THE EFFECT OF FINANCIAL INTEGRATION ON FINANCIAL DEVELOPMENT: EVIDENCE FROM ASEAN COUNTRIES

By

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School of Economics, Finance and Banking,
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SCHOOL OF ECONOMICS, FINANCE, AND BANKING
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ABSTRACT

Under the International Monetary Fund and World Bank structural adjustment reform programs, integration was introduced to the developing countries as a means of growing these economies. The objective of the study is to determine the effect of financial integration on financial development for nine major economies in ASEAN countries. This study employs the unbalanced panel data for nine selected ASEAN countries, which are Malaysia, Indonesia, Thailand, Singapore, Cambodia, Myanmar, Philippines, Vietnam and Laos for the period 2004 and 2014. The study uses secondary data since the nature of the data is quantitative. It focused on six key variables namely financial depth as a dependent variable while financial integration, economic growth, inflation, real interest rate and income group as independent variables. The study discovers the positive relationship between financial integration and financial depth for nine ASEAN countries. In addition, the study also finds a positive link between economic growth and financial depth. The findings of this study will provide insights to regulators in improving rules and regulations of their country in order to reduce the restrictions of external account into the country.

Keywords: Financial Integration, Financial development, Panel data, Macroeconomic

ABSTRAK

Di bawah program pembaharuan pengubahsuaian struktur Antarabangsa Tabung Kewangan dan Bank Dunia, integrasi telah diperkenalkan kepada negara-negara membangun sebagai satu cara untuk berkembang ekonomi ini. Objektif kajian ini adalah untuk menentukan kesan integrasi kewangan kepada pembangunan kewangan selama sembilan ekonomi utama di negara-negara ASEAN. Kajian ini menggunakan data panel tidak seimbang selama sembilan negara ASEAN dipilih, yang terdiri daripada Malaysia, Indonesia, Thailand, Singapura, Kemboja, Myanmar, Filipina, Vietnam dan Laos untuk tempoh 2004 dan 2014. Kajian ini menggunakan data sekunder kerana sifat semula jadi data adalah kuantitatif. Kajian ini tertumpu kepada enam pembolehubah utama mendalam iaitu kewangan sebagai pemboleh ubah bersandar manakala integrasi kewangan, pertumbuhan ekonomi, inflasi, kadar faedah sebenar dan berpendapatan sebagai pembolehubah bebas. Kajian ini mendapati terdapat hubungan positif antara integrasi kewangan dan kedalaman kewangan bagi sembilan negara ASEAN. Di samping itu, kajian itu juga mendapati terdapat hubungan positif antara pertumbuhan ekonomi dan kedalaman kewangan. Penemuan daripada kajian ini dapat membantu pihak berkuasa dalam meningkatkan kaedah-kaedah dan peraturan-peraturan negara mereka untuk mengurangkan sekatan akaun luar ke negara ini.

Kata kunci: Integrasi Kewangan, Perkembangan Kewangan, Data Panel, Makroekonomi

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Sincerely,

Syarifah Intan Munirah bt Sayed Mahadzir

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LIST OF ABBREVIATIONS/NOTATIONS/GLOSSARY OF TERMS

Terms	Definition
AEC	ASEAN Economic Blueprint
ASEAN	Association of Southeast Asian National
CPI	Inflation
D4IG	Income group
FI	Financial Integration
GDP	Gross Domestic Product
GFDD	Global Financial Development Database
IMF	International Monetary Funds
OLS	Ordinary Least Square
P-P	Normal Probability Plot
RIR	Real interest rate

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Financial integration is defined as an integration within international financial markets which cause significant changes in countries' production structures and in the methods of doing business through the quantity and quality of international capital flows (Serdaroglu, 2015). Financial liberalization has taken three major categories which are (i) the deregulation of interest rates; (ii) the introduction of competition between the different channels of financing and (iii) the opening of the financial system to others (Allegret & Dulbecco, 1999).

Financial integration normally occurs in a situation which financial markets countries are closely linked together in financial market system. It is a process of removal of various constraints in the financial sector including the restriction on interest rate and banking regulations (Chauhan, 2012). In particular, financial integration brings advantages to emerging markets economies with the better mobilization of savings either in local or foreign market. Besides, financial integration can also strengthen the domestic financial system by leading to a more efficient allocation of capital, thereby promoting international risk-sharing (Yang, 2012).

Financial development is a part of the strategy of private sector development in order to encourage economic growth and reduce the level of poverty in a country. Financial development thus involves the establishing and enlargement of institutions, instruments and markets that support this investment and growth process. A better measurement of financial development is crucial to assess the development of the financial sector thus will

The contents of the thesis is for internal user only

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Appendix A

Construction of KAOPEN

KAOPEN is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).* Up to 1996, we assign dummy variables for the four major categories on the restrictions on external accounts.

These variables are:

- variable indicating the presence of multiple exchange rates (*k1*);
- variable indicating restrictions on current account transactions(*k2*);
- variable indicating restrictions on capital account transactions (*k3*); and
- variable indicating the requirement of the surrender of export proceeds (*k4*).

In 1996, the classification method in the *AREAER* changed and these four categories were disaggregated further, in an effort to better reflect the complexity of capital controls policies.7 For the extension of the four binary classifications after 1996, we followed Mody and Murshid (2005).

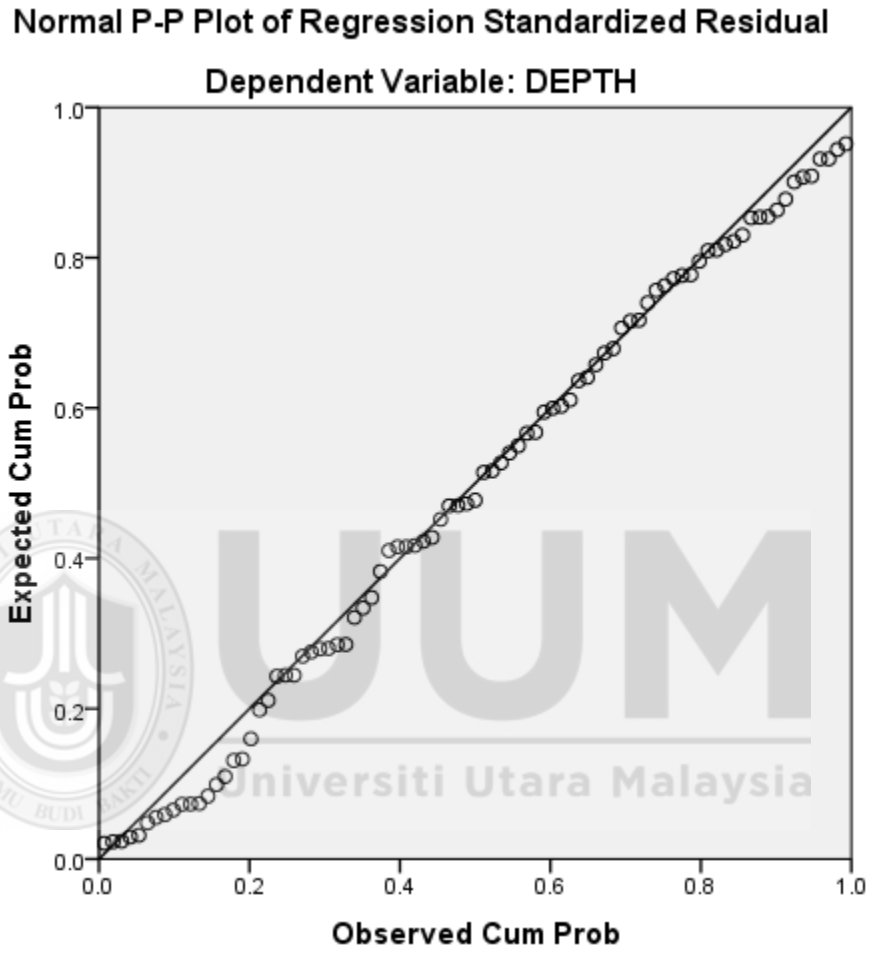
In order to focus on the effect of *financial openness* – rather than *controls* – we reverse the values of these binary variables, such that the variables are equal to one when the capital account restrictions are non-existent. Moreover, for controls on capital transitions (*k3*), we use the share of a five-year window (encompassing year *t* and the preceding four years) that capital controls were not in effect (*SHAREk3*).

$$SHAREk_{3,t} = \left(\frac{k_{3,t} + k_{3,t-1} + k_{3,t-2} + k_{3,t-3} + k_{3,t-4}}{5} \right)$$

Then we construct an index for capital "openness" (*KAOPENt*), which is the first standardized principal component of *k1t, k2t SHAREk3, k4t*. This index takes on higher values the more open the country is to cross-border capital transactions. By construction, the series has a mean of zero.The first eigenvector for KAOPEN was found to be (SHAREk3, k1, k2, k4)' = (0.57, 0.25, 0.52, 0.58)', indicating that the variability of KAOPEN is not merely driven by the SHAREk3 series.

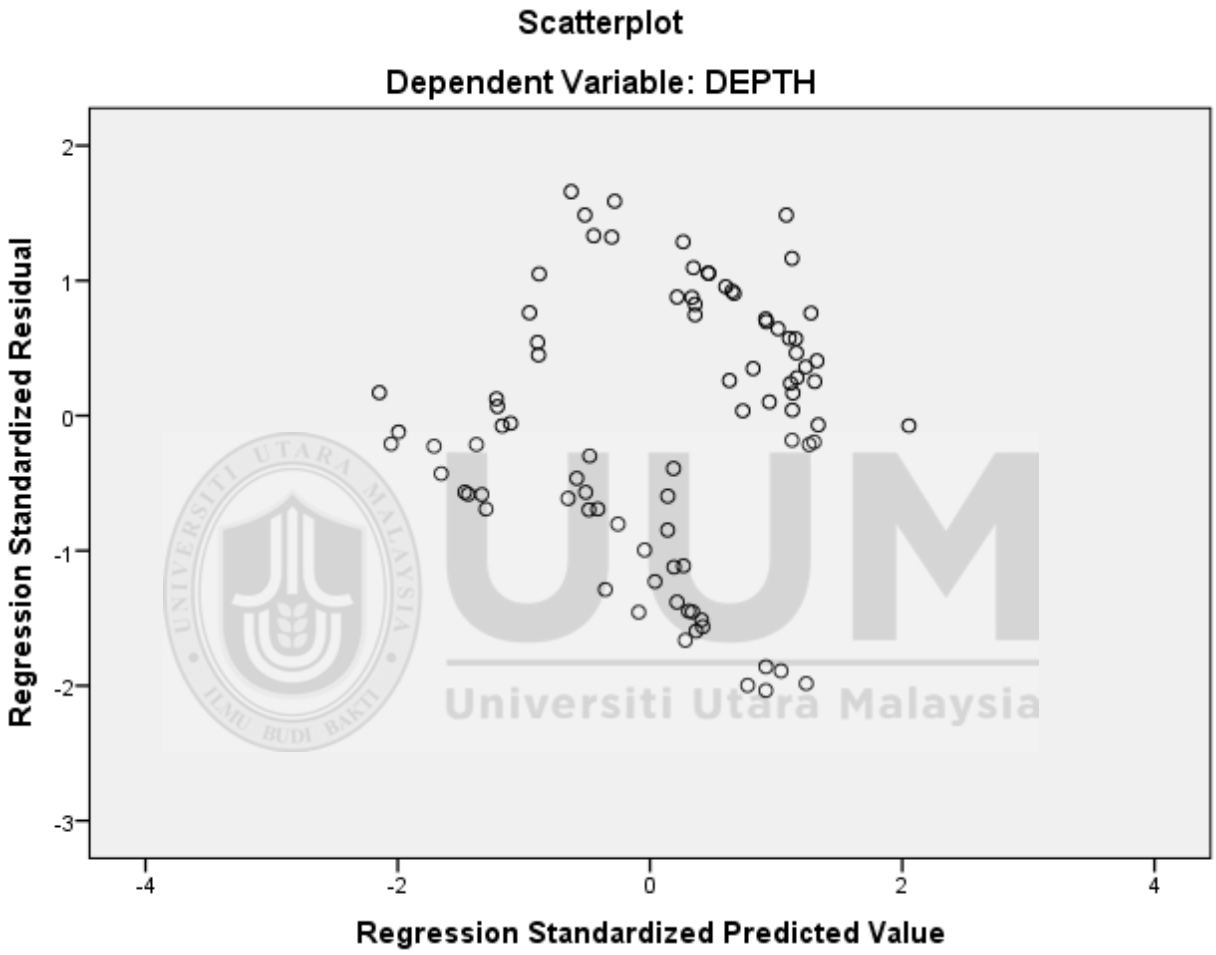
Appendix B

Diagnostic test: Test of Normality



Appendix C

Diagnostic test: Test of outliers



Appendix D

```
tsset country v3
       panel variable:  country (unbalanced)
        time variable:  v3, 2004 to 2014
                delta:  1 unit
```

```
. xtsum depth2 chinnito lngdp cpi dforinc realinterest
```

Descriptive statistic

Variable		Mean	Std. Dev.	Min	Max	Observations
depth2	overall	56.18471	37.82864	4.04	127.07	N = 87
	between		38.80297	7.743333	99.37909	n = 9
	within		13.13794	27.29199	134.5793	T = 9.66667
chinnito	overall	-.1177736	1.30181	-1.894798	2.389193	N = 98
	between		1.287581	-1.894798	2.389193	n = 9
	within		.4498565	-.9314607	1.375326	T-bar = 10.8889
lngdp	overall	5.833968	1.976902	3.083284	9.333183	N = 98
	between		1.972836	3.806905	8.998211	n = 9
	within		.6169422	4.834636	9.180671	T-bar = 10.8889
cpi	overall	5.903768	5.66651	-.8457	35.0246	N = 98
	between		3.11329	2.541227	11.12745	n = 9
	within		4.828704	-3.756086	29.80091	T-bar = 10.8889
dforinc	overall	.3367347	.4750231	0	1	N = 98
	between		.5	0	1	n = 9
	within		0	.3367347	.3367347	T-bar = 10.8889
realin~t	overall	3.710045	5.436347	-5.6163	28.544	N = 98
	between		3.60176	0	12.5174	n = 9
	within		4.310041	-8.807355	19.73665	T-bar = 10.8889

Pooled OLS estimation

```
. regress depth2 chinnito lngdp cpi dforinc realinterest

      Source |       SS           df       MS      Number of obs   =        87
-------------+----------------------------------   F(5, 81)        =      9.00
       Model |  43940.1941         5  8788.03882   Prob > F        =    0.0000
    Residual |   79126.346        81  976.868469   R-squared       =    0.3570
-------------+----------------------------------   Adj R-squared   =    0.3174
       Total |   123066.54        86  1431.00628   Root MSE        =    31.255

------------------------------------------------------------------------------
      depth2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    chinnito |    13.7357   3.267912     4.20   0.000     7.233579    20.23782
       lngdp |   6.719365   2.338341     2.87   0.005       2.0668    11.37193
         cpi |    .8642905    .941818     0.92   0.362    -1.009632    2.738213
     dforinc |   9.844775   9.794383     1.01   0.318    -9.642974    29.33252
realinterest |   -.2766298   .7344997    -0.38   0.707    -1.738054    1.184794
       _cons |   7.846248   15.68912     0.50   0.618    -23.37019    39.06268
------------------------------------------------------------------------------

. estimates store ols
```

Random effect

```
. xtreg depth2 chinnito lngdp cpi dforinc realinterest ,re

Random-effects GLS regression                   Number of obs     =         87
Group variable: country                         Number of groups  =          9

R-sq:                                           Obs per group:
     within  = 0.1490                                         min =          3
     between = 0.2686                                         avg =        9.7
     overall = 0.1639                                         max =         11

                                                Wald chi2(5)      =      14.02
```

```
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0155

------------------------------------------------------------------------------
      depth2 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    chinnito |   7.643583   3.219922     2.37   0.018     1.332651    13.95451
       lngdp |   16.75338   5.527003     3.03   0.002     5.920656    27.58611
         cpi |  -.1566282   .4536677    -0.35   0.730    -1.045801    .7325442
     dforinc |  -9.665462   30.83853    -0.31   0.754    -70.10787    50.77695
realinterest |   .6430161   .5350043     1.20   0.229     -.405573    1.691605
       _cons |  -43.63006   31.42162    -1.39   0.165    -105.2153    17.95519
-------------+----------------------------------------------------------------
     sigma_u |  37.988205
     sigma_e |   13.01574
         rho |  .89494071   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. estimates store re
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        depth2[country,t] = Xb + u[country] + e[country,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                  depth2 |   1431.006       37.82864
                       e |   169.4095       13.01574
                       u |   1443.104       37.98821

        Test:   Var(u) = 0
                                chibar2(01) =   250.06
                            Prob > chibar2 =   0.0000
```

Fixed Effect

```
. xtreg depth2 chinnito lngdp cpi dforinc realinterest ,fe
note: dforinc omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =        87
Group variable: country                         Number of groups   =         9

R-sq:                                           Obs per group:
     within  = 0.1555                                         min =         3
     between = 0.2663                                         avg =       9.7
     overall = 0.1626                                         max =        11

                                                F(4,74)            =      3.41
corr(u_i, Xb)  = -0.6675                        Prob > F           =    0.0130

------------------------------------------------------------------------------
      depth2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    chinnito |   8.152431   3.428585     2.38   0.020     1.320827    14.98404
       lngdp |   23.57529   7.292154     3.23   0.002     9.045355    38.10522
         cpi |  -.1390341   .4540365    -0.31   0.760    -1.043722    .7656533
     dforinc |          0  (omitted)
realinterest |   .6383494   .5437896     1.17   0.244    -.4451751    1.721874
       _cons |  -86.88849   43.62878    -1.99   0.050    -173.8207    .0437489
-------------+----------------------------------------------------------------
     sigma_u |  43.343918
     sigma_e |   13.01574
         rho |  .91728475   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(8, 74) = 49.86                     Prob > F = 0.0000

.
. estimates store panelfixed
```

```
. xtreg depth2 chinnito lngdp cpi dforinc realinterest ,re

Random-effects GLS regression                   Number of obs     =         87
Group variable: country                         Number of groups  =          9

R-sq:                                           Obs per group:
     within  = 0.1490                                         min =          3
     between = 0.2686                                         avg =        9.7
     overall = 0.1639                                         max =         11

                                                Wald chi2(5)      =      14.02
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0155

------------------------------------------------------------------------------
      depth2 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    chinnito |   7.643583   3.219922     2.37   0.018     1.332651    13.95451
       lngdp |   16.75338   5.527003     3.03   0.002     5.920656    27.58611
         cpi |  -.1566282   .4536677    -0.35   0.730    -1.045801    .7325442
     dforinc |  -9.665462   30.83853    -0.31   0.754    -70.10787    50.77695
realinterest |   .6430161   .5350043     1.20   0.229     -.405573    1.691605
       _cons |  -43.63006   31.42162    -1.39   0.165    -105.2153    17.95519
-------------+----------------------------------------------------------------
     sigma_u |  37.988205
     sigma_e |   13.01574
         rho |  .89494071   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Hausman test

```
. hausman panelfixed

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |   panelfixed       .          Difference          S.E.
-------------+----------------------------------------------------------------
    chinnito |    8.152431     7.643583        .5088478        1.177834
       lngdp |    23.57529     16.75338        6.821906        4.756863
         cpi |   -.1390341    -.1566282         .017594        .0182954
realinterest |    .6383494     .6430161       -.0046667         .097353
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        3.48
                Prob>chi2 =      0.4816
                (V_b-V_B is not positive definite)


. regress depth2 chinnito lngdp cpi dforinc realinterest

      Source |       SS           df       MS      Number of obs   =        87
-------------+----------------------------------   F(5, 81)        =      9.00
       Model |  43940.1941         5  8788.03882   Prob > F        =    0.0000
    Residual |   79126.346        81  976.868469   R-squared       =    0.3570
-------------+----------------------------------   Adj R-squared   =    0.3174
       Total |   123066.54        86  1431.00628   Root MSE        =    31.255

------------------------------------------------------------------------------
      depth2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
```

```
    chinnito |    13.7357   3.267912     4.20   0.000     7.233579    20.23782
       lngdp |   6.719365   2.338341     2.87   0.005       2.0668    11.37193
         cpi |   .8642905    .941818     0.92   0.362    -1.009632    2.738213
     dforinc |   9.844775   9.794383     1.01   0.318    -9.642974    29.33252
realinterest |  -.2766298   .7344997    -0.38   0.707    -1.738054    1.184794
       _cons |   7.846248   15.68912     0.50   0.618    -23.37019    39.06268
------------------------------------------------------------------------------

. vif

    Variable |       VIF       1/VIF
-------------+----------------------
     dforinc |      2.01    0.497157
       lngdp |      1.82    0.550150
    chinnito |      1.45    0.691977
         cpi |      1.40    0.713990
realinterest |      1.38    0.722983
-------------+----------------------
    Mean VIF |      1.61

.
```

```
. xtreg depth2 chinnito lngdp cpi dforinc realinterest ,fe
note: dforinc omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =        87
Group variable: country                         Number of groups   =         9

R-sq:                                           Obs per group:
     within  = 0.1555                                         min =         3
     between = 0.2663                                         avg =       9.7
     overall = 0.1626                                         max =        11

                                                F(4,74)            =      3.41
corr(u_i, Xb)  = -0.6675                        Prob > F           =    0.0130

------------------------------------------------------------------------------
      depth2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    chinnito |   8.152431   3.428585     2.38   0.020     1.320827    14.98404
       lngdp |   23.57529   7.292154     3.23   0.002     9.045355    38.10522
         cpi |  -.1390341   .4540365    -0.31   0.760    -1.043722    .7656533
     dforinc |          0  (omitted)
realinterest |   .6383494   .5437896     1.17   0.244    -.4451751    1.721874
       _cons |  -86.88849   43.62878    -1.99   0.050    -173.8207    .0437489
-------------+----------------------------------------------------------------
     sigma_u |  43.343918
     sigma_e |   13.01574
         rho |  .91728475   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(8, 74) = 49.86                     Prob > F = 0.0000

. xtserial depth2 chinnito lngdp cpi dforinc realinterest
```

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,       7) =    120.662
           Prob > F =      0.0000
.
. xtreg depth2 chinnito lngdp cpi dforinc realinterest ,fe
note: dforinc omitted because of collinearity

Fixed-effects (within) regression               Number of obs     =         87
Group variable: country                         Number of groups  =          9

R-sq:                                           Obs per group:
     within  = 0.1555                                         min =          3
     between = 0.2663                                         avg =        9.7
     overall = 0.1626                                         max =         11

                                                F(4,74)           =       3.41
corr(u_i, Xb)  = -0.6675                        Prob > F          =     0.0130

------------------------------------------------------------------------------
      depth2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    chinnito |   8.152431   3.428585     2.38   0.020     1.320827    14.98404
       lngdp |   23.57529   7.292154     3.23   0.002     9.045355    38.10522
         cpi |  -.1390341   .4540365    -0.31   0.760    -1.043722    .7656533
     dforinc |          0  (omitted)
realinterest |   .6383494   .5437896     1.17   0.244    -.4451751    1.721874
       _cons |  -86.88849   43.62878    -1.99   0.050    -173.8207    .0437489
-------------+----------------------------------------------------------------
     sigma_u |  43.343918
     sigma_e |   13.01574
         rho |  .91728475   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(8, 74) = 49.86                     Prob > F = 0.000
```

```
. xttest3

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

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

chi2 (9)  =     2691.27
Prob>chi2 =      0.0000
```

```
.
. pwcorr depth2 lngdp cpi dforinc chinnito realinterest, sig star(5)
```

	depth2	lngdp	cpi	dforinc	chinnito	realin~t
depth2	1.0000					
lngdp	0.3192*	1.0000				
	0.0026					
cpi	-0.0329	-0.3109*	1.0000			
	0.7620	0.0018				
dforinc	0.3673*	0.5395*	-0.4044*	1.0000		
	0.0005	0.0000	0.0000			
chinnito	0.4250*	-0.0486	-0.1816	0.2821*	1.0000	
	0.0000	0.6343	0.0735	0.0049		
realinterest	-0.3067*	-0.1573	-0.2907*	-0.1061	-0.2567*	1.0000
	0.0039	0.1219	0.0037	0.2985	0.0107	