For conventional banks finding, the banks might use an extremely high capital above what is required by the regulatory. This could lead to the decrease in profitability

as a high amount of cash (in the form of capital) was kept idle without using it to generate more profits. For assets quality, the result supports the findings of Vong & Chan (2008) and Athanasoglou, (2005). This means, conventional banks have to focus more on their credit risk. Though banks tend to be more profitable when they are able to undertake more lending activities, it can also mean that higher provision is needed, if the assets financed end up as non-performing. In such an event, expenses will rise and will affect the profits made and the quality of the asset will be decreased. The credit quality and credit portfolio are some indicators that could affect the quality of the provision of the conventional financial market in Malaysia. Therefore, conventional banks in Malaysia should decrease Reserves for impaired loans/impaired loans to reduce their loan loss provision expenses, be more vigilant in creating and growing their assets so that it will not end up as bad debt thereby eating their profits. This will raise the profit made by the banks.

All other independent variables (i.e., management efficiency, earnings quality, concentration risk, GDP and inflation) are contrary to the expectations (i.e., hypotheses F3-F7) of this research as insignificant relationships were found. Thus, hypothesis F3-F7 are rejected, (except the finding of efficiency ratio for Islamic banks which is in line with this research hypothesis) and ES concept. The insignificant relationship of these variables against profitability indicates that, for the period under study, the combination of these variables does not have much impact on all the banks in Malaysia as a whole and Islamic and conventional banks in particular. This means bank's profitability in Malaysia for the period under study can be influenced by the other factors i.e., ownership factors, board governance and structure etc. This might true because in most cases the bank's management depends on the owners risk appetites which is delegated directly to the board management and inturns rest with the board struture other than

bank specific factors and macroeconomic factors combined in this study except for CAR, assets quality and (efficiency for Islamic banks).

On the other hand, the relationship between the bank specific factors and macroeconomic factors and insolvency risks (hypothesis F8-F14) measured by z score also produced a mixed finding. For the whole study, the CAR has a significant and positive relationship with insolvency risks, which is consistent with the previous studies by Ghosh (2015), Kohler (2015), Tabak et al. (2015), Williams (2014), Mirzaei et al. (2013), Nguyen et al. (2012) and Zhang et al. (2012). The findings is also consistent with this study's hypothesis (i.e., Hypothesis F8). A negative relationship of earning quality and insolvency risks (z score) is contrary to the expectations of this study (i.e., hypothesis F11). In summary, the findings show that, for all the banks in Malaysia, the high capital led to the banks solvency, however, the increase in earning quality led to decrease of banks solvency. This means that Malaysian banks should increase their earnings ability through granting more loans and reducing the provisions on loans and the NPLs ratio. Accordingly, hypothesis F8 is accepted while hypothesis F11 is rejected.

A significant negative relationship between banks concentration and insolvency risks measured through z score (for the whole study period) is inconsistent with the expectation for this study (i.e., hypothesis F14). This means hypothesis F14 is rejected for the whole study. However, the findings is consistent with the previous studies by Demsetz, (1973). Conversely, for Islamic and conventional banks separate study, a positive relationship between banks concentration and insolvency risks is consistent with the relative market power hypothesis and Structure conduct performance (SCP). The results is also consistent with this research hypothesis (i.e. hypothesis F14). The findings indicate that, for the pooled data study, the competitive banking sector led to decrease in the bank solvency. Conversely, for Islamic and conventional banks separate

study, the significant positive relationship shows that competitive banking industry increased their solvency. Thus hypothesis F14 is failed to be rejected for Islamic and conventional banks separate study.

Positive relationship between GDP and insolvency risks (z score) for whole banks study, Islamic and conventional banks studies is consistent with the Life-Circle Concept of consumption and this research hypothesis (i.e., hypothesis F13). The findings is also consistent with previous studies by Kohler (2015), Anginer et al. (2014), Dima et al. (2014) and Lee & Hsieh (2014). The finding shows higher economic growth led peoples to have excess fund and repay the financial institutions loan thereby increasing the bank's solvency. Accordingly, hypothesis F13 is accepted.

With regards to inflation, for the pooled study, a negative relationship between inflation and insolvency risks (z score) was found while a positive relationship was observed in conventional banks. A negative relationship which is consistent with this study's hypothesis (i.e., F12) implied that for the period under study, as the general inflation increases in Malaysia it resulted in the decrease of banks solvency. This might be due to inflation reduced the purchasing power of the consumer which resulted in customers defaults on loans and leads to the banks reporting loss that will reduced their capital. Over time reductions in the banks capital will make them insolvent. This finding is consistent with the uncertainty concept and previous studies by Kohler, (2015); Cubillas & González, (2014); Mirzaei et al., (2013); Delis et al., (2012); and Houston et al., (2010). Accordingly, for pooled study, F12 hypothesis is accepted. A positive relationships for conventional banks signifies that general increase in the level of inflation makes peoples prefer to save their earning in banks than to invest in capital market. More savings improve the banks liquidity which subsequently improves the banks solvency. The findings is consistent with the previous studies by Barakat &

Hussainey; (2013); Bertay et al., (2013); Bourkhis & Nabi, (2013); and Tan & Floros, (2013), , but is contrary to this research hypothesis. Thus, for conventional banks, F12 hypothesis is rejected.

In summary, this study reveals that the bank specific factors and macroeconomic factors have an insignificant relationship with profitability except CAR and assets quality for the profitability model in conventional banks and efficiency ratio in Islamic bank's profitability model. The bank specific factors and macroeconomic factors seems to be quite equal in terms of the sign, magnitude, and t-statistic values for the pooled, Islamic and conventional banks samples (with the exceptions of few variables mentioned above). Furthermore, the study found that the factors that determines the bank's insolvency risk (z score) have mixed findings. While earning quality and concentration has a negative relationship with insolvency risks for the pooled study, GDP (for pooled, Islamic and conventional banks study), concentration (for Islamic and conventional banks study only) and inflation (for conventional banks study only) has a positive relationship with banks insolvency risks.

6.4.5 Result of Research Question 2: Factors that Determines Liquidity (Pooled, Islamic and Conventional Banks)

The discussion of results will start with the second research question “*What is the effect of the bank specific factors and macroeconomic factors on the liquidity of Islamic and conventional banks in Malaysia?*”

Table 6. 8: The summary results for group 2 hypotheses (Liquidity determinants)

Hypothesized path	Pooled	Islamic	Conventional
C1: CAR -> Liquidity	Supported (+)	Supported (+)	Supported (+)
C2: Asset Quality -> Liquidity	Not Supported (-)	Not Supported (+)	Not Supported (+)
C3: Efficiency -> Liquidity	Not Supported (+)	Not Supported (-)	Not Supported (-)
C4: Earning Quality -> Liquidity	Not Supported (+)	Not Supported (+)	Not Supported (+)
C5: Inflation -> Liquidity	Not Supported (+)	Not Supported (+)	Not Supported (-)
C6: GDP -> Liquidity	Not Supported (-)	Supported (-)	Supported (-)
C7: Concentration-> Liquidity	Not Supported (-)	Supported (-)	Supported (-)

The Group 2 hypotheses, as summarized in table 6.8, examine the relationship between bank specific factors and macroeconomic factors and liquidity. According to the predicted sign and significance values for the factors that determine liquidity presented in the pool, Islamic and conventional banks samples, there are mixed results. CAR has a significant positive relationship with liquidity for the pool, Islamic and conventional banks studies. This is consistent with the concept of risk absorption, and the previous studies by Vodova (2011), Beger et al. (2016), and Mahdi & Abbas (2017). In addition, this is also in line with this research hypothesis (i.e. hypothesis C1). Accordingly, C1 hypothesis is accepted in this study. The findings mean that, for all the bank's study (i.e., pooled, Islamic and conventional), the CAR plays a prominent role in enhancing the liquidity. On the other hand, (for Islamic and conventional banks study) a negative relationship of concentration and GDP on banks liquidity is not consistent with this research hypotheses (C6 and C7), but is consistent with the previous studies by Horvath, R., et al. (2016) and Cucineli, (2013) respectively. The findings indicates that high banks concentration and improve in GDP lower the banks' liquidity. Accordingly, hypothesis C6 and C7 is rejected in this study.

Apart from the above, all other findings for impact of bank specific factors and macroeconomic factors on liquidity revealed insignificant relationship. Thus, it is

contrary to this research hypothesis (i.e. hypothesis C2-C7). Accordingly, hypothesis C2-C7 is rejected in this research.

6.4.6 The Results of the Research Question 3: The Effect of Liquidity on Banks profitability and insolvency risks (z score).

The discussion of results will start with the third research question: “*Does the liquidity effect the profitability and insolvency risks of Islamic and conventional banks in Malaysia?*” Hypothesis 3 (i.e., sub-hypothesis F15-F16) predicts a positive relationship of banks liquidity on profitability and insolvency risks (z score). However, contrary to the predicted sign, table 6.6 shows that all the samples (i.e., Pooled, Islamic, and conventional banks) have an insignificant relationships of bank's liquidity on profitability and significant negative relationship (for pooled and Islamic banks studies) of liquidity on insolvency risks (z score). Though in the relationship between liquidity and profitability, the findings indicated a contrary expectation to this research hypotheses, but it is consistent with previous studies by Muda, et al (2013) and Idris (2011). The finding shows that, for the period under study, liquidity contributed to the bank's profitability insignificantly. On the other hand, regarding the relationship of liquidity and banks insolvency risk (s score), contrary to the research hypothesis, which predicts a positive relationship between banks liquidity and insolvency risks, a negative relationship was observed for pooled and Islamic banks studies. However, the results is consistent with the previous study by Lee & Chih (2013), while insignificant relationships were observed for conventional banks, and is consistent with the Dong et al. (2014) study. Thus, sub-hypothesis F15 and F16 is rejected in this study The findings also provide a further reason to reject the argument from previous studies that always say liquidity has a positive relationship with the bank's solvency. The absence of the

significant relationship between bank liquidity and profitability in pooled, Islamic and conventional banks samples could be due to the facts that there is an increase in NPLs ratios which eats the profits and subsequently overall solvency of the banks or the banks keep excessive liquidity beyond the regulators' requirements. Furthermore, based on the descriptive statistics (which shows the banks have excess than required liquidity), if the average bank's liquidity level exceeds 100%, banks' profitability tends to diminish. This occurred in the Bordeleau and Graham, (2010) study. In addition, it has been conceptualized (concept of risk-return trade-off) in the banks liquidity literature in a study by Bordeleau & Graham (2010), based on a 1997–2009 sample of US and Canadian banks, that profitability is improved for banks that hold some liquid assets, however, there is a point at which holding further liquid assets diminishes a bank's profitability and threaten the solvency of the bank. There thus seems to be a tradeoff between short-term profitability gains of low liquidity and longer-term performance benefits of insurance against liquidity shocks by the banks. Accordingly, this research is in line with risk-returns tradeoff concept that says, holding high liquid assets reduced the bank's profitability and solvency. However, low liquidity might be translated to increased the banks profitability and solvency if the banks used the excess fund to finance the profitable projects.

Based on this reason, it is suggested that keeping high liquidity by the banks than appropriate would result in lower profitability. This implies that the cause of diminished profitability in this study might be because of this reason. The study also suggests that Malaysian banks that have excess liquidity should attempt to choose less risky projects because high-risk projects will result in high NPLs ratios, which will eventually diminish profitability and leads to insolvency.

Overall, the study suggests that Malaysian banks should maintain the average liquidity level at 100% to sustain their profitability. Moreover, it is also suggested that banks in Malaysia need to improve more on their profitability in order to shield away from insolvency risks.

6.4.7 Result of Research Question 4: Comparison Between Islamic and Conventional Banks Profitability and Z Score.

The research will start with the discussions on research questions four: *“Does the profitability, insolvency risks and liquidity of Islamic and conventional banks in Malaysia differ?”*

The question above is addressed by performing a multi-group comparison analysis of the path coefficients of factors that determinese liquidity, profitability and insolvency risks (z score). The question is typically applied to explore different characteristics such as bank category, country or gender. The different characteristics are recognized as heterogeneous data (Hair et al., 2013). The multi-group analysis aims to compare parameters (usually path coefficients) across two or more groups of data as to whether there are differences for each of the parameter group estimates. The study gives an illustration based on Figure 6.1 below for the simple example of heterogeneity in the context of factors that determines insolvency risks (z score), in which the bank's insolvency (Y) depends on two macroeconomic factors: concentration risk (X_1) and inflation (X_2). If the full data set is used and if the research failed to determine the heterogeneity between the pooled sample (all the banks), the path coefficient estimates would show substantial bias (Hair et al., 2013). That is, by using the full data set, both path coefficient estimates equal to 0.1, leading to a conclusion that banks concentration and inflation are equally crucial across pooled samples when in fact, they

are not. More specifically, when the study split the pooled sample, the effect of concentration risks (X_2) on insolvency risks (Y) is much higher in the conventional banks subsample (Group 2 ($p_{x_2^1}$ 0.70; the superscript in parentheses indicates the group) than in the Islamic banks subsample (Group 1 ($p_{x_1^2}$ 0.31)). Inflation (X_1) exerts a greater influence on insolvency risks in the conventional bank's subsample than in the Islamic bank's subsample. However, the question arises whether the path coefficients between each banking sector are statistically significant. If there is a significant difference, what factors contribute to the differences between the bank's categories? In testing this, the researcher assumed two cases, a) standard errors of the two samples are equal and b) standard errors are unequal.

Table 6.9 shows the differences in the comparison of the path coefficient estimates for Malaysian banks (Islamic vs. Conventional) and provides the results of the multi-group comparison based on two methods of measurements, i.e., assumed equal standard errors and assumed unequal standard errors (Hair et al., 2017). The study finds consistent results for both measurements, which indicate that this study cannot reject the null hypothesis that most of the path coefficients are equal across the two categories of banks. In this case, it is concluded that for the bank specific factors and macroeconomic factors, the study rejects the null hypothesis that all path coefficient estimates for Islamic and conventional banks are equal. This result supports Doumpos et al. (2017), who found that the impact of bank specific factors and macroeconomic factors on bank's profitability are insignificantly equal across Islamic and conventional banks. The result of the study also indicates that there is no significant difference between Islamic and conventional banks in terms of the effect of the bank's liquidity on the bank's profitability and insolvency risks. Notwithstanding, the study made an

analysis for separate Islamic and conventional banks (in addition to pooled data analysis) in order to show more details on the findings and also to see the whole effects on the banking sector.

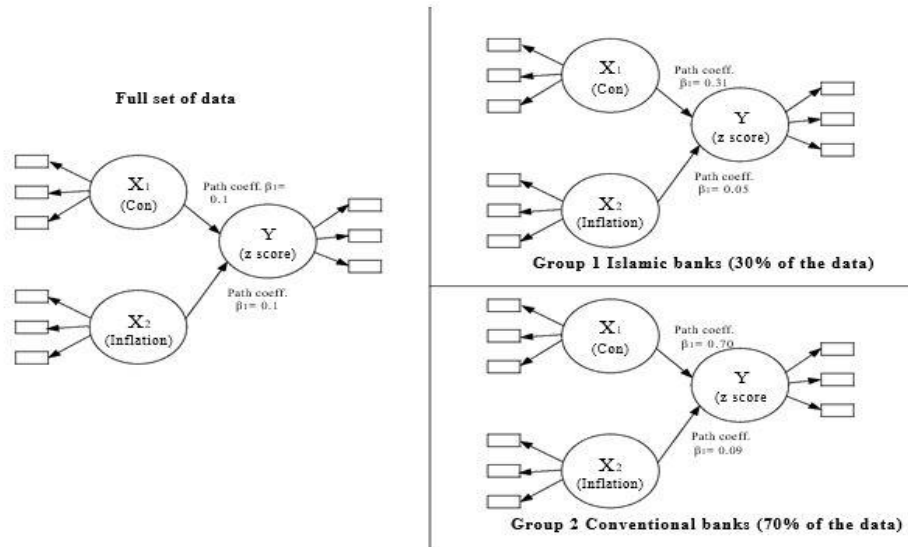


Figure 6. 1: Heterogeneity in a structural model

In summary, this study acknowledges that there are no bank specific factors and macroeconomic factors on bank's liquidity, profitability and insolvency risks (z score) that differ in terms of the sign, magnitude and significance level for Islamic and conventional banks in Malaysia (i.e., all are equal). From multi-group comparison test results, this research failed to reject the hypotheses that some bank specific factors and macroeconomic factors coefficients are unequal across Islamic and conventional banks. This indicates an additional contribution that the often-made implicit assumption of the unequal impact of such relationships across the banks does not hold.

Table 6. 9: Multi-group comparison test results (PLS-MGA)

MGA Islamic/conventional	(diff)	Equal standard errors assumed	Unequal standard errors assumed
Panel A			
CAR -> Liquidity	0.018	0.082	0.063
Assets Quality -> Liquidity	0.287	1.309	1.081
Efficiency -> Liquidity	-0.256	1.391	1.122
Earning Quality -> Liquidity	0.010	0.052	0.066
Inflation -> Liquidity	0.059	0.744	0.780
GDP -> Liquidity	-0.047	0.629	0.948
Concentration -> Liquidity	-0.139	1.523	1.008
Panel B			
CAR -> Profitability	0.521	0.243	1.411
Assets Quality -> Profitability	-0.238	1.057	0.779
Efficiency -> Profitability	-0.402	0.395	0.824
Earning Quality -> Profitability	-0.012	0.255	0.040
GDP -> Profitability	0.125	0.084	0.954
Inflation -> Profitability	-0.034	0.074	0.300
Concentration -> Profitability	-0.039	0.100	0.242
CAR -> Z Score	-0.173	0.047	1.006
Assets Quality -> Z Score	-0.456	0.036	1.470
Efficiency -> Z Score	-0.128	0.052	0.401
Earning Quality -> Z Score	0.052	0.055	0.453
Inflation -> Z Score	-0.134	0.049	1.717*
GDP -> Z Score	-0.249	0.049	3.10***
Concentration -> Z Score	-0.350	0.047	2.783***
Panel C			
Liquidity -> Profitability	0.052	0.106	0.318
Liquidity -> Z Score	-0.245	0.044	2.074**

Notes: ***, **, *Statistically significant at the 1 percent, 5 percent and 10 percent levels, respectively.

6.4.8 Mediating Roles Between the Factors that Determines Liquidity and Profitability and Insolvency Risks (z score).

A mediation model hypothesizes that the independent variable (X) influences the mediator variable (M), which, in turn, influences the dependent variable (Y). This study focuses on the simultaneous relationship between bank specific factors and macroeconomic factors (X), liquidity (M), and bank's profitability and insolvency risk (Y). The advent of SEM with simultaneous analysis can extend the path analysis coefficients from path coefficient "a" of the bank specific factors and macroeconomic factors (X) to banks liquidity (M), path coefficient "b" of bank liquidity (M) to banks profitability and insolvency risks (Y) and path coefficient "c" of the bank specific factors and macroeconomic factors (X) to banks profitability (Y). Therefore, this research hypothesized that across the banks, there are potential indirect/mediation effects of liquidity between the bank specific factors and macroeconomic factors and bank's profitability and insolvency risks (z score). The PLS-SEM simultaneous technique has been applied to obtain results for those relationships through the research model.

Most arguments from prior studies regarding the precondition that must be met for the mediation effect from the PLS-SEM simultaneous method are as follows (Baron and Kenny, 1986; Iacobucci & Duhachek, 2003; Mackinnon et al., 1995). First, the indirect paths "a" and "b" should be significant. Path "a" is the significant relationship between the path coefficients (X specific factors) and the bank's liquidity (M). Path "b" is the significant relationship between the path coefficient of the liquidity (M) and a bank's profitability and insolvency risks (Y). Second, the relationship between the path coefficients of bank specific factors and macroeconomic

factors (X) and profitability and insolvency risks (Y) can be significant or non-significant (path c) (see Hayes, 2009; Mackinnon et al., 2000; Shrout & Bolger, 2002; Zhao et al., 2010 who recommended that the total direct effect path c is not a necessary condition to be significant). However, these conditions cannot be concluded until their significance is confirmed using the bootstrap T-statistics proposed by Hair et al. (2013) and Preacher & Hayes (2008). Accordingly, in this study, the only sample that meets the requirements mentioned above for some variables is the pooled and Islamic banks study samples as there is a significant relationship between bank's liquidity and insolvency risk (path "b") for pooled and Islamic banks samples. The other sample, i.e., the conventional banks do not meet the requirement of path "b" being significant. Therefore, the question emerges whether the bank's liquidity has mediated the relationship between the bank specific factors and macroeconomic factors and profitability and insolvency risks (z score). Do the bank's specific factors and macroeconomic factors affect the bank's profitability and insolvency risks (z score) indirectly through liquidity? To answer these questions, there is a need to understand the typology of mediation explained in section 5.3.1 of chapter 5 in this study, to know if there is mediation, what type of mediation the research found.

6.4.9 Mediation Effect of Liquidity (Pooled and Islamic Banks).

By excluding the mediator variable (bank liquidity) from the pooled study model, all the direct relationships on profitability (X on Y) are not significant. However, the total direct effect path "c" is significant for most paths using insolvency (z score) model except for assets quality and efficiency (see Table 6.6 and 6.7). On the other hand, the effect on mediator variable as summarized in table 6.8 shows that most of the paths for pooled study "a" $X \rightarrow M$ are not significant, except for CAR. Meanwhile, for Path "b"

M→Y, i.e., only liquidity and insolvency risks (z score) relationship is significant (see table 6.6). Table 6.10 shows that there is a significant mediation effect for only CAR->Liquidity -> Insolvency risks (z score) relationship in the pooled study model. The t-statistics bootstrapping test is significant.

Table 6. 10: Mediation test analysis results

Path Mediation Effect All Banks (Pooled Study)	Bootstrapping (t-statistics)
CAR -> Liquidity -> Profitability	0.714
Asset Quality -> Liquidity -> Profitability	0.086
Efficiency -> Liquidity -> Profitability	0.202
Earning Quality -> Liquidity -> Profitability	0.091
GDP -> Liquidity -> Profitability	0.57
Inflation -> Liquidity -> Profitability	0.02
Concentration -> Liquidity -> Profitability	0.452
CAR -> Liquidity -> Z Score	4.103*
Asset Quality -> Liquidity -> Z Score	0.149
Efficiency -> Liquidity -> Z Score	0.33
Earning Quality -> Liquidity -> Z Score	0.228
Inflation -> Liquidity -> Z Score	0.033
GDP -> Liquidity -> Z Score	1.306
Concentration -> Liquidity -> Z Score	1.027

Table 6. 11: Mediation test analysis results (Islamic banks)

Path Mediation Effect Islamic Banks	Bootstrapping
CAR -> Liquidity -> Profitability	0.416
Assets Quality -> Liquidity -> Profitability	0.511
Efficiency -> Liquidity -> Profitability	0.491
Earnings -> Liquidity -> Profitability	0.102
Inflation -> Liquidity -> Profitability	0.004
GDP -> Liquidity -> Profitability	0.422
Concentration -> Liquidity -> Profitability	0.303
CAR -> Liquidity -> Z Score	1.575
Assets Quality -> Liquidity -> Z Score	1.011
Efficiency -> Liquidity -> Z Score	1.165
Earnings -> Liquidity -> Z Score	0.257
Inflation -> Liquidity -> Z Score	0.01
GDP -> Liquidity -> Z Score	1.736*
Concentration -> Liquidity -> Z Score	1.851*

Therefore, based on the structural model for pooled study summarized in table 6.6 and 6.7, the bank specific factor that are presumed to be mediated by the bank's liquidity in the z score (insolvency risks) model (i.e., Capital Adequacy Ratio) can be described as "competitive mediation." Take for example, H₁: the higher the banks' capital (X), the higher the bank's solvency, i.e., z score (Y). The logic of this simple cause-effect relationship is shown in Figure 6.2. Higher banks' capital are a signpost of security for depositors as it acts as a buffer which indicates an excellent reputation for the banks in honoring their obligations and paying higher returns on their deposits amount. This is if the banks used the excess fund to finance the profitable projects leading to the generation of more returns and improve in the overall banks solvency. This relationship was estimated by excluding the mediator (liquidity) in figure 6.2 (i.e., the relationship between the CAR and insolvency risks, path "c"). The obtained results indicate significant positive relationships (c= 0.21, t=3.702, p<0.01 as in table 6.6) show a good reason to believe that, as more capital increased, the bank's solvency increased which will distance the banks from bankruptcy.

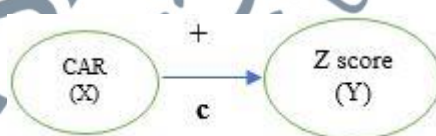


Figure 6. 2: Simple cause-effect model

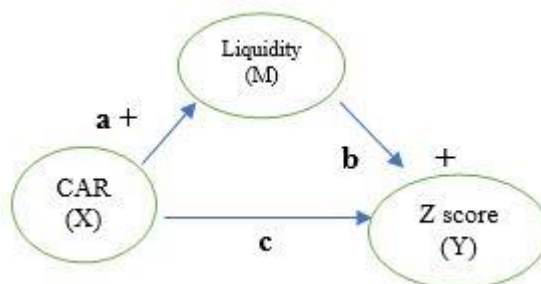


Figure 6. 3: Mediating Model

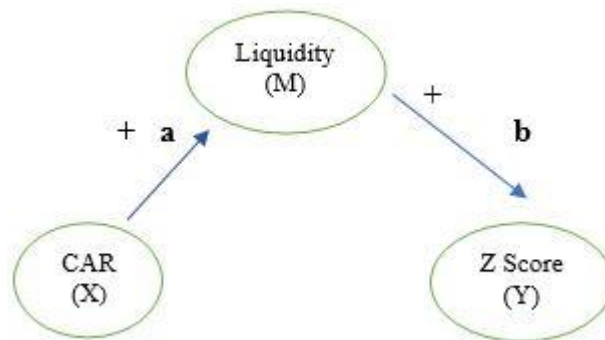


Figure 6. 4: Complex Cause Model

Hence, H₂ suggests that banks with more capital are strong in facing financial distress because by having high liquidity to support higher financing, which is translated to higher solvency for the banks. H₃ suggest the high liquidity induced the banks to insolvency (i.e hypothesis F16). The finding suggests that the banks have the incentive to use higher capital because of the benefit of low funding cost. But this will have a negative impacts on the banks profitability and solvency (this is in line with risk return tradeoff concept). When the two hypotheses H₂ (path a) and H₃ (path b) are combined (a *b) in one model, the complicated cause-effect relationship will appear as an indirect effect (Figure 6.4). The combination of H₁ to H₃ is needed to establish a complete mediation model (Figure 6.3). Accordingly, the bank liquidity mediates the relationship between the CAR and insolvency risks (z score). The full explanation for this example can be expressed from table 6.6. The estimation of path “a” between CAR and bank liquidity is a significant positive relationship: a= 0.08, t=6.842, p<0.01. Path “b” between liquidity and insolvency risks (z score) showed a significant negative relationship: b= -0. 042, t= 5.74, p<0.05. The overall model for indirect effect ab and direct effect c has a different sign (the three path coefficients a x b x c is significant and

multiplying the three coefficients results in a negative value). Thus, this mediation model is categorized as competitive mediation.

Previous studies (Hair et al., 2013; Mackinnon, 2000; Shrout & Bolger, 2002; Zhao et al., 2010) argue that variance accounted for (VAF) value will become larger than one or even become negative for competitive mediation. The size of the effect (VAF) for the above discussion is consistent with the argument of a negative value (i.e., VAF -0.20 @ -20%). Based on Hair et al. (2013). This situation is usually the exception to the VAF-based assessment of mediation effects.

For Islamic banks sample, excluding the mediator variable (bank liquidity) from the model, all the direct relationship with profitability are not significant, except efficiency. While the direct effect path "c" is significant for most paths using z score as dependent variables except for concentration and GDP (see Table 6.6 and 6.7). The effect of the mediator (i.e., path a) is significant with liquidity only for CAR, Concentration and GDP. On the otherhand, path "b" M→Y i.e., liquidity and insolvency risks (z score) is significant. Conversely, liquidity to profitability shows insignificant relationship. The above findings show that some factors have a strong mediation effect in the Islamic banks' sample through insolvency risks (z score) as a dependent variable i.e., Capital adequacy (CAR), Concentration (Con), and Gross Domestic Products (GDP).

Therefore, based on the structural model for Islamic banks study in table 6.6, the variables that are presumed to be mediated by the bank liquidity in the z score model (i.e., Concentration risk and GDP) can be described as "complementary mediation."

Take, for example, H₁: the increase in the banking concentration (X) increase the bank's insolvency risks (Y). The logic of this simple cause-effect relationship can be explain

as concentrated banking sector is a signpost for the banks to reduced financing to only selected customers. This might be due to the huge NPLs incurred and banks are afraid to take more risk which might cause the collapse, leading to the generation of low returns (negative). There is good reason to expect a positive relationship, as higher concentration risk increased the banks insolvency risks. This might be due to the default by a concentrated sector. On the other hand, on the relationship between GDP – liquidity – z score on Islamic banks samples, the direct effect (i.e. path c) shows high economic growth increase the banks solvency. This might be due to high income as the peoples pays their loans to banks on time. For path “a” (i.e., relationship between GDP and liquidity), the significant negative relationship means that low economic growth increased the banks liquidity. This might be due to the preference by the peoples to save their money in the banks account rather than to investing their money in capital market directly. However, as path “c” of the relationship between liquidity and insolvency risks (z score) is negative, it means keeping an excess liquidity lowers the banks solvency. This might be due to the banks keeping high idle funds without using them to generate more returns. Thus, it negatively effect their solvency. Multiplying path $axbxc$ results in a significant positive relationship. This is termed as complementary relationship and it is in line with concept building.

Finally, for Islamic banks, the study finds that CAR – liquidity – insolvency risks (z score) is considered as an “indirect-only mediation.” The term “indirect-only mediation” defines a situation where the indirect path ab is significant, but the direct effect is not significant (Baron & Kenny, 1986; Iacobucci & Duhachek, 2003; Mackinnon et al., 1995; Zhao et al., 2010). In this case, Baron & Kenny (1986) and Hair et al. (2013) argued that this situation represents full mediation: the bank's liquidity is

fully mediating the effect of CAR on banks insolvency risks (z score). The direct effect path c shows an insignificant relationship ($c = -0.080$, $t=0.521$), path “a” shows a positively significant relationship ($a=-0.657$, $t=2.738$, $p<0.01$), path “b” shows a negatively significant relationship ($b=-0.237$, $t=2.329$, $p<0.05$). Therefore, the banks are drawn into high liquidity whenever the capital adequacy ratio increased. If a bank’s position is not stable and profitable, there is a possibility that increased liquidity may decrease the bank's solvency (z score). When the capital is high, many banks have a high capital adequacy ratio and are expected to have a high liquidity ratio, which will lead to lower profitability, because of excess idle liquidity. For example, the Malaysian percentage range for the capital adequacy of Islamic banks is a mean of 8.68%, up to 12% (see descriptive statistics). However, if the banks financed toxic assets, a high NPLs ratio might lead to an increased in insolvency risks even if the bank has enough capital and high liquidity.

Hence for the relationship of “concentration-liquidity- insolvency risks (z score)” H_2 suggests that Islamic banks with higher concentration are strong in facing financial distress because of having low liquidity which limits their investment in risky projects that will erode their profitability, H_3 suggests that the banks with high liquidity and did not use it judiciously to finance high quality assets and earn a moderate profits, will lead to increase in insolvency risks. When the two hypotheses H_2 (path a) and H_3 (path b) are combined ($a * b$) in one model, the mediating-effect relationship will appear as an indirect effect. The combination of H_1 to H_3 is needed to establish a complete mediation model. Hence (the bank liquidity mediates the relationship between the concentration and bank insolvency risks). The full explanation for this example can be expressed from Table 6.6. The estimation path “a” between concentration and bank

liquidity is a significant negative relationship: $a = -0.279$, $t = 2.218$, $p < 0.05$. In addition, the path “b” between bank liquidity and insolvency risks also shows a significant negative relationship: $b = -0.237$, $t = 2.329$, $p < 0.05$ while path “c” between concentration and insolvency risks shows a significant positive relationship: $c = 0.311$, $t = 2.621$, $p < 0.01$. The overall model for indirect effect “ab” and direct effect “c” has the same sign (i.e. the three path coefficients $a \times b \times c$ is significant and multiplying the three coefficients results in a positive value). This mediation model is categorized as complementary mediation. Previous studies (Hair et al., 2013; Mackinnon, 2000; Shrout & Bolger, 2002; Zhao et al., 2010) argue that the VAF value will become larger than one or even become negative for complementary mediation. The size of the effect (VAF) for the above discussion is consistent with the argument of a positive value (i.e., VAF 0.20 @ 20%).

The practical implication (for pooled study) is that banks with high CAR tend to be strong and would increase their liquidity. However, without many projects to be financed, in turn, leads to insolvency risks by the banks. Accounting for the mediation effect of bank liquidity results in the “true” relationship between the bank's capital and insolvency risk. This relationship is systematically affected by the level of bank liquidity, which in turn can be explained by the bank's capital. Furthermore, banks tend to have high liquidity when its, efficiency ratio and earning quality are improving and thus, generate higher profits. However, when the liquidity level is above the average of 100%, profitability starts to diminish. This is obvious based on the simulation (robustness check) done by the researcher. The simulation shows that the banks in Malaysia has 2 options: Either 1. To increase the liquidity ratios in line with liquidity risk concept (i.e. 108% and above). Both the bank's profitability and insolvency

risks (z score) will be negatively effected. However, the banks can be able to withstand the liquidity shocks. Or 2.) the banks may choose to have a low liquidity in line with liquidity buffer concept (i.e. 15% and below) and both the profitability and insolvency risks (z score) will have a positive impact. On the otherhand, if there is any liquidity dry up in the market (i.e. as in during the 2008 GFC) the banks maybe negatively affected and it may lead to another financial crisis. But, if there is no such a liquidity dry up, the banks can be able to survive an excessive loss as both z score and profitability are positive.

To conclude, the main implications for this study is that, if the banks chooses to have a high liquidity ratios, their profitability will be low but they can survive a financial crisis like that of 2008. If the banks choose to have a low liquidity ratios their profitability and z score will be high, but a shock like that of 2008 financial crisis may lead banks to collapse. This might have happened because of the high bank's liquidity level as explained earlier in the discussion of research question 2. This means that the positive sign for direct effect (CAR and insolvency risks for pooled study) provides a clue that there are two reasons that might reflect this relationships: (i) the relationship with other exogenous variables, (ii) the possibility that the increased in the bank's capital distanced the banks from bankruptcy and became more profitable (Cliff & Earleywine, 1994; Collins et al., 1998; Davis, 1985; Mackinnon, 2000; Mcfatter, 1979; Shrout & Bolger, 2002; Tzelgov & Henik, 1991; Zhao et al., 2010). The future studies can look further into alternative factors that can influence the banks profitability and insolvency risks (i.e., board governance structure, size etc.).

As for the Islamic banks, the practical implication is that banks with a lower concentration of assets tend to be strong and appear to have an excess liquidity. An

excess liquidity leads to the decrease in the solvency. Likewise, for GDP, the decrease in the overall GDP of the economy tends to increase the bank's liquidity as the deteriorating of the economy leads the consumer to save their funds in the bank's account rather than investing it directly. As the liquidity increased the banks tends to be more careful in their financing activities which distanced them from bankruptcy and decreased their overall solvency. Accounting for the mediation effect of bank liquidity results in the “true” relationship between concentration-liquidity-z score, and GDP-liquidity-z score.. This relationship is systematically affected by the bank's liquidity, which in turn can be explained by either bank concentration or GDP as the case may be. There are other, potentially more significant direct effects that might be associated with bank concentration and GDP that decreased the bank's solvency. For example, banks tend to have higher asset quality when their liquidity position improves, and it leads the banks to be more careful in their financing activities which leads to low solvency (z score). In addition, as the banks earning quality improved, their liquidity position decreased resulting in low solvency.

Furthermore, when the banking sector becomes more efficient and records qualitative earnings, the overall profitability will increase paving the way for the general improvement of GDP in the economy. However, when the liquidity level is above an average of 100%, profitability starts to diminish. This is obvious during the 2008 Global Financial Crisis (GFC). After the GFC, the Islamic bank's solvency fluctuated, and overall banks' profitability started to decline. This might have happened because of the excess liquidity beyond the Basel III recommendation.

In sum, the bank's liquidity plays a vital role as a mediator variable for Malaysian banks. The bank specific factors and macroeconomic factors that are strongly

mediated by liquidity in Malaysia are CAR for pooled study and concentration, CAR and GDP for Islamic banks. These variables' effects are a type of "complementary mediation" except CAR for Islamic banks that is expressed as "indirect-only mediation" and for pool study and is expressed as competitive mediation.

6.5 Summary of the Chapter

This study used Partial Least Squares, which is a variance-based Structural Equation Modelling (PLS-SEM) technique to empirically test the relationship between factors that determines liquidity and factors that determine profitability in Malaysia for the period between 2000 to 2016. The key focus of this study is to examine the impact of bank specific factors and macroeconomic factors on bank's profitability and insolvency risk together with the mediation effect of bank liquidity on these factors simultaneously. The results of bootstrap indicate that bank's liquidity plays a mediating role on few variables in Malaysian pooled and Islamic bank's studies but not in conventional bank's study. The results indicate that, for pooled study, only Car - insolvency risk is mediated by the banks' liquidity. For the Islamic bank's study, CAR, Concentration and GDP through banks insolvency risk is mediated by the liquidity.

These findings have practical implications for designing a model for the bank's liquidity structure decisions. From a performance perspective, it is critical to obtain a bank's optimal liquidity structure that has been suggested by a balanced portfolio and risk-return trade-off concepts. This study provides an idea about how different bank specific factors and macroeconomic factors have been affected by the way banks manage their long term and short-term liquidity to obtain higher bank solvency which will be translated to high profitability. The study finds that the average Malaysian banks use liquidity as a control mechanism to minimize their insolvency risk, as stated by risk-

return trade-off concept. The study finds that most of bank specific factors and macroeconomic factors do not directly affect the bank's solvency and profitability. The results of the study have important implications for banks management decisions. In this regards, the liquidity structure decision tends to be affected only by the bank's capital for pooled study while for Islamic banks, CAR, concentration and GDP are the factors that have the impacts on the liquidity structure decision.

To be specific, this study suggests that banks should have a high capital ratio, high asset quality, and decreased concentration. Besides, the banks should possess optimum liquidity that will enhance their solvency and profitability. This is consistent with most of the predicted bank's profitability and liquidity concepts, i.e., balanced portfolio concept and risk-return trade-off concept. However, this contradicts some previous studies such as Vodova (2011) who find a negative effect between CAR and liquidity for pooled study and those three bank specific factors and macroeconomic factors (i.e., concentration, GDP and CAR) for Islamic bank.

In addition, for Islamic banks, if the concentration increase, the bank's liquidity will be low, but the bank's insolvency risks is high because the banks are more careful in their financing activities perhaps due to the negative outcome of the 2008 global financial crisis. This is consistent with the Moral hazard of too big to fail concept. Also, the study strongly recommends that banks finance more projects when the economy's GDP increase as this can distance them from bankruptcy by increasing the overall profitability. In this respect, it is consistent with the Yu and Gan, (2010) study which found that at the time of prospects of the economy, banks would prefer to increase their financings. This will increase their solvency which will have positive impacts on the overall profitability.

An optimum liquidity level is vital to avoid diminishing bank's value as when the average liquidity level is above approximately 100%, the profitability starts to diminish. This is probably because of a decrease in bank financing activities and keeping idle funds. The results of the negative indirect effect (path: "a" x "b") between CAR \rightarrow liquidity \rightarrow insolvency risks for pooled study means that the banks insolvency risks could increase because of the higher capital. This is because an increase in the liquidity is caused by the increase in capital and since capital enters calculation of LCR and NSFR at 100%, consequently, decrease in the banks financing activities will reduce the overall profitability. The positive direct effect for CAR and insolvency risks for pooled banks study support the nature of Nguyen et al. (2012) and Zhang et al. (2012). The negative relationship of concentration to insolvency risks, is in line with Ramadan et. Al. (2011) and Nguyen & Nghiem (2015) studies. All should be noted by the banks. This study also finds that the effect of CAR on insolvency risks for Islamic banks is fully mediated through bank liquidity. Banks should expect to have high liquidity during times of high capital adequacy ratio, but there might be an increased in insolvency risks if the banks did not make a good credit assessment in their financing portfolio, thus decreasing their overall solvency.

Identification of the mediation effect is essential for the development of concepts in finance in two ways. First, the concept of capital-liquidity can be formulated as a causal model (risk absorption concept). The vast array of empirical studies on liquidity risk are aimed at providing support for a liquidity concept (i.e., risk absorption concept, balanced portfolio concept, risk returns tradeoff concept and the moral hazard of too big to fail concept). The amount of evidence is large, and the researchers often provide a conclusion based on the relationships estimates. It can be emphasized that a

relationships between two variables does not necessarily mean causation (one causes the other) (Opgen-Rhein & Strimmer, 2007; Rimer, 1998). One cannot draw cause and effect conclusions based on relationship. The most acceptable concept of liquidity is related to three events: how bank specific factors and macroeconomic factors affect liquidity level, and in turn, how they affect the bank's profitability and insolvency risks.

This study moved from a simple question (such as “Does the X variable predict the Y variable?”) to slightly more complex one (such as “How” or “Why” X causes Y). This study gives a clear understanding of “how” or “why” X causes Y by the inclusion of a third variable that might influence the relationship of the two variables, i.e., the predictor (X) and the outcome variable (Y). Secondly, the direct path is rarely expected and clarified. The assertion of unexplained “direct” paths is often evidence of the effects of one or more omitted mediators. It is common for independent conceptual variables to affect the dependent variables through two (or more) mediators (Zhao et al., 2010). In that case, the positive (negative) sign in this study of the direct effect that emerged in “complementary mediation” can provide guidelines for concept building. The positive (negative) sign of the direct effect can provide a clue in the future study for a second mediation mechanism. Rucker et al. (2011) and Zhao et al. (2010) suggest that two or more other mediators might reflect the direct effect with different signs. Third, the introduction of factor analysis in PLS-SEM provides a silver lining in liquidity concept because it can help (i) detect the overall model structure in the relationships between variables (ii) identify the underlying relationships pattern (indicators) shared by the variables in order to test the conceptual models, i.e., how liquidity is there?, is it short term or only long term?, and (iii) eliminate or identify items for improvement, such as redundant variables or irrelevant variables.

Several international studies assume that the effects of the factors that determine liquidity and profitability are not equal across the banks. This study provides evidence that this assumption is unfounded. Using PLS Multi-Group Analysis (MGA), the finding of the study shows that the researcher failed to reject the null hypothesis that all path coefficient estimates for Islamic and conventional banks are equal. This study acknowledged that there are no bank specific factors and macroeconomic factors on liquidity, profitability and insolvency risks (z score) that does differ in terms of the sign, magnitude and significance level for Islamic and conventional banks. This study has provided a valuable contribution by testing the equality of coefficient effects from each bank's path coefficient estimates. The result gives more robust answers to the contradictory results presented by various studies in international liquidity risk assumptions. This researcher had assumed that banks specific factors' effects on liquidity are equal. However, despite this findings, the study made a separate analysis on each banking sector (i.e. Islamic and conventional banks) in order to know the overall effects on the banking sector.

For robustness checks, the researcher creates two constructs for bank specific as well as macroeconomic variables. Bank specific construct comprised all bank specific factors, while macroeconomic construct consisted all macroeconomic variables. Then for mediating path analysis, the researcher joined, 1) bank specific factors -- - liquidity --- Profitability/Z Score and 2) macroeconomic factors---liquidity—Profitability/Z Score). This is in order to see whether the study can generalize that liquidity plays a significant mediating role or not for bank-specific and macroeconomic factors. The findings show, for pooled study as shown in table 1 of appendix C; liquidity plays a significant mediating role for bank specific factors only and the type of mediation is

competitive mediation same with the detail's findings in the study. Since the coefficient is negative, the results indicate that, the improvements in the bank specific factors reduced the banks liquidity (possibly through well managed liquidity management processes). On the other hand, low liquidity leads to the improvement of the bank's solvency (this may be due to the banks well managed liquidity that sought to improve the earnings stability). However, macroeconomic factors did not have any impacts on the liquidity and solvency of the banks for pooled sample during the period under study. Contrary, for Islamic banks sample as shown in table 2 of appendix C, liquidity plays a significant mediating role for macroeconomic factors only and the type of mediation is complementary same with the detail's findings in the study. As the coefficient is positive, the results mean, as the overall economic growth of Malaysia improves, the Islamic banks liquidity increase (this might possibly be due to the higher disposable incomes of the household which they used to save in the banks). Higher liquidity improves the Islamic banks solvency (this might be due to the facts that, the overall economic growth reduces the loans defaults, thereby improving the solvency of the banks). Overall, the above results indicate that, this study can only generalize with respect to bank specific variables in pooled study only. On the other hand, for Islamic banks, the research can only generalize with respect to macroeconomic factors only. As shown in table 3 of appendix C, no generalization can be made for conventional banks sample. On the other hand, the robustness tests for pre and post crisis periods shows liquidity did not play any significant roles on both bank specific and macroeconomic factors. Thus, no generalizations on both bank specific as well macroeconomic factors can be made in the study.

The research has limitations that should be considered. First, this study does not consider other factors that may affect liquidity and bank profitability such as corporate governance and bank size. Second, the study only considers testing liquidity as mediation without considering other variables such as the ownership, that can moderate this relationship. Finally, the study uses only Malaysian banks as samples, so different results may be obtained when the model is tested in other countries as different countries have different regulations with regards to the financial system. A follow-up study in this area can strengthen and replicate this model in different countries to improve the generalization of findings, which may be fruitful for future research.