CHAPTERV

RESULTS AND DISCUSSION

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Introduction

This chapter presents the results and discussions of the empirical evidence from ılyzing the distributional impact of financial variables such as Monetary aggregates (M1, M2 1 M3), Commercial loans (CR) and Stocks prices (CI) on output from 10 sectors namely nufacturing (MF), mining and quarrying (MN), construction (CS), agricultural (AG), electric, ; and water (EW), transport, storage and communications (TR), wholesale and retail trade and tel and restaurants (WR), finance and insurance and real estate and business service (FB), vernment services (GS) and others services (OS) in Malaysia.

The augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) unit root test procedures; hansen and Juselius (1990) cointegration test; and the Toda and Yamamoto (1995) test are nducted to achieve the objectives of the study.

2 Unit Root Test results

Since cointegration requires a certain stochastic structure of the time series involved, the st step in the empirical application is to determine if the variables are stationary or non-itionary in levels. The prerequisite for a set of series to be cointegrated is that they should be tegrated of the same order. The results of the unit root tests are presented in table 5.1.

able 5.1 Unit root test results

Variables	Levels		First-differences	
	ADF (Trend)	PP (Trend)	ADF (Without trend)	PP (Without trend)
ectoral Production				
AG	-1.897629(1)	-1.771574(1)	-6.829070(2)*	-7.454660(1)*
MN	-2.214724(1)	-2.497552(1)	-5.230161(2)*	-5.496321(2)*
MF	-3.1837569(1)	-2.496244(1)	-6.598571(2)*	-5.202690(2)*
CS	-1.450548(1)	-1.762570(1)	-5.827985(2)*	-9.339056(2)*
EW	-2.582652(1)	-2.537666(1)	-7.143246(2)*	-13.33185(2)*
TR	-1.095387(1)	-1.171998(1)	-5.673607(2)*	-7.991682(2)*

lote: *Rejection of the null at 1 percent level; ** Rejection of the null at 5 percent level. The critical value for ADF evel- trend) at 1 percent and 5 percent of level of significant are –4.2023 and –3.5247 respectively; the critical alue for PP (level- trend) at 1 percent and 5 percent level of significant are 4.1958 and –3.5217 respectively. The ritical value for ADF (first-differences -without trend) at 1 percent and 5 percent of level of significant are –3.6067 nd –2.9378 respectively. The critical value for PP (first-differences- without trend) at 1 percent and 5 percent level f significant are 3.6019 and –2.9358 respectively. (Mackinnon's critical values from Eviews). Significant lags in arentheses.

ble 5.1 Unit root test results (Continued)

Variables	Levels		First-differences	
	ADF	PP	ADF	PP
	(Trend)	(Trend)	(Without trend)	(Without trend)
ctoral Production				
WR	-1.677632(1)	-0.721754(1)	-7.219321(2)*	-7.069831(2)*
FB	-2.417803(1)	-2.276880(1)	-7.308814(2)*	-13.43225(2)*
GS	-2.394008(1)	-2.078575(1)	-7.969814(2)*	16.553301(2)*
OS	-0.092253(1)	0.1513851(1)	-5.172414(2)*	-7.592605(2)*
'nancial Variables				
M1	-1.522576(1)	1.586275(1)	-3.448590(2)**	-5.991865(2)*
M2	-0.048656(2)	-0.526231(1)	-3.765760(2)*	-4.970191(2)*
M3	-0.506991(1)	-2.520074(1)	-7.343192(2)*	-14.04771(2)*
CR	-0.964491(1)	-0.640574(1)	-1.982884(2)*	-3.144625(2)**
CI	-1.637643(1)	-2.062285(1)	-4.387179(2)*	-7.438278(2)*

ote: *Rejection of the null at 1 percent level; ** Rejection of the null at 5 percent level. The critical value for ADF evel- trend) at 1 percent and 5 percent of level of significant are –4.2023 and –3.5247 respectively; the critical alue for PP (level- trend) at 1 percent and 5 percent level of significant are 4.1958 and –3.5217 respectively. The itical value for ADF (first-differences -without trend) at 1 percent and 5 percent of level of significant are –3.6067 ıd –2.9378 respectively. The critical value for PP (first-differences- without trend) at 1 percent and 5 percent level f significant are 3.6019 and –2.9358 respectively. (Mackinnon's critical values from Eview). Significant lags in arentheses.

Table 5.1 presents the augmented Dickey-Fuller (ADF) test and Phillip-Perron (PP) tests' esults for all series involved in the analysis in logarithmic forms in levels and also in first ifferences. In level, both the ADF and PP tests are conducted with constant and trend, while the irst differences tests only include constant.

The statistical results indicate that all the null hypothesis of nonstationary cannot be ejected at the level 5% significance level base on Mackinnon's critical value. However, when all he series are first differences, the results indicate that the null hypothesis can be rejected for all he involved series. Therefore, all the series are said to be first-order integrated, denoted by I (1) and are non-stationary in levels, or they contain a unit root in their level form.

In conclusion, the results are consistent with the view that most macroeconomic variables are non-stationary in level but stationary in the first difference (see Nelson and Plosser, 1982).

.3 Johansen Cointegration Tests

Given the power of these unit root tests, we consider the series to be I (1) process. The ext step is to apply the Johansen-Juselius co-integration procedure, which is based on the iaximum-likelihood estimation technique. This procedure yields two test statistics known as $\lambda - \max$ and $\lambda - trace$ that are used to identify the number of co-integrating vectors. In applying ie technique, however, we need to decide the lag order of VAR. When data are quarterly, a ommon practice is to use four lags. However, we carry out the procedure using 2 lags. The esult indicates that the order of VAR at 2 is acceptable by the data representation with nrestricted intercept and no trends. The result from cointegration tests are presented. (refer to 'able 5.2.1 - Table 5.2.3)

Multivariate relationships are tested for the selected financials variable and sectoral roduction. In this study, the Johansen and Juselius (1990) procedure is utilized to test for the resence (or absence) of cointegration relationship. If the computed χ^2 value exceeds the ritical χ^2 value from the χ^2 table at the α percent level of significance, we reject the null iypothesis. Given that there were four variables in the model, there can be at most a maximum of three coinegrating vectors, so that r could be equal to 0, 1, 2, and 3.

able 5.2.1: Johansen Cointegration Test Results (Money Variable M1)

ectoral		Variables: M1, CR, CI							
		λ - Max				Trace statistics			
	k	Ho: r=0	Ho: r≤1	Ho: r≤2	Ho: r≤3	Ho: r=0	Ho: r≤1	Ho: r≤2	Ho: r≤3
lnAG	2	32.28*	28.45*	14.39**	2.03	77.41*	45.13*	16.69*	2.30
lnMN	2	27.35**	9.17	8.44	1.01	45.97	18.62	9.46	1.01
lnMF	2	31.94**	20.07**	15.20**	2.71	47.96**	29.9988	15.61**	2.71
lnCS	2	30.08**	22.81**	3.83	1.54	50.37**	35.06**.	16.37**	1.54
lnEW	2	26.97	14.64	5.51	3.24	55.33*	23.38	8.74	3.24
lnTR	2	42.54*	12.61	7.63	2.91	67.17*	29.89**	12.01	3.04
lnWR	2	35.31*	24.78**	15.12**	2.92	54.29**	29.83**	16.05**	2.93
lnFB	2	33.14**	21.04**	14.61**	3.74	63.53*	30.38**	19.35**	3.74
lnGS	2	30.58**	19.1	6.44	3.32	59.44*	28.86	9.77	3.32
lnOS	2	38.28*	22.01**	10.41	3.15	74.84*	36.55*	14.55	3.15

lotes: *Rejection of the null at 1percent level; ** Rejection of the null at 5percent level. k is the number of lag ength in VAR. The 5 percent critical values are: λ-max: r=0, 27.07 (5percent), 32.24 (1percent), r≤1, 20.97 (5 ercent), 25.52 (1percent), r≤2, 14.07 (5percent), 18.63(1percent), r≤3, 3.76(5percent), 6.65 (1percent), and trace: =0, 47.21 (5percent), 54.46 (1percent), r≤1, 29.68 (5percent), 35.65 (1percent), r≤2, 15.41(5percent), 20.04 1percent), r≤3, 3.76 (5percent), 6.65 (1percent). See Table 1 in Osterwald-Lenum (1992).

ible 5.2.2: Johansen Cointegration Test Results (Money Variable M2)

		Variables: M2, CR, CI							
ectoral		λ - Max				Trace statistics			
	k	Ho: r=0	Ho: r≤1	Ho: r≤2	Ho: r≤3	Ho: r=0	Ho: r≤1	Ho: r≤2	Ho: r≤3
lnAG	2	42.39*	18.04	9.71	0.047	49.09**	31.37**	10.18	0.47
lnMN	2	28.21**	10.98	8.88	2.34	48.2**	22.21	11.22	2.34
lnMF	2	38.19*	22.3**	17.14**	2.77	60.36*	35.77*	16.92**	2.77
lnCS	2	68.51*	35.77*	15.78*	3.39	64.18*	33.42**	13.68	3.39
lnEW	2	26.41	19.46	10.52	2.72	44.65	23.69	12.62	2.74
lnTR	2	38.29*	21.47**	10.42	3.22	73.43*	35.14**	15.66**	3.24
lnWR	2	33.05*	23.99**	17.08**	2.82	54.96*	31.91**	17.91**	2.82
lnFB	2	46.95*	21.07**	16.82**	3.52	54.65*	33.69**	15.62**	3.52
lnGS	2	53.44*	28.89*	15.3**	3.68	55.93*	30.45**	16.49**	3.68
lnOS	2	51.12*	20.36**	13.33	3.72	66.94*	42.42*	22.05*9	3.72

lotes: *Rejection of the null at 1percent level; ** Rejection of the null at 5percent level. k is the number of lag ength in VAR. The 5 percent critical values are: λ-max: r=0, 27.07 (5percent), 32.24 (1percent), r≤1, 20.97 (5 ercent), 25.52 (1percent), r≤2, 14.07 (5percent), 18.63(1percent), r≤3, 3.76(5percent), 6.65 (1percent), and trace: =0, 47.21 (5percent), 54.46 (1percent), r≤1, 29.68 (5percent), 35.65 (1percent), r≤2, 15.41(5percent), 20.04 (1percent), r≤3, 3.76 (5percent), 6.65 (1percent). See Table 1 in Osterwald-Lenum (1992).

ble 5.2.3: Johansen Cointegration Test Results (Money Variable M3)

		Variables: M3, CR, CI							
ectoral		λ - Max				Trace statistics			
	k	Ho: r=0	Ho: r≤1	Ho: r≤2	Ho: r≤3	Ho: r=0	Ho: r≤1	Ho: r≤2	Ho: r≤3
lnAG	2	24.46	15.89	10.88	2.38	53.62*	29.15	13.27	2.38
lnMN	2	20.81	15.03	6.81	3.35	47.01	26.21	11.16	3.35
lnMF	2	53.44*	29.89*	18.87*	2.72	50.15**	29.71**	17.57**	2.71
lnCS	2	50.44*	26.81*	12.89	1.94	68.21*	39.92*	18.48	1.96
lnEW	2	26.33	18.27	10.21	3.75	44.65	23.69	13.97	3.75
lnTR	2	30.91**	17.82	8.27	2.72	57.27*	31.83**	14.02	2.72
lnWR	2	36.07*	28.76*	17.87**	3.43	49.23**	31.68**	16.41**	3.43
lnFB	2	31.29**	25.25**	17.96**	3.63	57.53*	32.85**	15.61**	3.63
lnGS	2	30.08**	22.81**	11.85	3.13	55.74*	31.49**	14.99	3.13
lnOS	2	28.54**	24.17**	7.39	3.03	51.11*	36.07**	12.43	3.03

lotes: *Rejection of the null at 1percent level; ** Rejection of the null at 5percent level. k is the number of lag ength in VAR. The 5 percent critical values are: λ -max: r=0, 27.07 (5percent), 32.24 (1percent), r≤ 1, 20.97 (5 ercent), 25.52 (1percent), r≤2, 14.07 (5percent), 18.63(1percent), r≤3, 3.76(5percent), 6.65 (1percent), and trace: =0, 47.21 (5percent), 54.46 (1percent), r≤ 1, 29.68 (5percent), 35.65 (1percent), r≤ 2, 15.41(5percent), 20.04 1percent), r≤3, 3.76 (5percent), 6.65 (1percent). See Table 1 in Osterwald-Lenum (1992).

Results from using the Johansen-Juselius cointegration test for a four-dimensional vector odel are summarized as follows. For the case of [M2, CR, CI, EW], [M3, CR, CI, MN], [M3, R, CI, EW], the value of the test statistics indicate that the zero cointegrating vector (r=0) nnot be rejected by $\lambda - \max$ and $\lambda - trace$ statistic tests. Thus, this result provides support for cointegration between all the variables. However, for the case of [M1, CR, CI, GS], [M2, CR, I, MN], indicate that the null hypothesis of no cointegration is soundly rejected by both tests. ence, we conclude that there appear to be one cointegrating vector (r = 1) among the four series id imply that the series have three common stochastic trends. This result provides for tegration between all variables. Furthermore, for the case of [M1, CR, CI, MN], [M1, CR, CI, W], [M3, CR, CI, AG], results indicate that r = 0 or r = 1 cannot be rejected either by $\lambda - \max$ or $\lambda - trace$ statistic tests.

Both the maximum eigenvalue and trace likelihood ratio test reject the null hypothesis of ero cointegrating and the null hypothesis of one cointegrating vectors for [M1, CR, CI, OS] as vell as [M2, CR, CI, CS]. This implies the existence of at least two cointegrating vectors, which ffers a higher degree of support for cointegration between these variables.

The corresponding test statistic for [M1, CR, CI, AG], [M2, CR, CI, GS], [M1, CR, CI, MF], [M2, CR, CI MF], [M3, CR, CI, MF], [M1, CR, CI, FB], [M2,CR,CI,FB], [M3, CR, CI, FB], [M1, CR, CI, WR], [M2, CR, CI, WR], [M3, CR, CI, WR] show that there is at least one cointegrating present in the model based on the five percent significant level. The null hypothesis r = 0 against $r \geq 1$ is soundly rejected by both the test, implying that the hypothesis of no cointegration is rejected. The same conclusion are arises when the null hypothesis r = 2 is tested or this system. At r = 3, trace and maximal eigenvalue tests are unable to reject the null in all the cases. Hence, we conclude that there appear to be three stationary linear combination among the four series in these financial and sectoral production variables.

The trace indicates the existence of three cointegrating vectors in [M1, CR, CI, CS], [M2, CR, CI, TR], [M2, CR, CI, WR], [M2, CR, CI, OS] and two vectors in [M1, CR, CI, TR], [M1, CR, CI, FB], [M2, CR, CI, AG], [M3, CR, CI, TR]. However, the maximal eigenvalue suggests that only one cointegrating vector and two cointegrating vectors are found in these variables respectively. Johansen and Juselius (1990) indicate that the trace test may lack power relative to the maximal eigenvalue test. Based on the power of the test, $\lambda-\max$ test is often preferred.

In summary, all the models from the four-dimension system are found to be cointegrated implying the rejection of null hypothesis of non-cointegration in both $\lambda-\max$ and $\lambda-trace$ statistic tests except these [M1, CR, CI, EW], [M1, CR, CI, WR], [M2, CR, CI, EW], [M2, CR, CI, FB], [M3, CR, CI, AG], [M3, CR, CI, MN], [M3, CR, CI, EW], [M3, CR, CI, WR], [M3, CR, CI, FB] that indicate non-cointegration between the variables. In short, the results of the multivariate cointegrating regression strongly indicate that financial variable and sectoral production are tied together by some long-run equilibrium relationships.

These findings are consistent with Shelley and Wallace (1998) who concluded that money has non-neutral affects to the output in fourteen out of twenty U.S. manufacturing industries in her studies. Beside that Cho and Kang (1999) found that money and credit are related to the Korea economy.

Granger Non-causality Test Results

A third procedure (MWALD) (See Toda and Yamamoto, 1995, and Dolado and tkepohl, 1996) is theoretically very simples, as it involves estimation of VAR model in a aightforward way (MWALD). However, as presented in the methodology, the implementation the test is not entire by straightforward and involves some programming (refer Appendix A.1), mely using RATS to obtain the MWALD test, which is not available on Eviews.

The results of Granger non-causality test are presented in Table 5.3.1. Toda and amamoto (1995) proved that in integrated and cointegrated systems the Wald test for linear striction on the parameters of VAR (k) has an asymptotic χ^2 distribution when a VAR (k + nax) is estimated. In this study, the model was estimated using total lag p= 3 (where k=2 and nax =1)[5.1].

[5.1] When data are quarterly, a common practice is to use four lags. However, Azali, Lee, Habibullah and Azman-aini (2000) carry out the procedure using two lags.

Table 5.3.1: Model 1 Results of long-run Granger non-causality test due to Toda Yamamoto ([illegible])

Model 1: Null hypothesis (M1, CR, CI)	Test statistic Mwald	p-values	Null hypothesis (M2, CR, CI)	Test statistic Mwald	p-values	Null hypothesis (M3, CR, CI)	Test statistic Mwald	p-values
M1 does not Granger cause AG	0.247	0.884	M2 does not Granger cause AG	2.161	0.349	M3 does not Granger cause AG	15.407	0.001*
AG does not Granger cause M1	2.091	0.351	AG does not Granger cause M2	15.571	0.006*	AG does not Granger cause M3	5.190	0.074***
M1 does not Granger cause MN	0.821	0.663	M2 does not Granger cause MN	2.809	0.245	M3 does not Granger cause MN	1.552	0.460
MN does not Granger cause M1	1.527	0.466	MN does not Granger cause M2	11.571	0.003*	MN does not Granger cause M3	0.585	0.746
M1 does not Granger cause MF	7.890	0.022*	M2 does not Granger cause MF	6.058	0.041*	M3 does not Granger cause MF	4.035	0.095**
MF does not Granger cause M1	10.530	0.006*	MF does not Granger cause M2	6.793	0.037*	MF does not Granger cause M3	5.574	0.06**
M1 does not Granger cause CS	5.541	0.062**	M2 does not Granger cause CS	2.161.	0.349	M3 does not Granger cause CS	0.247	0.883
CS does not Granger cause M1	28.948	0.001*	CS does not Granger cause M2	15.571	0.006*	CS does not Granger cause M3	0.197	0.906
M1 does not Granger cause EW	0.652	0.721	M2 does not Granger cause EW	1.932	0.380	M3 does not Granger cause EW	0.054	0.972
EW does not Granger cause M1	2.416	0.298	EW does not Granger cause M2	2.544	0.280	EW does not Granger cause M3	0.042	0.906
M1 does not Granger cause TR	4.073	0.130	M2 does not Granger cause TR	2.491	0.278	M3 does not Granger cause TR	2.333	0.311
TR does not Granger cause M1	5.557	0.062**	TR does not Granger cause M2	5.673	0.058**	TR does not Granger cause M3	0.532	0.766
M1 does not Granger cause WR	12.047	0.003*	M2 does not Granger cause WR	8.203	0.012	M3 does not Granger cause WR	8.517	0.012*
WR does not Granger cause M1	10.590	0.006*	WR does not Granger cause M2	4.761	0.092**	WR does not Granger cause M3	5.584	0.076**
M1 does not Granger cause FB	5.088	0.078**	M2 does not Granger cause FB	6.837	0.037*	M3 does not Granger cause FB	16.066	0.001*
FB does not Granger cause M1	11.443	0.003*	FB does not Granger cause M2	6.652	0.031*	FB does not Granger cause M3	7.085	0.028*
M1 does not Granger cause GS	4.004	0.135	M2 does not Granger cause GS	7.289	0.026*	M3 does not Granger cause GS	0.527	0.768
GS does not Granger cause M1	2.327	0.312	GS does not Granger cause M2	8.797	0.012*	GS does not Granger cause M3	8.695	0.012*
M1 does not Granger cause OS	0.062	0.969	M2 does not Granger cause OS	13.076	0.001*	M3 does not Granger cause OS	1.534	0.464
OS does not Granger cause M1	6.433	0.040*	OS does not Granger cause M2	2.960	0.227	OS does not Granger cause M3	7.646	0.0218*

Notes:
*and** denote statistical significant at 5 percent and 10 percent level respectively.
Model 1 - Monetary aggregate (M1 or M2 or M3) does not Granger-cause the respective sectoral production.

Table 5.3.2: Model 2 Results of long-run Granger non-causality test due to Toda-Yamamoto (1995)

Model 2: Null hypothesis (CR, M1, CI)	Test statistic Mwald	p-values	Null hypothesis (CR, M2, CI)	Test statistic Mwald	p-values	Null hypothesis (CR, M3, CI)	Test statistic Mwald	p-values
CR does not Granger cause AG	4.817	0.089**	CR does not Granger cause AG	1.233	0.539	CR does not Granger cause AG	0.662	0.718
AG does not Granger cause CR	2.319	0.313	AG does not Granger cause CR	2.373	0.305	AG does not Granger cause CR	0.933	0.627
CR does not Granger cause MN	0.281	0.868	CR does not Granger cause MN	0.492	0.781	CR does not Granger cause MN	0.115	0.944
MN does not Granger cause CR	0.741	0.690	MN does not Granger cause CR	1.708	0.425	MN does not Granger cause CR	0.618	0.734
CR does not Granger cause MF	2.493	0.287	CR does not Granger cause MF	7.822	0.020*	CR does not Granger cause MF	10.007	0.006*
MF does not Granger cause CR	1.085	0.581	MF does not Granger cause CR	1.754	0.416	MF does not Granger cause CR	0.550	0.760
CR does not Granger cause CS	4.264	0.118	CR does not Granger cause CS	2.701	0.259	CR does not Granger cause CS	1.877	0.391
CS does not Granger cause CR	31.405	0.001*	CS does not Granger cause CR	26.720	0.001*	CS does not Granger cause CR	30.126	0.001*
CR does not Granger cause EW	1.234	0.539	CR does not Granger cause EW	4.177	0.124	CR does not Granger cause EW	1.426	0.490
EW does not Granger cause M1	1.756	0.415	EW does not Granger cause M1	1.139	0.565	EW does not Granger cause M1	0.887	0.641
CR does not Granger cause TR	2.419	0.298	CR does not Granger cause TR	1.904	0.385	CR does not Granger cause TR	0.105	0.948
TR does not Granger cause CR	11.975	0.002*	TR does not Granger cause CR	25.120	0.001*	TR does not Granger cause CR	1.335	0.111
CR does not Granger cause WR	0.865	0.651	CR does not Granger cause WR	2.648	0.266	CR does not Granger cause WR	0.557	0.756
WR does not Granger cause CR	3.417	0.181	WR does not Granger cause CR	1.037	0.589	WR does not Granger cause CR	0.694	0.706
CR does not Granger cause FB	3.009	0.222	CR does not Granger cause FB	1.475	0.475	CR does not Granger cause FB	0.731	0.693
FB does not Granger cause CR	3.206	0.201	FB does not Granger cause CR	2.611	0.271	FB does not Granger cause CR	1.425	0.490
CR does not Granger cause GS	7.158	0.027*	CR does not Granger cause GS	0.709	0.701	CR does not Granger cause GS	5.178	0.075**
GS does not Granger cause CR	10.263	0.006*	GS does not Granger cause CR	12.531	0.002*	GS does not Granger cause CR	2.031	0.362
CR does not Granger cause OS	2.668	0.263	CR does not Granger cause OS	1.190	0.551	CR does not Granger cause OS	2.010	0.366
OS does not Granger cause CR	1.085	0.581	OS does not Granger cause CR	0.286	0.866	OS does not Granger cause CR	2.301	0.316

Notes:

* and ** denote statistical significant at 5% and 10% level respectively.

Model 2 - Credit (CR) does not Granger-cause the respective sectoral production.

Table 5.3.3: Model 3 Results of long-run Granger non-causality test due to Toda-Yamamoto (1995)

Null hypothesis Model 3: (CI, M1, CR)	Test statistic Mwald	p-values	Null hypothesis (CI, M2, CR)	Test statistic Mwald	p-values	Null hypothesis (CI, M3, CR)	Test statistic Mwald	p-values
CI does not Granger cause AG	5.311	0.070**	CI does not Granger cause AG	10.393	0.006*	CI does not Granger cause AG	7.577	0.022*
AG does not Granger cause CI	11.705	0.003*	AG does not Granger cause CI	7.502	0.025*	AG does not Granger cause CI	13.023	0.001*
CI does not Granger cause MN	3.095	0.212	CI does not Granger cause MN	5.798	0.055**	CI does not Granger cause MN	5.431	0.066
MN does not Granger cause CI	0.165	0.921	MN does not Granger cause CI	0.756	0.685	MN does not Granger cause CI	0.630	0.729
CI does not Granger cause MF	4.388	0.137	CI does not Granger cause MF	2.309	0.233	CI does not Granger cause MF	0.096	0.912
MF does not Granger cause CI	0.727	0.695	MF does not Granger cause CI	0.522	0.760	MF does not Granger cause CI	0.220	0.896
CI does not Granger cause CS	6.410	0.041*	CI does not Granger cause CS	2.567	0.277	CI does not Granger cause CS	7.173	0.027*
CS does not Granger cause CI	1.836	0.399	CS does not Granger cause CI	8.693	0.012*	CS does not Granger cause CI	2.652	0.265
CI does not Granger cause EW	0.111	0.945	CI does not Granger cause EW	0.073	0.964	CI does not Granger cause EW	0.159	0.923
EW does not Granger cause CI	0.006	0.997	EW does not Granger cause CI	0.650	0.723	EW does not Granger cause CI	0.108	0.947
CI does not Granger cause TR	1.823	0.402	CI does not Granger cause TR	6.605	0.037*	CI does not Granger cause TR	14.521	0.001*
TR does not Granger cause CI	0.302	0.859	TR does not Granger cause CI	0.567	0.753	TR does not Granger cause CI	0.532	0.766
CI does not Granger cause WR	0.774	0.678	CI does not Granger cause WR	1.157	0.561	CI does not Granger cause WR	2.890	0.235
WR does not Granger cause CI	2.992	0.224	WR does not Granger cause CI	1.900	0.386	WR does not Granger cause CI	2.374	0.305
CI does not Granger cause FB	1.371	0.503	CI does not Granger cause FB	1.076	0.538	CI does not Granger cause FB	1.064	0.587
FB does not Granger cause CI	1.611	0.447	FB does not Granger cause CI	0.312	0.855	FB does not Granger cause CI	0.451	0.797
CI does not Granger cause GS	2.807	0.246	CI does not Granger cause GS	5.612	0.060**	CI does not Granger cause GS	1.028	0.598
GS does not Granger cause CI	0.845	0.655	GS does not Granger cause CI	0.152	0.926	GS does not Granger cause CI	1.471	0.479
CI does not Granger cause OS	5.997	0.049*	CI does not Granger cause OS	6.452	0.039*	CI does not Granger cause OS	8.890	0.011*
OS does not Granger cause CI	6.433	0.040*	OS does not Granger cause CI	6.431	0.040*	OS does not Granger cause CI	0.960	0.619

Notes:
* and ** denote statistical significant at 5% and 10% level respectively.
Model 3 - Stock Prices(CI) does not Granger-cause the respective sectoral production.

Table 3.5.4: Summary Results of Granger non-causality

Model	AG	MN	MF	CS	EW	TR	WR	FB	GS	OS
Model 1:										
M1, CR, CI	←/→	←/→	M1↔MF*	M1↔CS*	←/→	M1←TR**	M1↔WR*	M1↔FB**	←/→	M1←OS*
M2, CR, CI	M2←AG*	M2←MN*	M2↔MF*	M2←CS*	←/→	M2←TR**	M2↔WR*	M2↔FB*	M2↔GS*	M2→OS*
M3, CR, CI	M1↔AG*	←/→	M3↔MF**	←/→	←/→	←/→	M3↔WR**	M3↔FB*	M3←GS*	M3←OS*
Model 2:										
CR, M1, CI	CR→AG**	←/→	←/→	CR←CS*	←/→	CR←TR*	←/→	←/→	CR↔GS*	←/→
CR, M2, CI	←/→	←/→	CR→MF*	CR←CS*	←/→	CR←TR*	←/→	←/→	CR←GS*	←/→
CR, M3, CI	←/→	←/→	CR→MF**	CR←CS*	←/→	←/→	←/→	←/→	CR→MF**	←/→
Model 3:										
CI, M1, CR	CI ↔AG**	←/→	←/→	CI→CS*	←/→	←/→	←/→	←/→	←/→	CI↔OS*
CI, M2, CR	CI ↔AG*	CI→MN**	←/→	CI←CS*	←/→	CI→TR*	←/→	←/→	CI→GS**	CI↔OS*
CI, M3, CR	CI ↔AG*	←/→	←/→	CI→CS*	←/→	CI→TR*	←/→	←/→	←/→	CI→OS*

Notes:
* and ** denote statistical significant at 5 percent and 10% level respectively.
→ and ← denote Granger causality and reverse Granger causality respectively.
↔ denotes bi-directional Granger causality.
←/→ denotes the absence of long-run Granger-causality.
Model 1 – Monetary aggregate (M1 or M2 or M3) does not Granger-cause the respective sectoral production.
Model 2 – Credit (CR) does not Granger-cause the respective sectoral production.
Model 3 – Stock Price (CI) does not Granger-cause the respective sectoral production.

1.1 Model 1 – Monetary aggregate (M1 or M2 or M3) does not Granger-cause the respective production

As shown in Table 5.3.1, the results of model 1 indicate that monetary aggregates have a ·directional Granger causality between the manufacturing (MF), wholesale and retail and hotel d restaurants (WR), finance and insurance and real estate and business service (FB). Thus, it ows that monetary aggregates have a strong predicting power among the manufacturing (MF), nolesale and retail and hotel and restaurants (WR), finance and insurance and real estate and isiness service (FB) in Malaysia. These findings are consistent with Ahmed studies showed that ianticipated money growth has a significant effect on total hours in six of nineteen Canadian anufacturing industries. Gauger (1988) also found the neutrality of money of anticipated oney growth and concluded that anticipated money growth is not neutral in eight of eleven idustries in her studies.

The estimates of model 1 indicate that narrow money (M1) is not indicative of long-run ranger causality with respect to agricultural (AG), mining and quarrying (MN), electric, gas nd water (EW) and government services (GS). Thus, narrow money (M1) is neutral for above ectoral production respectively. However, narrow money has a reverse Granger causality with espect storage and communications (TR), and other services (OS).

On the other hand, broad monetary aggregate (M2 and M3) is neutral with respect to lectric, gas and water (EW). Simiilar to M3 is neutral with respect to mining and quarrying MN), construction (CS), transport, storage and communications (TR).

4.2 Model 2 – Credit (CR) does not Granger-cause the respective sectoral production

Model 2 is used to test whether commercial loan (CR) Granger-cause sectoral production. ıe estimates of model 2 indicate that credit (CR) is absence of long-run Granger causality with spect to electric, gas and water (EW), wholesale and retail and hotel and restaurants (WR), ıance and insurance and real estate and business service (FB), and other services (OS). Thus, ese results indicate that the role of credit as proxy of monetary variable is neutral with respect the all services sector production with the exception of for the transport, storage and ommunications (TR) as well as government services (GS). The neutrality of credit on the above rvices production shows that, these sectors have been relied on other sources of financing, such s from the equity market and foreign direct investments.

The results of model 2 indicate that Credit is not indicative long-run Granger-causality ith respect to mining and quarrying (MN) and a reverse Granger-causality with respect to onstruction (CS) in Malaysia.

In short, these results demonstrate the importance of credit to manufacturing (MF), onstruction (CS) and government services (GS) in the long run in Malaysia. These findings are onsistent with Azali and Mathews (1999) found during the pre-liberalization and post-iberalization period both money and credit are significant in Malaysia.

5.4.3 Model 3 – Stock Price (CI) does not Granger-cause the respective sectoral production

The estimate of Model 3, which is tests the null of non-causality between stock prices and sectoral production. The results imply that stock prices are neutral with respect to manufacturing (MF). For the insignificant of stock prices on manufacturing sector (MF), although surprising, but the results indicates that in a long run the stock market is unable to influence significant the sectoral production.

The results of model 3 indicate that stock prices (CI) not indicative long run Granger-causality with respect to electric, gas and water (EW), wholesale and retail and hotel and restaurants (WR), finance and insurance and real estate and business service (FB) in Malaysia. However, the results also show that stock prices (CI) have a bi-directional Granger causality between the agricultural (AG).

Evidence from model 3 also shows that stock prices are highly insignificant in influencing the total services sectoral (SV) except for the transport, storage and communications (TR) and other services (GS), which are highly significant influencing the output in the long run. The presence of bi-directional relationships also cannot be rejected between stock prices and agricultural sectoral production.

.5 Conclusion

This chapter presents the empirical results of the analysis as well as the interpretation of ιe estimation results. A summary of the study and the findings of the empirical analysis (refer to able 5.1 – 5.3.4) are also given in this chapter.