The Impact of Interest Rate Spread and Money Supply (M2) on Economic Growth – A Study in 40 Selected Nations

Quy T. Vo[1,2,*], Mai. H. T. Tran[1,2]

[1]International University, Ho Chi Minh City, Vietnam

[2]Vietnam National University, Ho Chi Minh City, Vietnam

[*]Corresponding author

ABSTRACT

The goal of this research study is to look at how the Interest Rate Spread and Money Supply (M2) affect Economic Growth in different countries. We evaluate the literature on conducting research to investigate the impact of independent variables and control variables on economic growth. The research spans 40 countries from 2001 to 2021 and is divided into three groups: Developed Countries, Developing Countries, and Emerging Countries. The findings confirmed that the Interest Rate Spread and Money Supply (M2) have a positive impact on Economic Growth. These results imply that expantaionary mometery policy supports economic growth. The positive relationship between interest rate spread and economic growth confirmed the the importance of the banking sector in the economy.

Keywords: Interest Rate Spread, Money Supply (M2), Economic Growth

INTRODUCTION

Most central banks have used monetary policy as a tool to support economic growth. Changing the money supply will affect the inflation rate and then interest rates in debts markets, both borrowing and lending rates, and finally cause prices to change. Therefore, changes in the money supply can affect the production of goods and services level in the economy. This is why monetary policy is a meaningful policy tool for achieving both inflation and growth objectives. The global economy has been experiencing the hard time: Russia's invasion of Ukraine, inlation rate increasing in most economies and reaching the highest level for the decade. The central banks have applied an appropriate monetary policy to control inflation rate and gain expected economic growth rate. The situation motivated us to conduct the study to investigate the impact of money supply and interest rate spread on economic growth. The next section of the paper will be literature review, hypothesis development and research model, data processing, research findings and discussion and conclusion.

The neoclassical growth framework, and monetarist theory are theoretical frameworks providing insights into the connection between IRS, M2, and economic growth. However, there is still ambiguous agreement of the relationship between IRS, money supply (M2), and economic growth in previous studies. Obeng & Sakyi (2017) confirmed significantly impact of macroeconomic factors on IRS in the long run in Ghana. On other side, IRS impacts economic growth significantly and negatively both in the short and long term, according to Daniel, et al. (2022). Regarding the relationship between money supply (M2) and economic growth, according to Nyorekwa et. al., (2018), emerging nations with undeveloped financial systems have limited connectivity to the global market likely to have a weaker link between monetary policy and economic growth. However, Manouchehr & Ahmad (2011) confirmed a substantial correlation between M2

and gross domestic product in Iran. Most studies on the same research issue conducted in single economy, therefore the correlation between IRS, M2, and economic growth across various economies should be further investigated. This study tries to fill the gap by conducting the study with 40 countries in different groups of economies: emerging market economies, developing countries, and developed countries to provide meaningful empirical evidence to get insights of the relaionship.

LITERATURE REVIEW

The difference between lending rates and deposit rates of financial institutions is known as an interest rate spread. Monetarist theory introduced by Friedman (1968) highlights the importance of money supply as an important macroeconomic factor affecting the economic growth of a country. Monetarist theory states that changes in money supply have the greatest effect on both the pattern of the business cycle and the growth rate of the economy (Kenton, 2021).

Interest Rate Spread and economic growth

IRS is usually used as a measure of bank efficiency (Mohamed, Jalloh, & Yao, 2017). A considerable disparity between loan and deposit rates reflects a weak and ineffective financial sector that might limit economic growth and promote instability according to Cochrane (2013), High IRS, on the other hand, is one of the key drivers of delayed economic growth in developing economies (Leimbach, 2015).

Money Supply (M2) and economic growth

Chaitip et. al., (2015) employed the Pooled Mean Group Estimator (PMGE) to investigate the link between money supply and economic development in ASEAN Economic Cooperation (AEC) countries between 1995 and 2013. Their findings revealed that the money supply support economic growth. Inam (2017) investigated the impact of monetary policy on Nigeria's economic development from 1970 to 2012 by using the Ordinary Least Squares (OLS) approach and the Granger Causality test. The analysis showed a statistically negligible positive correlation between the money supply and economic growth. Aslam (2016) investigated the influence of the money supply on the Sri Lankan economy from 1959 to 2013. The findings revealed a considerable positive effect of the money supply on economic growth at a 1% level of significance.

Hypothesis development and research model

Based on the theories and empirical evidence presented above, we propose the following research hypotheses:

H1: Interest rate spread has a positive influence on economic growth in the selected countries.

H2: Money supply (M2) has a positive influence on economic growth in the selected countries.

To test above research hypotheses, we proposed the research model as below:

$$GDP_{i,t} = \alpha_i + \beta_1 IRS_{i,t} + \beta_2 M2_{i,t} + \beta_3 SAV_{i,t} + \beta_4 INF_{i,t} + \beta_5 EXPT_{i,t} + \beta_6 FDI_{i,t} + \varepsilon_{i,t}$$

α_i: The regression intercept.

β_i: The regression slopes.

$\varepsilon_{i,t}$: The random error of the listed country i at the end of quarter t

---

Table 1 – Variables description

	VARIABLES	SYMBOL
	DEPENDENT VARIABLE	
1	$GDP_{i,t}$ means the growth rate of Gross Domestic Product amount of the listed country i at the end of quarter t	$GDP_{i,t}$
	INDEPENDENT VARIABLES	
2	$IRS_{i,t}$ means the interest rate spread amount of the listed country i at the end of quarter t	$IRS_{i,t}$
3	$M2_{i,t}$ means the growth rate of Money Supply amount of the listed country i at the end of quarter t	$M2_{i,t}$
	CONTROL VARIABLES	
4	$SAV_{i,t}$ means the gross domestic savings as a share of GDP amount of the listed country i at the end of quarter t	$SAV_{i,t}$
5	$INF_{i,t}$ means the inflation rate amount of the listed country i at the end of quarter t	$INF_{i,t}$
6	$EXPT_{i,t}$ means the total exports of goods and services as a share of GDP amount of the listed country i at the end of quarter t	$EXPT_{i,t}$
7	$FDI_{i,t}$ means the foreign direct investment as a share of the GDP amount of the listed country i at the end of quarter t	$FDI_{i,t}$

Data processing

Data is yearly data point collected from 2001 to 2021. The research sample consists of 40 countries listing in Appendix 1 with 840 observations. The Generalized Least Squares (GLS) regression model was used to test research hypotheses. Table 2 presents statistical despription of all variables in the research model. Table 3 shows the result of the autocorrelation test.

Statistical description

Table 2 – Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
GDP	3.26	3.94	(21.4)	15.33
IRS	7.01	6.24	(0.68)	45.11
M2	0.14	0.73	(0.57)	14.62
SAV	19.70	1.73	(21.19)	57.06
INF	5.44	8.92	(11.16)	150
EXP	35.33	21.7	6.47	115.37
FDI	3.90	6.63	(40.08)	106.6

Correlation testing

Table 3 shows the correlation coefficient between variables in the research model. The test confirmed that the autocorrelation phenominon does not exist in the data set because all the correlation coefficient values are lower than 0.4.

Table 3 – Correlation matrix

	GDP	IRS	M2	SAV	INF	EXP	FDI
GDP	1						
IRS	0.0309	1					
M2	0.0501	0.0413	1				
SAV	0.1534	-0.1381	-0.0211	1			
INF	-0.0393	0.1036	0.0009	-0.1282	1		
EXP	0.0269	-0.1827	0.0791	0.2937	-0.0045	1	
FDI	0.0332	-0.0315	0.0168	-0.0726	0.0193	0.3208	1

Multicollinearity test with Variance Inflation Factor (VIF)

To get the effective regression coefficient, a multicollinearity test was conducted and resulted in VIF value lower than 3. The Multicollinearity Test results indicate a mean Variance Inflation Factor (VIF) of 1.12. This suggests that there is a moderate level of correlation among the independent variables in the regression model. While a VIF between 1 and 5 suggests some degree of multicollinearity, it is not severe enough to warrant immediate corrective measures. The relatively low VIF value indicates that the independent variables in the model are not highly correlated with each other. This is a positive finding as it ensures that the variables provide unique and independent information to the regression analysis. The absence of severe multicollinearity enhances the reliability of the estimated coefficients and allows for more accurate interpretation and inference.

Table 4 – VIF test for multicollinearity

Variable	VIF	1/VIF
EXP	1.3	0.770330
SAV	1.16	0.861130
FDI	1.15	0.866173
IRS	1.06	0.947459
INF	1.03	0.973606
M2	1.01	0.988354
Mean VIF	1.12	

RESEARCH FINDINGS

Table 5 presents the result of hypothesis testing by applying GLS (Generalized Least Squares) regression model. The GLS regression model provides reliable coefficient estimates with statistically significant relationships between the GDP growth rate and the independent variables with p-values lower than 0.05. The results confirmed that H1 and H2 are accepted. In other words, interest rate spread and money supply are explaining factors of the GDP growth rate.

Table 5 – The testing result for the hypothesis

GDP	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
IRS	0.0335039	0.006985	4.8	0.000	0.0198137	0.0471942
M2	0.3041052	0.0244833	12.42	0.000	0.2561188	0.3520916
SAV	0.0609564	0.0034468	17.68	0.000	0.0541907	0.0677018
INF	-0.0089334	0.0031387	-2.85	0.004	-0.0150852	-0.0027816
EXP	-0.0059354	0.0019309	-3.07	0.002	-0.0097199	-0.0021508
FDI	0.025167	0.0057106	4.43	0.000	0.0141241	0.0365093
_cons	1.863495	0.1620476	11.50	0.000	1.545888	2.181103

In addition, the coefficient estimates for the GDP growth rate variable with IRS, M2 growth rate, gross domestic savings, and foreign direct investment variables have t-statistics greater than 1.96 providing empirical evidence of a significant relationship between these variables in the research model. The coefficient estimate for the GDP growth rate and inflation rate variable has a t-statistic below 1.96 suggesting that the relationship is not statistically significant.

CONCLUSIONS AND RECOMMENDATIONS

This study conducted aims to investigate the impact of interest rate spread and money supply (M2) on economic growth across various countries. By utilizing the GLS regression model, valuable insights into the associations between these variables were gained. The analysis of the data revealed a statistically significant relationship between the IRS, money supply (M2), and economic growth in the selected 40 countries. These findings further validate the substantial influence of interest rate spread and money supply (M2) on economic growth across different countries, providing empirical evidence of their important role in driving economic growth dynamics. The study's findings imply that the central banks may use IRS and M2 as tools to gain expected economic growth rate.

In conclusion, this study provided empirical evidence of the impact of interest rate spread and money supply (M2) on economic growth in various countries. The findings substantiate the importance of these factors in shaping economic performance. The indings also provide recommendations to policymakers, investors, and financial analysts in making well-informed decisions That Foster Sustainable Economic Growth And Stability./.

REFERENCES

1. Aslam, A. L. (2016, 03). Impact of Money Supply on Sri Lankan Economy: An Econometric Analysis. International Letters of Social and Humanistic Sciences, 67, 11-17. doi:10.18052/www.scipress.com/ILSHS.67.11
2. Chaitip, P., Chokethaworn, K., Chaiboonsri, C., & Khounkhalax, M. (2015, 12). Money Supply Influencing on Economic Growth-wide Phenomena of AEC Open Region. Procedia Economics and Finance, 24, 108-115. doi:10.1016/S2212-5671(15)00626-7
3. Cochrane, J. H. (2013, 05). Finance: Function Matters, Not Size. Journal of Economic Perspectives, 27, 29-50. doi:https://www.aeaweb.org/articles?id=10.1257/jep.27.2.29
4. Daniel, B., Paul, H., & Edmond, A. (2022). The Effect Of Interest Rate Spread On Economic Growth: Ghana's Perspective. International Journal of Business and Management Review, 1-23.
5. Friedman, M. (1968). The Role of Monetary Policy. The American Economic Review, 58, 1-17.
6. Inam, U. S. (2017). Monetary Policy And Economic Growth In Nigeria: Evidence From Nigeria. Advances in Social Sciences Research Journal. doi:https://doi.org/10.14738/assrj.46.2806

7. Kenton, W. (2021, 03 21). Monetarist Theory: Economic Theory of Money Supply. From Investopedia: https://www.investopedia.com/terms/m/monetaristtheory.asp

8. Leimbach, M. a. (2015, 03). Future growth patterns of world regions – A GDP scenario approach. Global Environmental Change, 42. doi:10.1016/j.gloenvcha.2015.02.005

9. Manouchehr, N., & Ahmad, J. S. (2011). The Impact of Monetary Policy on Economic Growth in Iran. Middle-East Journal of Scientific Research, 740-743.

10. Mohamed, Jalloh, & Yao, G. (2017, 01). Financial Deepening, Interest Rate Spread and Economic Growth: New Evidence from Sub-Sahara Africa. International Journal of Business, Economics and Management, 4, 52-64. doi:10.18488/journal.62.2017.43.52.64

11. Nyorekwa, T., Enock, Odhiambo, & Nicholas. (2018, 05). Monetary Policy and Economic Growth: A Review of International Literature. Journal of Central Banking Theory and Practice, 7, 123-237. doi:10.2478/jcbtp-2018-0015

12. Obeng, S., & Sakyi, D. (2017, 03). Macroeconomic Determinants of Interest Rate Spreads in Ghana. African Journal of Economic and Management Studies, 8, 76-88. doi:10.1108/AJEMS-12-2015-0143

APPENDIX

Appendix 1 – List Of Countries

No.	Name	Region	Income Group	Note
DEVELOPED COUNTRIES				
1	United States	North America	High income	The list is based on the G7. The G7 is an informal grouping of seven of the world's advanced economies, including Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States, as well as the European Union.
2	France	Europe & Central Asia	High income	
3	Germany	Europe & Central Asia	High income	
4	Italy	Europe & Central Asia	High income	
5	Japan	East Asia & Pacific	High income	
6	United Kingdom	Europe & Central Asia	High income	
7	Canada	North America	High income	
EMERGING COUNTRIES				
8	Brazil	Latin America & Caribbean	Upper middle income	
9	Chile	Latin America & Caribbean	High income	
10	China	East Asia & Pacific	Upper middle income	
11	Colombia	Latin America & Caribbean	Upper middle income	
12	Czechia	Europe & Central Asia	High income	
13	Egypt, Arab Rep.	Middle East & North Africa	Lower middle income	

14	Hungary	Europe & Central Asia	High income
15	Indonesia	East Asia & Pacific	Lower middle income
16	Korea, Rep.	East Asia & Pacific	High income
17	Malaysia	East Asia & Pacific	Upper middle income
18	Mexico	Latin America & Caribbean	Upper middle income
19	Peru	Latin America & Caribbean	Upper middle income
20	Philippines	East Asia & Pacific	Lower middle income
21	South Africa	Sub-Saharan Africa	Upper middle income

DEVELOPING COUNTRIES

22	Albania	Europe & Central Asia	Upper middle income
23	Algeria	Middle East & North Africa	Lower middle income
24	Antigua and Barbuda	Latin America & Caribbean	High income
25	Armenia	Europe & Central Asia	Upper middle income
26	Dominican Republic	Latin America & Caribbean	Upper middle income
27	Eswatini	Sub-Saharan Africa	Lower middle income

28	Guatemala	Latin America& Caribbean	Upper middle income
29	Jamaica	Latin America & Caribbean	Upper middle income
30	Jordan	Middle East & North Africa	Upper middle income
31	Kenya	Sub-Saharan Africa	Lower middle income
32	Nigeria	Sub-Saharan Africa	Lower middle income
33	Paraguay	Latin America & Caribbean	Upper middle income
34	Seychelles	Sub-Saharan Africa	High income
35	Ukraine	Europe & Central Asia	Lower middle income
36	Vietnam	East Asia & Pacific	Lower middle income
37	Gambia	Sub-Saharan Africa	Low income
38	Uganda	Sub-Saharan Africa	Low income
39	Pakistan	South Asia	Lower middle income
40	Lebanon	Middle East & North Africa	Lower middle income

Appendix 2 – Stationarity Test of GDP Growth Rate Variable

Levin-Lin-Chu unit-root test for GDP

_____

Ho: Panels contain unit roots	Number of panels = 40
Ha: Panels are stationary	Number of periods = 21
AR parameter: Common	Asymptotics: N/T -> 0

Panel means: Included

Time trend: Not included

ADF regressions: 1 lag

LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)

_____

	Statistic	p-value

_____

Unadjusted t	-15.5172	
Adjusted t*	-3.9807	**0.0000**

_____

Appendix 3 – Stationarity Test of Interest Rate Spread Variable

Levin-Lin-Chu unit-root test for IRS

_____

Ho: Panels contain unit roots	Number of panels = 40
Ha: Panels are stationary	Number of periods = 21
AR parameter: Common	Asymptotics: N/T -> 0

Panel means: Included

Time trend: Not included

ADF regressions: 1 lag

LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)

_____

	Statistic	p-value

_____

Unadjusted t	-12.1698	
Adjusted t*	-4.9932	**0.0000**

_____

Appendix 4- Stationarity Test of M2 (Money Supply) Growth Rate Variable

Levin-Lin-Chu unit-root test for M2

_____

Ho: Panels contain unit roots   Number of panels =   40

Ha: Panels are stationary   Number of periods =   21

AR parameter: Common   Asymptotics: N/T -> 0

Panel means: Included

Time trend: Not included

ADF regressions: 1 lag

LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)

_____

	Statistic	p-value

_____

Unadjusted t	-18.0416	
Adjusted t*	1.5356	**0.9377**

_____

Appendix 5 – Stationarity Test of Gross Domestic Savings Variable

Levin-Lin-Chu unit-root test for SAV

_____

Ho: Panels contain unit roots   Number of panels =   40

Ha: Panels are stationary   Number of periods =   21

AR parameter: Common   Asymptotics: N/T -> 0

Panel means: Included

Time trend: Not included

ADF regressions: 1 lag

LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)

_____

	Statistic	p-value

_____

| Unadjusted t | -10.6618 | |
| Adjusted t* | -2.9478 | **0.0016** |

_____

Appendix 6 – Stationarity Test of Inflation Rate Variable

Levin-Lin-Chu unit-root test for INF

_____

Ho: Panels contain unit roots	Number of panels = 40
Ha: Panels are stationary	Number of periods = 21

AR parameter: Common   Asymptotics: N/T -> 0

Panel means: Included

Time trend: Not included

ADF regressions: 1 lag

LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)

_____

	Statistic	p-value

_____

| Unadjusted t | -14.8588 | |
| Adjusted t* | -4.2883 | **0.0000** |

_____

Appendix 7 – Stationarity Test of Total Exports Variable

Levin-Lin-Chu unit-root test for EXP

_____

Ho: Panels contain unit roots   Number of panels =   40

Ha: Panels are stationary   Number of periods =   21

AR parameter: Common   Asymptotics: N/T -> 0

Panel means: Included

Time trend: Not included

ADF regressions: 1 lag

LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)

_____

            Statistic   p-value

_____

 Unadjusted t   -8.3767

 Adjusted t*   -2.7073   **0.0034**

_____

Appendix 8 – Stationarity Test of Foreign Direct Investment Variable

Levin-Lin-Chu unit-root test for FDI

_____

Ho: Panels contain unit roots   Number of panels =   40

Ha: Panels are stationary   Number of periods =   21

AR parameter: Common   Asymptotics: N/T -> 0

Panel means: Included

Time trend: Not included

ADF regressions: 1 lag

LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)

Statistic   p-value

Unadjusted t   -15.3111

Adjusted t*   -7.1352   **0.0000**

Appendix 9 – Pooled OLS Regression Model

Source	SS	df	MS			
Number of obs =				840		

Source	SS	df	MS	Number of obs = 840
Model	427.19149	6	71.1985817	F(6, 833) = 4.71
				Prob > F = 0.0001
Residual	12604.7411	833	15.131742	R-squared = 0.0328
				Adj R-squared = 0.0258
Total	13031.9325	839	15.5326967	Root MSE = 3.89

GDP	Coef.	Std. Err.	t	P>|t|	Beta
IRS	.0315285	.0220843	1.43	0.154	.0499782
M2	.2878275	.1836052	1.57	0.117	.0537318
SAV	.0584744	.0123408	4.74	0.000	.1739913
INF	-.0104223	.0152648	-0.68	0.495	-.0235788
EXP	-.006975	.0070504	-0.99	0.323	-.0384087
FDI	.0352121	.0217631	1.62	0.106	.059239
_cons	2.015293	.3840908	5.25	0.000	.

Appendix 10 – Heteroscedasticity Test for Pooled OLS Regression Model

White's test for **Ho: homoskedasticity**

---

against Ha: unrestricted heteroskedasticity

chi2(27)   =   101.43

Prob > chi2 =   0.0000

Cameron & Trivedi's decomposition of IM-test

_____

Source	chi2	df	p
Heteroskedasticity	101.43	27	0.0000
Skewness	40.14	6	0.0000
Kurtosis	6.81	1	0.0090
Total	148.38	34	0.0000

_____

Appendix 11 – FEM Regression Model

Fixed-effects (within) regression	Number of obs = 840
Group variable: country1	Number of groups = 40

R-sq: within = 0.0862   Obs per group: min = 21

   between = 0.0075   avg = 21.0

   overall = 0.0204   max = 21

                F(6,794)   =   12.49

corr(u_i, Xb) = -0.7023   Prob > F   =   0.0000

_____

GDP	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
IRS	.148236	.050407	2.94	0.003	.0492892	.2471828
M2	.1308447	.1658913	0.79	0.431	-.1947926	.456482

SAV	.1503282	.0320581	4.69	0.000	.0873994	.2132569
INF	-.0439006	.0147292	-2.98	0.003	-.0728133	-.0149878
EXP	.0570777	.0176556	3.23	0.001	.0224205	.0917349
FDI	.0341773	.021153	1.62	0.107	-.0073452	.0756998
_cons	-2.667113	.7882859	-3.38	0.001	-4.214483	-1.119742

—————-+———————————————————————

Appendix 12 – REM Regression Model

Random-effects GLS regression   Number of obs   =   840

Group variable: country1   Number of groups   =   40

R-sq: within = 0.0794   Obs per group: min =   21

    between = 0.0122   avg =   21.0

    overall = 0.0260   max =   21

                         Wald chi2(6)   =   45.46

corr(u_i, X)   = 0 (assumed)   Prob > chi2   =   0.0000

———————————————————————————————————

GDP	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	

—————-+———————————————————————

IRS	.0991902	.0354093	2.80	0.005	.0297893	.1685911
M2	.1713046	.1682697	1.02	0.309	-.1584979	.5011071
SAV	.0909694	.0206885	4.40	0.000	.0504207	.1315181
INF	-.0354344	.0147232	-2.41	0.016	-.0642913	-.0065775
EXP	.0165845	.0114161	1.45	0.146	-.0057905	.0389596
FDI	.0340258	.0211225	1.61	0.107	-.0073735	.0754252
_cons	.2256012	.6265673	0.36	0.719	-1.002448	1.45365

—————-+———————————————————————

Appendix 13 – The Hausman Test

—- Coefficients —-

| | (b) | (B) | (b-B) | sqrt(diag(V_b-V_B)) |
	re	fe	Difference	S.E.
IRS	.0991902	.148236	-.0490458	.
M2	.1713046	.1308447	.0404599	.0281915
SAV	.0909694	.1503282	-.0593588	.
INF	-.0354344	-.0439006	.0084661	.
EXP	.0165845	.0570777	-.0404932	.
FDI	.0340258	.0341773	-.0001514	.

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Appendix 14 – The Autocorrelation Test

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 39) = 0.599

Prob > F = 0.4438

Appendix 15 – The Heteroscedasticity Test For FEM Regression Model

Modified Wald test for groupwise heteroskedasticity

in fixed effect regression model

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

chi2 (40) = 842.41

Prob>chi2 = **0.000**