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THE IMPACT OF FINANCIAL INTEGRATION ON  
BANKING SYSTEM EFFICIENCY IN ASEAN COUNTRIES

By

HAMIZAH BINTI MAHMUD



Thesis Submitted to

School of Economics, Finance and Banking,

Universiti Utara Malaysia,

in Partial Fulfillment of the Requirement for the Master of Sciences (Finance)



**Pusat Pengajian Ekonomi,  
Kewangan dan Perbankan**

SCHOOL OF ECONOMICS, FINANCE, AND BANKING

**Universiti Utara Malaysia**

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## ABSTRACT

Financial integration is a situation in which financial markets of countries around the world are closely linked together through the process of banking deregulation, capital account liberalization and financial openness. In theory, the liberalized financial system would stimulate higher competition, increase the flows of funds into the domestic banking system and improve the efficiency of the financial intermediation process. The objective of the study is to determine the impact of financial integration on the banking system efficiency for five major economies in ASEAN countries. This study employs the unbalanced panel data for five selected ASEAN countries, which are Malaysia, Indonesia, Philippines, Singapore and Thailand between the periods of 2004 to 2014. The dependent variables for this study is banking system efficiency which is represented by the bank net interest margin to total earning assets ratio, the main independent variable is the financial integration and the control variables are inflation, economic growth rate, income group and real interest rate. The study discovers the positive relationship between financial integration and banking system efficiency for five ASEAN countries. In addition, the study also finds the positive link between inflation and banking system efficiency while the higher and middle income countries have a better efficiency performance as compared to the lower and middle income group. In contrary, the economic growth rate is found to have a negative relationship with the banking system efficiency. In addition, the result argues that the real interest rate is not one of the factors that determine the banking sector efficiency. For the robustness model, the bank overhead costs to total assets ratio (operational cost) is employed as the dependent variables to measure the banking system efficiency. Despite of using the bank overhead costs to total assets ratio as the dependent variable, the findings support the earlier conclusion that the financial integration, inflation and income group enhance the banking sector efficiency. Therefore, these findings would assist the policy makers in assessing the effectiveness of the current regulations on the financial integration.

**Keywords:** Financial Integration, Banking System Efficiency, Bank Net Interest Margin, ASEAN, Inflation, Economic Growth rate, Income Group, Real Interest Rate.

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In the name of Allah, the Most Gracious and the Most Merciful

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Sincerely,

Hamizah Binti Mahmud  
School of Economics, Finance and Banking  
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## CHAPTER ONE

### INTRODUCTION

#### 1.0 BACKGROUND OF THE STUDY

In the last few decades, the financial system around the world has been transformed by the process of financial integration. Financial integration<sup>1</sup> is a situation in which the financial markets around the world are closely linked together through the process of liberalization in the banking system, trade openness and freedom in investment activities across countries (Baele *et al.* 2004). According to Chauhan (2012) and Patnaik and Shah (2012), financial integration also involved the removal of several restrictions in the financial sector that includes the restriction on interest rate and banking regulations.

In addition, Chinn and Ito (2006 & 2008) argue that the financial integration process that includes the financial openness and capital account liberalization would contribute positively to the economic development. They state that the liberalized financial system would stimulate higher competition, increase the flows of funds into the domestic banking system and improve the efficiency of the financial intermediation process. Other than that, Bhetuwal (2007) describes that the financial integration would also improve the risk diversification which then increase the volume of investment activities among the liberalized countries. Moreover, earlier studies conducted by

---

<sup>1</sup> Since the financial integration is conducted through various channels that also involve the reduction in regulation imposed in the financial system, thus, throughout this study, the words financial integration, financial liberalization, financial openness and financial deregulation are used interchangeably.

The contents of  
the thesis is for  
internal user  
only

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## APPENDIX A

(9 vars, 55 obs pasted into editor)

```
. tsset code year
      panel variable:  code, 1 to 5
      time variable:  year, 2004 to 2014
```

```
. regress ybni x1fi x2cpi x3_lngdp x4incomegroup x5realinterestrate
```

Source	SS	df	MS	Number of obs =	54
Model	111.488862	5	22.2977723	F( 5, 48) =	43.41
Residual	24.6541928	48	.513629017	Prob > F =	0.0000
				R-squared =	0.8189
				Adj R-squared =	0.8000
Total	136.143054	53	2.56873688	Root MSE =	.71668

ybni	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x1fi	-.1598967	.0792262	-2.02	0.049	-.3191917 - .0006017
x2cpi	-.0762086	.0105095	-7.25	0.000	-.0973393 - .0550779
x3_lngdp	1.602561	.22905	7.00	0.000	1.142025 2.063097
x4incomegr~p	-1.682036	.2222442	-7.57	0.000	-2.128888 -1.235185
x5realinte~e	.006231	.034693	0.18	0.858	-.063524 .075986
_cons	-30.15341	5.530597	-5.45	0.000	-41.27342 -19.0334

```
. vif
```

Variable	VIF	1/VIF
x2cpi	1.80	0.554397
x3_lngdp	1.69	0.590585
x4incomegr~p	1.25	0.797645
x5realinte~e	1.11	0.901467
x1fi	1.06	0.939458

```
Mean VIF | 1.38
```

```
. ssc install xttest3
```

```
checking xttest3 consistency and verifying not already installed...
all files already exist and are up-to-date.
```

```
. xtreg ybni x1fi x2cpi x3_lngdp x4incomegroup x5realinterestrate, fe
```

Fixed-effects (within) regression	Number of obs =	54
Group variable (i): code	Number of groups =	5
R-sq: within = 0.2910	Obs per group: min =	10
between = 0.0000	avg =	10.8
overall = 0.0183	max =	11
	F(4, 45) =	4.62
corr(u_i, Xb) = -0.3399	Prob > F =	0.0033

ybni	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x1fi	-.4960277	.2146476	-2.31	0.025	-.9283501 - .0637053
x2cpi	-.024169	.023206	-1.04	0.303	-.0709084 .0225704
x3_lngdp	-.4848981	.7613376	-0.64	0.527	-2.018311 1.048515

```

x4incomegr~p | (dropped)
x5realinte~e | -.0171721 .0346525 -0.50 0.623 -.0869659 .0526216
   _cons | 18.88113 18.00131 1.05 0.300 -17.37537 55.13764
-----+-----

```

```

sigma_u | 1.7137691
sigma_e | .66817325
rho | .86804766 (fraction of variance due to u_i)
-----+-----

```

```

F test that all u_i=0: F(4, 45) = 2.56 Prob > F = 0.0516

```

```

. ssc install xtserial
ssc install: "xtserial" not found at SSC, type -findit xtserial-
(To find all packages at SSC that start with x, type -ssc describe x-)
r(601);

```

```

. findit xtserial

```

```

. xttest3

```

```

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

```

```

H0: sigma(i)^2 = sigma^2 for all i

```

```

chi2 (5) = 31.44
Prob>chi2 = 0.0000

```

```

. xtserial ybni x1fi x2cpi x3_lngdp x4incomegroup x5realinterestrates

```

```

Wooldridge test for autocorrelation in panel data

```

```

H0: no first order autocorrelation

```

```

F( 1, 4) = 33.088
Prob > F = 0.0045

```

```

. regress ybni x1fi x2cpi x3_lngdp x4incomegroup x5realinterestrates, robust
cluster (code)

```

```

Regression with robust standard errors
Number of obs = 54
F( 3, 4) = .
Prob > F = .
R-squared = 0.8189
Root MSE = .71668

Number of clusters (code) = 5

```

```

-----+-----

```

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
x1fi	-.1598967	.038608	-4.14	0.014	-.2670896	-.0527038
x2cpi	-.0762086	.0188621	-4.04	0.016	-.1285783	-.0238389
x3_lngdp	1.602561	.1601564	10.01	0.001	1.157895	2.047226
x4incomegr~p	-1.682036	.1949529	-8.63	0.001	-2.223313	-1.14076
x5realinte~e	.006231	.0319408	0.20	0.855	-.0824508	.0949128
_cons	-30.15341	4.425083	-6.81	0.002	-42.43941	-17.86741

```

-----+-----

```

## APENDIX B

Notes:

1. (/m# option or -set memory-) 10.00 MB allocated to data
2. (/v# option or -set maxvar-) 5000 maximum variables

```
. (9 vars, 55 obs pasted into editor)

. tsset code year
  panel variable: code, 1 to 5
  time variable: year, 2004 to 2014

. regress gfddei04 x1fi x2cpi x4incomegroup x3_lngdp x5realinterestr
```

Source	SS	df	MS	Number of obs =	54
Model	57.7405485	5	11.5481097	F( 5, 48) =	50.55
Residual	10.9649986	48	.228437472	Prob > F =	0.0000
				R-squared =	0.8404
				Adj R-squared =	0.8238
Total	68.7055471	53	1.29633108	Root MSE =	.47795

gfddei04	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x1fi	-.1832809	.0528358	-3.47	0.001	-.2895143	-.0770475
x2cpi	-.0371316	.0070087	-5.30	0.000	-.0512236	-.0230396
x4incomegr~p	-1.654607	.148214	-11.16	0.000	-1.952611	-1.356602
x3_lngdp	.3390739	.1527528	2.22	0.031	.0319439	.6462039
x5realinte~e	.0344831	.0231367	1.49	0.143	-.0120363	.0810025
_cons	-2.209241	3.688339	-0.60	0.552	-9.625144	5.206662

```
. vif
```

Variable	VIF	1/VIF
x2cpi	1.80	0.554397
x3_lngdp	1.69	0.590585
x4incomegr~p	1.25	0.797645
x5realinte~e	1.11	0.901467
x1fi	1.06	0.939458
Mean VIF	1.38	

```
. ssc install xttest3
checking xttest3 consistency and verifying not already installed...
all files already exist and are up-to-date.
```

```
. xtreg gfddei04 x1fi x2cpi x3_lngdp x4incomegroup x5realinterestr, fe
```

Fixed-effects (within) regression	Number of obs =	54
Group variable (i): code	Number of groups =	5
R-sq: within = 0.3051	Obs per group: min =	10
between = 0.3802	avg =	10.8
overall = 0.3113	max =	11
	F(4, 45) =	4.94
corr(u_i, Xb) = 0.2936	Prob > F =	0.0022

gfddei04	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
----------	-------	-----------	---	------	----------------------

```

      x1fi |  -.1867062   .1447582   -1.29   0.204   -.4782641   .1048517
      x2cpi |  -.0302711   .0156501   -1.93   0.059   -.0617921   .0012499
      x3_lngdp |  .140898   .5134455   0.27   0.785   -.8932343   1.17503
x4incomegr~p |  (dropped)
x5realinte~e |  .0182757   .0233696   0.78   0.438   -.0287932   .0653445
      _cons |  1.408437   12.14007   0.12   0.908   -23.04292   25.8598
-----+-----
      sigma_u |  .97621167
      sigma_e |  .45061551
      rho |  .82435407   (fraction of variance due to u_i)
-----+-----
F test that all u_i=0:      F(4, 45) =      2.25      Prob > F = 0.0785

```

```
. xttest3
```

Modified Wald test for groupwise heteroskedasticity  
in fixed effect regression model

H0:  $\sigma(i)^2 = \sigma^2$  for all i

```
chi2 (5) =      82.76
Prob>chi2 =      0.0000
```

```
. ssc install xtserial
ssc install: "xtserial" not found at SSC, type -findit xtserial-
(To find all packages at SSC that start with x, type -ssc describe x-)
r(601);
```

```
. findit xtserial
```

```
. xtserial  gfddei04 x1fi x2cpi x3_lngdp x4incomegroup x5realinterestrte
```

Wooldridge test for autocorrelation in panel data

H0: no first order autocorrelation

```
F( 1, 4) =      11.531
Prob > F =      0.0274
```

```
. regress  gfddei04 x1fi x2cpi x3_lngdp x4incomegroup x5realinterestrte,
robust cluster (code)
```

```
Regression with robust standard errors
Number of obs =      54
F( 3, 4) =      .
Prob > F =      .
R-squared =      0.8404
Root MSE =      .47795

Number of clusters (code) = 5
```

```
-----+-----
      |              Robust
      |              Coef.  Std. Err.      t    P>|t|      [95% Conf. Interval]
-----+-----
      |
gfddei04 |              Coef.  Std. Err.      t    P>|t|      [95% Conf. Interval]
-----+-----
      x1fi |  -.1832809   .0637319   -2.88   0.045   -.3602291   -.0063327
      x2cpi |  -.0371316   .0148135   -2.51   0.066   -.0782605   .0039973
      x3_lngdp |  .3390739   .1303911   2.60   0.060   -.02295   .7010978
x4incomegr~p |  -1.654607   .1990385   -8.31   0.001   -2.207226   -1.101987
x5realinte~e |  .0344831   .0261303   1.32   0.257   -.0380662   .1070323
      _cons |  -2.209241   3.57816   -0.62   0.570   -12.14381   7.725324
-----+-----

```

## APENDIX C

### Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
eff	55	.00	6.78	3.5238	1.65993
fi	55	-1.19	2.39	.2838	1.28605
cpi	55	62.18	124.39	96.7704	12.49534
gdp	55	25.20	27.50	26.2927	.55406
RIR	55	-5.29	10.63	3.1110	2.98297
Valid N (listwise)	55				

## APENDIX D

	<i>Y=BNI</i>	<i>X1=FI</i>	<i>X2=CPI</i>	<i>x3_LNGDP</i>	<i>X4=Income Group</i>	<i>X5=Real interest rate</i>
Y=BNI	1					
X1= FI	-0.103281705	1				
X2=CPI	-0.337319665	-0.19439	1			
x3_LNGDP	0.368853309	-0.13879	0.551822	1		
X4=Income Group	-0.747424625	0.106775	0.138206	-0.25413	1	
X5=Real interest rate	-0.055725819	-0.04532	0.272644	0.145463	0.085441879	1