



# **THE IMPACT OF FINANCIAL SECTOR ON ECONOMIC GROWTH ESTIMATED USING ARDL MODEL: A CASE OF MONGOLIA**

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## **Abstract**

*The financial sector plays an important role on real economic growth and development by establishing financial assets, allocating them effectively to the market, and placing them on the right investment. The financial sector is the main channel for capital allocation and a fragile structure that exists in trust. The stability of the financial sector is largely dependent on market expectations. The purpose of this study is to determine the impact of the financial sector on economic growth in Mongolia through the ARDL model (Auto Regressive Distributed Lag*

*Models). Financial depth in the financial sector is not well-developed, negatively affecting the real economies of these countries. Some researchers believe that financial sector growth in developing world is one of the reasons for the financial crisis. Therefore, we use real GDP, real interest rate, real exchange rate, inflation rate, M2 money ratio GDP (financial deepening), share of GDP, share of investment, total capital expenditure share of investment expenditure, variable parameters. In doing so, we look at the impact of our economic growth on these factors and evaluate the real results. As a result of the survey, financial deepening may have a negative impact on the economy in the short run, but it has a long-term positive impact.*

*Keywords: ARDL model, GDP, Real interest, Real exchange rate*

## **INTRODUCTION**

Economic growth is characterized by the interaction of multiple macro-economic variables. When the economy grows, the income of the population should increase. Therefore, economic growth depends on the gross domestic product or service that the country produces, or GDP. Economic growth is the result of a year-on-year growth in economic sectors such as agriculture, industry, mining, finance, public administration and international trade (Upreti, 2015).

Economic growth differs from country to region, disparities in economic development, and level of economic impact on each sector. In some countries, the service sector is an influential sector of economic growth. For Southeast Asian countries, the manufacturing sector has been the driving force behind the economy (Ghani & O'Connell, 2014; UNIDO, 2015).

In developed countries, the financial system has a very complex structure. It is an important indicator of how well the economy is doing (Bist, 2018; Schinasi, 2004). In late-2015, Asian economies and China's economic downturn were caused by financial markets (Cashin & Raissi, 2017).

In addition, the global economic crisis following the fall of the US housing sector in 2008 was due to the financial sector crisis. In the developing world, the financial sector has an important impact on economic growth.

Theoretically, the financial sector plays a crucial role in promoting economic growth and development. Although empirical studies show that this is a complex measure of financial sector performance and development. Assessing the financial sector depends on many indicators. The World Bank has developed "4x2" methodology to measure the financial sector (Myagmarsaren, S, 2014). An important measure of the financial deepening of this methodology is the ratio of money supply and GDP. Therefore, the steady growth of money supply and the growth of credit

in the economy are one of the best ways to support growth in the financial sector as well as economic and production growth.

## METHODOLOGY

A number of interpreter variants were selected for this study and used data time series (1st quarter of 2010 to fourth quarter of 2018). Due to the financial crisis in 2008-2009, macroeconomic indicators of our country have been affected by unexpected shocks and distorting interdependence. So we chose data from the 2010. In some cases, Mongolia's economic restructuring and the peculiarities of the financial system have no steady relationship between GDP and other indicators.

Total monetary, annual inflation, MNT, foreign currency loan interest rate and real effective exchange rate index were taken from monthly statistics from the Bank of Mongolia. Real GDP, total capital accumulation, investment and total budget expenditure were used from the National Statistics Committee's data. Equation of economic growth is as follows: The description of the variables used in the model is given in Table 1.

$$LY_t = \alpha_0 + \beta_1 M2Y_t + \beta_2 RIR_t + \beta_3 INF_t + \beta_4 CGA_t + \beta_5 REER_t + \beta_6 INV_t + \beta_7 RF_t + e_t \quad (1)$$

Due to seasonal fluctuations in our data, season adjustments were made using the Gensus X12-ARIMA method, using Fisher's identification when calculating the real interest rate. Examined the Granger Causality Tests to determine whether the interrelationships of the indicators used in the economic growth equation. Sustainability was tested by the unit of ADF (Augmented Dickey-Fuller test). In the case of a linear regression model, ARDL (Auto Regressive Distributed Lag Models) method was used for the Eviews 10.0 program.

Table 1 Factors of model

Variables	Explanation	Expected Relationship
<b>Dependent variable</b>		
Y	The value of logarithm from real GDP calculated at comparative prices in 2010	
<b>Independent variable</b>		
RIR	Nominal quarterly loan rate - seasonal inflation	+/-
REER	The value derived from a real effective exchange rate indicator	-
INF	Annual inflation (country)	
M2Y	M2 ratio of money to GDP (financial depth)	+/-
INV	Percentage of investment in GDP	+
CGA	Percentage of total capital expenditure on investment	+
RF	A fraudulent variable with the structural change in the financial sector	+/-

The source: NSO, Statistical Bulletin of Mongolbank

## EMPIRICAL RESULTS

The research section aims to explain the impact of the financial sector on economic growth using the econometric evaluation methods. Granger tests that variables change are one of the causes. The sustainability is measured by the unit test and the results are shown below.

Table 2 Results of the Granger causal test

<b>Probability of the null hypothesis that is not the cause.</b>				
<b>Delay mean: 1-4</b>	<b>Delay 1</b>	<b>Delay 2</b>	<b>Delay 3</b>	<b>Delay 4</b>
(RIR)is not a cause of (Y)	0.81	0.04*	0.09*	0.76
(INF) is not a cause of (Y)	0.22	0.39	0.73	0.41
(REER)is not a cause of (Y)	0.25	0.64	0.16	0.01*
(M2Y)is not a cause of (Y)	0.00*	0.00*	0.00*	0.10*
(CGA)is not a cause of (Y)	0.00*	0.00*	0.00*	0.00*
(INV)is not a cause of (Y)	0.09*	0.13	0.09*	0.48
(RF)is not a cause of (Y)	0.57	0.89	0.90	0.01*

Note: The (\*) mark indicates that the null hypothesis disapproves of the 10% significance of the argument between the variables.

According to the Granger's test results, all the variables, except for inflation, are the reason for the economic growth (Y) with a 1-4-time delay.

Table 3 The result of the ADF test of the unit of the variable

Variables	Insanity value	Form of equation		Uncategorized data		Integration
		There is no fixed quantitative and trend value	Fixed quantity	It has a fixed number and trend	The probability of a zero prediction that the unit root of the ADF test is true	
Y	2		+		0.0105*	I(0)
D(INF)	0		+		0.0001*	I(1)
RIR	1		+		0.0000*	I(0)
D(REER)	0		+		0.0000*	I(1)
M2Y	1		+		0.0071*	I(0)
D(INV)	1		+		0.0000*	I(1)
CGA	1		+		0.0000*	I(0)
RF	2		+		0.0054*	I(0)

Note: The (\*) mark indicates that the unspecified serial equilibrium or non-steady rejection of the zero assumption is rejected at the 5% significance level. However, I (0) is stable at the given level, I (1) is the same as the order level 1, and (+) is the form of the equation used in the test.

As a result of the unitary test, the variables used in the economic growth equation are stable at the significance level of 5% (by some variables by rank order 1), which can be assessed using the ARDL model.

Table 4 Correlation matrix of variables

	<b>Y</b>	<b>RIR</b>	<b>REER</b>	<b>INF</b>	<b>M2Y</b>	<b>CGA</b>	<b>INV</b>	<b>RF</b>
<b>Y</b>	1.00	0.26	-0.22	-0.30	0.04	0.38	-0.07	-0.20
<b>RIR</b>	0.26	1.00	0.14	-0.28	-0.33	0.08	-0.12	0.14
<b>REER</b>	-0.22	0.14	1.00	0.31	-0.45	0.17	0.13	-0.25
<b>INF</b>	-0.30	-0.28	0.31	1.00	-0.30	0.23	0.56	-0.37
<b>M2Y</b>	0.04	-0.33	-0.45	-0.30	1.00	-0.34	-0.27	0.20
<b>CGA</b>	0.38	0.08	0.17	0.23	-0.34	1.00	0.35	-0.29
<b>INV</b>	-0.07	-0.12	0.13	0.56	-0.27	0.35	1.00	-0.32
<b>RF</b>	-0.20	0.14	-0.25	-0.37	0.20	-0.29	-0.32	1.00

As shown in Table 4, the real interest rate (RIR), the financial depth (M2Y) and the total capital expenditures (CGA) of investment expenditures are positively correlated with economic growth (Y). The real exchange rate (REER), inflation (INF), investment in GDP (INV), and financial sector restructuring (RF) are negatively associated with economic growth. The result of the corollary matrix is consistent with the expected forecast of the economic growth (Y) with the expected predictor variables (positive and negative with economic growth).

Table 5 Result of Bound test

Test statistics	Critical value of Bound test		
Calculated F-statistical value	Critic value	I(0)	I(1)
	10%	2.03	3.13
5.7996887*	5%	2.32	3.5
	1%	2.96	4.26

Note: (\*) indicates the significance level of 10%.

As a result of the Bound test, the estimated value of F-statistic is greater than the critical value of I (0) and I (1) at the 10% significance level. It reflects long and short-term relationship between economic growth and its explanatory variables.

Bound test results have been shown to have long-term dependence, as ARDL has been designed to evaluate the Schwarz Criterion based on the results shown in Table 6.

Table 6 Results of long term evaluation of ARDL (2, 2, 2, 1, 0, 0, 0, 0)

<b>An Economic Growth (y) is an explanatory variable</b>	<b>Coefficient</b>	<b>Standard error</b>	<b>T-statistics</b>	<b>Probability Value*</b>
Y(-1)	0.246103	0.171896	1.431704	0.1715
Y(-2)	0.558036***	0.161264	3.460386	0.0032
M2Y	0.016744	0.011461	1.460977	0.1634
M2Y(-1)	0.015631	0.012072	1.29483	0.2138
M2Y(-2)	0.027826**	0.011099	2.507011	0.0233
RIR	0.088616	0.127849	0.693127	0.4982
RIR(-1)	0.431158***	0.116201	3.710445	0.0019
RIR(-2)	0.256258**	0.109374	2.342947	0.0324
D(INF)	0.016267	0.091096	0.178569	0.8605
D(INF(-1))	0.212565**	0.100249	2.120375	0.05
CGA	0.002024	0.059364	0.034096	0.9732
D(REER)	0.053657	0.099461	0.539472	0.597
D(INV)	0.025723	0.021852	1.177188	0.2563
RF	-0.019971***	0.004751	-4.203763	0.0007
C	0.551499***	0.11096	4.970267	0.0001
<b>Diagnostic Tests</b>			LM Test	
Test statistics			of probability	
Serial correlation		F-statistic	0.6897	
Ramsey reset test		F-statistic	0.6253	
Normality			0.1491	
Heteroscedasticity		F-statistic	0.7573	

Note: (\*\*\*), (\*\*), (\*) indicates that the rejection of zero assumptions that is not influenced by the model at the significance level of 1%, 5%, and 10%.

The value of the regression equation parameters shows that the increase in real interest rate (RIR) and inflation (INF) and the increase in financial depth (M2Y) have a major impact on growth over the 1st and 2nd seasons due to economic growth (Y). In other words, there is a long-term positive relationship between Mongolia's economic growth (Y) and financial depth (M2Y). On the one hand, Mongolia accounts for about 95 percent of the financial sector in Mongolia. The development of the banking sector has a positive impact on economic growth by creating M2 money growth by encouraging investment.

Real interest rate (RIR) and economic growth (Y) are positively correlated over the long term. The real interest rate has a positive impact on economic growth by encouraging total demand as it enables the financial intermediaries to attract investment opportunities.

Inflation (INF) may increase as a result of economic growth, but inflationary change can not determine economic growth (Y). There is no unified results yet for the economists. Low and moderate inflation may have a positive impact on economic growth over the long run.

RF restructuring determinant of financial development is negatively associated with economic growth (Y). Financial deepening in the financial sector is not well developed, which creates a financial crisis and negatively impacts the real economy.

Table 7 The short-term evaluation of the ARDL model error (Error Correction Form)

<b>An Economic Growth (y)</b>				
<b>is an explanatory variable</b>	<i>Coefficient</i>	<b>Standard error</b>	<b>T-statistics</b>	<b>Probability Value *</b>
C	0.551499***	0.066311	8.31686	0.0000
D(Y(-1))	-0.558036***	0.119209	-4.68116	0.0003
D(M2Y)	0.016744**	0.006537	2.561357	0.0209
D(M2Y(-1))	-0.027826***	0.006251	-4.451729	0.0004
D(RIR)	0.088616	0.073069	1.212776	0.2428
D(RIR(-1))	-0.256258***	0.066661	-3.844216	0.0014
D(INF, 2)	0.016267	0.049324	0.329800	0.7458
CointEq(-1)	-0.195860***	0.023983	-8.166787	0.0000
R-squared	0.791801	Durbin-Watson stat		2.053050
S.E. of regression	0.007418	F-statistic		12.49586

Note: (\*\*\*), (\*\*), (\*) indicates that the rejection of zero assumptions that is not influenced by the model at the significance level of 1%, 5%, and 10%.

Table 7 shows the results of the evaluation correction form (Error correction form) used in the ARDL model to evaluate the long-term dependence. As a result of the evaluation, the error correction coefficient (CointEq) is negative at the 1% significance level, indicating a lag of variance of 19.6% of variance and a short-term correlation. In other words, the increase in real interest rate (RIR) and increased financial increment (M2Y) have a negative impact on economic growth (Y) after a quarter. Other variables do not have the impact on economic growth (Y) in the short term.

## CONCLUSION AND SUGGESTIONS

In this study, we are aiming to determine the impact of the financial sector on growth in Mongolia by the ARDL model. As a result of the survey, financial deepening may have a negative impact on the economy in the short run, but it has a long-term positive impact.

The structural reforms in the financial sector have had a negative impact on the real economy over the long run. In the financial sector, the size of the sector in the developing world creates a financial crisis and adversely affects the real economy. However, there is no short-term impact, due to the nature of our financial sector, the longer the cycle.

Percentage change in the real exchange rate (REER), investment in GDP (INV), and investment expenditure budget (CGA) influences long-term economic growth.

Further research on financial sustainability indicators needs to be examined in addition to the above variables of economic growth, which increases the size of the sample. It is possible to further expand research in this area.

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