

Research on Mongolian Cashmere Exports and its Impact on Economic Growth

Enkhod Ochirpurev

Shanghai University, School of Economics, No. 99 Shangda Rd, Baoshan District, Shanghai, China
 enkhodochirpurev[at]gmail.com

Abstract: *Foreign trade plays a key role in the country's economic development. Exports play an important role in economic growth, and the country's goal is to diversify exports and develop comparatively advantageous products and services. Mongolia has a nomadic culture, with more than 30 percent of the population being herders. Goats account for 40 percent of the 70 million livestock and about 28 million. Agricultural-based exports, especially cashmere exports, need to be considered at the policy level. The main purpose of this study is to study the impact of exports on the economic development of Mongolia and the impact of the cashmere sector on export economic growth based on empirical research. Based on the data for 1991-2019, an econometric assessment will be conducted and analyzed based on the economic model. As a result of the estimation, exports have a positive impact on Mongolia's economic growth, as well as cashmere exports have a positive impact on economic growth. In addition, the findings and recommendations of the study include recommendations to support Mongolia's cashmere exports.*

Keywords: Mongolia, Economic growth, Export and Cashmere export

1. Introduction

1.1 Basis of the research

In the 1990s, the era of globalization and economic integration is beginning to raise around the world. As a member of the World Trade Organization, Mongolia has gradually lifted trade embargoes and followed to the organization's open trade rules and regulations. Foreign trade has been playing an important role in the economic development of Mongolia. Mongolia's foreign trade peaked in 2011, owing to rising foreign direct investment in the mining industry and rising commodity prices for commodities such as copper, gold, and iron. In 2018, the total trade volume reached US \$ 12.88 billion, with exports at US \$ 7.01 billion and imports at US \$ 5.88 billion.¹

Mongolia has placed great emphasis on sustainable agricultural production in recent years, and has implemented several agricultural production export programs in order to diversify its economy and pursue sustainable development. Cashmere exports are the third largest sector in Mongolia, accounting for 40% of the global cashmere market. The Mongolian cashmere industry operates within the context of the world cashmere and garment industry.²

The relationship between foreign trade and economic growth has been studied by scholars from many parts of the world and different conclusions have been drawn. In the case of Mongolia, however, the study has not been extensive, especially in the cashmere sector. The Government of Mongolia has focused on foreign trade, including cashmere export promotion, with the adoption of

the Foreign Economic Relations Program in 2009, the Export Promotion Program in 2013, and the Cashmere Program in 2018. Mongolia has also been working to improve market access to key trading partners, increase exports, and lower tariff and non-tariff barriers in order to promote and broaden foreign trade.

Since Mongolia is located in East Asia and a landlocked country which is located between Russia to the north and China to the south, foreign trade of Mongolia is largely dependent on neighboring countries. Mongolia exports 90% of its goods to China, which also imports a third of Mongolia's imports. Mongolia is also 90 percent dependent on Russia for its energy needs. Mongolia's export sector is dominated by the mining sector, which has accounted for about 90% of total exports since 2011. Mongolia's main exports are several items, which include mineral products and commodities compose about 90% of the entire export. Cashmere products are also increasing and share of total export is 3-4 percent while food products have a good export potential.

Mongolia has prioritized sustainable agricultural production in its efforts to diversify its economy and seek sustainable growth in recent years, and has initiated many programs to promote agricultural exports. With its unique natural endowment, growing number of trade agreements at multilateral level and with key trading partners (such as Trade Facilitation Agreement, bilateral trade agreements with Japan, Eurasia Economic Union, and China), strong government commitment to sustainable development, and new initiatives from the government on export and agriculture, Mongolia is faced with increasing opportunities for foreign trade development.³ Cashmere exports are the third largest sector in Mongolia, accounting for 40% of the

¹ NSO, 2019

² United Nations, 2019

³ United Nations, 2019

global cashmere market. Mongolia's cashmere sector is part of the global cashmere and garment industry.

With a capacity to manufacture over 20 million cashmere sweaters per year, China leads the world in knitted garment production. Italy continues to dominate the high end of the cashmere industry, from spinning to knitting and weaving. Mongolia's cashmere industry is a competitive and traditional export sector. Exports of the industry have more than doubled since 2011, with exports rising from 3,580 tons to 7,720 tons in 2018. In recent years Mongolia's export of combed cashmere and cashmere garments has increased and it is forecasted that it would make an added value of US\$250-300 million a year. This will contribute US\$100 to the GDP per capita and bring additional 25,000-30,000 jobs.

The relationship between foreign trade and economic growth has been studied by scholars from many parts of the world and different conclusions have been drawn. In the case of Mongolia, however, the study has not been extensive, especially in the cashmere sector. The Government of Mongolia has focused on foreign trade, including cashmere export promotion, with the adoption of the Foreign Economic Relations Program in 2009, the Export Promotion Program in 2013, and the Cashmere Program in 2018.

The purpose of this research is to assess the current situation of the global and Mongolian cashmere markets, analyze its impacts of cashmere exports on Mongolia's economic growth and consolidate results of estimation. The object of research is the Mongolian economy and foreign trade. This study evaluates the impact of Mongolia's cashmere exports on economic growth based on data from 1991-2019 and is more innovative and has never been studied before. Based on the results of the study, it is possible to intensify the policy to support cashmere exports.

In this study, two types of econometric equation are estimated. These include:

- 1) Estimate and determine the impact of exports on Mongolia's economic growth
- 2) Estimate which export sector has the greatest impact on Mongolia's economic growth and assess the impact of cashmere exports.

The results of the study are expected to show a positive impact on export, especially cashmere exports, to the Mongolian economy.

1.2 Significance of Ropic

An empirical study of the relationship between foreign trade, especially cashmere exports, and economic growth, is useful in clarifying how the theory of economic growth that explains this relationship works in practice. Since theoretical sources do not provide a unified conclusion for all countries on the relationship between foreign trade and economic growth, it is theoretically important for Mongolia

to analyze this relationship through empirical research. An empirical study of the impact of foreign trade on economic growth in Mongolia is a valuable recommendation for government policy. The study of the impact of cashmere exports on the economy and whether it will become a secondary sector after mining will contribute to socio-economic policy.

1.3 Literature Review

In the science of economic theory, the relationship between economic growth and foreign trade is clearly stated. According to the export-led growth hypothesis, exports are a key determinant of growth. This is because, as Keynes explains, export growth leads to economic growth through a foreign exchange multiplier mechanism. Development economists have argued that exports play a key role in the impact of trade liberalization on economic growth. Exports, as a source of foreign exchange, determine the import capacity of the economy, which in turn provides domestic economic activity. This concept is similar to the role of the domestic multiplier, in which changes in consumption and investment change income to a greater extent.

Feder, G. (1983) used data from 31 countries covering 1964-1973 and found that exports had a statistically significant and positive effect on economic growth. Ram, R. (1985) analyzed time series and cross-sections for 88 developing countries from 1960 to 1982 and found that exports had a positive effect on economic growth.

Quah, D. and Rauch, J. (1990) used the ratio of foreign trade to GDP of 81 developing countries in 1960-1981 to analyze the relationship between foreign trade and income and found that foreign trade had a weak positive effect. Helliwell, J. and Chung, A. (1991) used the ratio of the total trade volume (exports and imports) of 19 countries to GDP in 1960-1981 and found that trade had a statistically significant positive effect on income. Dollar, D (1992) calculated the real exchange rate deviation index for 117 countries from 1976-1985 and used it to analyze the empirical relationship between trade liberalization and GDP. The study found a significant negative correlation between real exchange rate fluctuations and economic growth, leading to the conclusion that more free trade leads to higher growth.

Harrison, A. (1996) used data from 51 countries covering 1960-1984 and found that the impact of open trade on economic growth for countries depends on how the time factor of the study is chosen. For example, only one measure of openness in the use of cross-sectional data has a positive effect on economic growth; had a significant impact.

Frankel, J and Romer, D. (1999) conducted a study of the data of 63 countries in 1985 in relation to geographical features and identified the statistically significant positive effect of foreign trade on economic growth. Ibrahim, I (2002) analyzed Hong Kong, South Korea, Malaysia, the

Philippines, Singapore, and Thailand based on data from 1974-1993 to determine the positive effects of exports on economic growth and the positive indirect effects of exports on non-exports.

Lin, J. and Li, Y. (2002) conducted an econometric study using data from 1979-2000 for the People's Republic of China and found that a 10 percent increase in exports led to an average of 1 percent increase in GDP. Thungsuwan, S. and Thompson, H. (2003) conducted an empirical analysis of Thailand from 1969 to 2000 and concluded that export growth had a positive effect on economic growth. Dawson, P. and Hubbard, H. (2004) used Feder (1983) model to conduct a study covering 14 countries in Central and Eastern Europe during the transition period, 1994-1999, and found that a 10 percent increase in exports to 1.6 percent of GDP. These countries have been recommended to support export-oriented policies to ensure sustainable economic growth.

Ullah, S. and Zaman, B. (2009) conducted a study using data from 1970-2009 for Pakistan and concluded that export growth had affected economic growth. Squali, J. and Wilson, J. (2011) used the ratio of a country's foreign trade turnover to that of world trade as a measure of a country's trade openness, and found that the United States has an open trade policy that has a positive effect on economic growth.

For Mongolian scholars and researchers, there is no comprehensive study of the impact of foreign trade (cashmere export) on Mongolia's economic growth, but there are many important issues related to foreign trade.

Economist and Academician Luvsandorj. P (1980) addressed the issues of economic development of the People's Republic of Mongolia and mentioned the importance of export orientation. Bayandalai. D (1994), studying the structure and location of foreign trade, noted the need to limit imports to a certain extent and to develop export-oriented and import-substituting industries.

Gurgemjav. E (1995) examined the relationship between exports and imports and explained the important role of imports in the development of national production, including export-oriented production. Gantumur. P (2001) analyzed the factors influencing economic growth and estimated that if scientific and technological advances are used to process livestock raw materials and products to support domestic production and support export-oriented production, GDP growth can increase by 1.5 percentage per year. Naranchimeg. Ch (2006) listed 25 factors that affect economic growth, including scientific and technological advances and demand incentives, including favorable foreign trade policies. One of the key factors in accelerating economic growth is technology, he said, noting that stimulating foreign trade will increase investment and create technology. In Mongolia, the main factors affecting economic growth are production. The study identified sector structure, management skills, skilled labor, capital,

government spending, and technology.

Davaajargal. L (2006) used the Gravity Model and panel data from seven export partners, including Italy, the United Kingdom, Russia, China, South Korea, the United States, and Canada, and Mongolia for the 2000-2005, to estimate the impact of exchange rate fluctuations on Mongolia's foreign trade. Empirical studies have shown a statistically insignificant positive correlation between exchange rate uncertainty and foreign trade. Amarjargal. R (2007) using the gravity model, the 1984-2001 statistics study Mongolia's foreign trade in the context of integration into the Northeast Asian market and the conclusion of a Free Trade Agreement with Japan. The study found that Free Trade Agreement with Japan would increase foreign trade by almost 50 percent, and that joining Northeast Asian integration would be less statistically significant. The study shows that Mongolia can overcome its remoteness and its negative consequences by pursuing an open foreign trade policy, joining regional integration as much as possible, and concluding bilateral trade agreements.

2. Method

In this study I will apply Quantitative analysis. The model based on Ram, R. (1985) $Y = f(K, L, X)$ production aggregate function will be used in this study. Here Y is the actual product, K, L and X are the exports of capital and labor, respectively.¹

Feder and G. (1983) hypothesized that the economy has two sectors, export and non-export, and that the export sector will have a positive indirect effect on the non-export sector. An endogenous growth model based on a new theory of export led growth has the advantage of being able to accurately estimate the long-term effects of foreign trade on economic growth. Therefore, empirical analysis used endogenous growth models developed by G.Feder (1983) and R.Ram (1985) based on new growth theory and production aggregate function.

$$Y = f(K, L, X) \quad (1)$$

Where Y is aggregate real output, L is the labor input, K represents the input of capital, and X measures exports. It is easy to rewrite (1) in terms of growth rates.

Differentiate both sides of the function into a linear form:

¹ Ram, R. (1985). Exports and economic growth: Some additional evidence. *Economic Development and Cultural Change*, 33(2), 415-425 [62]

$$\frac{dY}{Y} = \left(\frac{\partial Y}{\partial K} \right) \frac{dK}{K} + \left(\frac{\partial Y}{\partial L} \right) \frac{dL}{L} + \left(\frac{\partial Y}{\partial X} \right) \frac{dX}{X} = \left(\frac{\partial Y}{\partial K} \right) \frac{dK}{Y} + \left(\frac{\partial Y}{\partial L} \right) \frac{dL}{L} + \left(\frac{\partial Y}{\partial X} \right) \frac{dX}{X} \quad (2)$$

Taking total derivatives, and manipulating the terms slightly, one gets the familiar expression:

$$\dot{Y} = \beta_0 + \beta_1 \dot{L} + \beta_2 \dot{K} + \beta_3 \dot{X} \quad (3)$$

Where a dot over a variable indicates its rate of growth and $\beta_0, \beta_1, \beta_2, \beta_3$ are the elasticities of output with respect to L, K, and X. Since K, the rate of growth of capital input, is usually not known for most countries, (3) can be reformulated by replacing K by the more tractable variable $\Delta K/Y$, which approximates the investment-income ratio, as follows:

$$\dot{Y} = \beta_0 + \beta_1 \dot{L} + \frac{\partial Y}{\partial K} \frac{K}{Y} \frac{dK}{K} + \beta_3 \dot{X} \quad (2a)$$

Or replacing dK by I ,

$$\dot{Y} = \beta_0 + \beta_1 \dot{L} + \alpha_0 \frac{I}{Y} + \beta_3 \dot{X} \quad (4)$$

Y - Average annual rate of growth of GNP (%)

I/Y - Gross domestic investment as percentage of GDP, averaged for the period

L - Average annual rate of growth of labor force (%)

X - Average annual rate of growth of export (%)

According to the new theory of growth, which explains the effect of open trade on economic growth in the long run through knowledge and technology, the measure of trade openness calculated for our country is included in Equation 2 to calculate economic growth:

$$\dot{Y} = \beta_0 + \beta_1 \dot{L} + \beta_1 \frac{I}{Y} + \beta_3 \dot{X} + \beta_4 OPENNESS + \varepsilon \quad (5)$$

As a measure of openness, many studies have used Trade intensity TI, or the ratio of a country's total foreign trade turnover to GDP. In this empirical study, the intensity of trade is calculated as follows and used as a measure of openness:

$$TI_t = (X_t + M_t) / GDP_t$$

X_t - Export

M_t - Import

GDP_t - Gross domestic product

The next model to be used in this study is a model to determine which export sectors have an impact on the economy. Muhammad.S, Saroja.S, Athula.N, (2016) estimated Export Led Economic Growth (ELG) hypothesis in Australia economic, by using extended version of the Tang-Lai-Ozturk (TLO) model¹.

¹ This model is selected from a list of the three most commonly used models (e.g., Augmented Cobb–Douglas, Feder, 1983 and

$$\ln NY_t = \alpha_0 + \alpha_1 \ln XAG_t + \alpha_2 \ln XMF_t + \alpha_3 \ln XMA_t + \alpha_4 \ln XO_t + \alpha_5 \ln RER_t + e_t \quad (6)$$

NY – the aggregate income

XAG, XMF, XMA, XO - exports from the Agriculture, Mining and Fuels, Manufacturing, and Other sectors

RER – Real exchange rate

In this study, I estimate following model:

$$\ln GDP_t = \alpha_0 + \alpha_1 \ln XCash_t + \alpha_2 \ln XMin_t + \alpha_3 \ln XAg_t + \alpha_4 \ln XO_t + \alpha_5 \ln RER_t + e_t \quad (7)$$

GDP – real GDP

$XCash$ – Cashmere export

$XMin$ – Mineral export

XAg – Agriculture export (excluding cashmere)

XO – Other Export

RER – Real Exchange rate

Data description

The dissertation examines, firstly, the impact of Mongolia's exports on economic growth, and secondly, examines which export sectors are contributing to economic growth, including cashmere exports. In the empirical analysis, the long-run relationship between economic growth and exports, cashmere exports, and other economic indicators was performed using Eviews 12 software. As mentioned above, two economic models were evaluated to examine the impact of exports on economic growth, and the impact of the export sector, including cashmere exports, using time series data of Mongolia.

Model 1:

According to Model 1, the dependent variable is economic growth, independent variables are the ratio of investment to GDP, trade openness, and labor force growth and export growth.

$$GDP_GROWTH$$

$$= \beta_0 + \beta_1 Labor + \beta_1 Inv + \beta_3 X + \beta_4 OPEN + \varepsilon$$

Endogenous Growth Model) and based on a number of model selection criteria. These include the model's ability to satisfy the model specification tests and regression model assumptions, the ability to account for diminishing marginal returns, and ability to capture the short-run as well as long-run effects of ELG on the Australian regional economies. Based on its performance in these criteria, the TLO model was found to be able to depict the reality in the Australian economy as closely as possible.

Table 1: Data description

Variables	Meaning	Measurement	Number of observations	Data source
GDP_GROWTH	GDP growth	%	28	National Statistics Office of Mongolia
Labor	Labor force growth	%	28	National Statistics Office of Mongolia
Inv	I/Y	ratio	28	National Statistics Office of Mongolia
X	Export growth	%	28	National Statistics Office of Mongolia
OPEN	(Xt+Mt)/GDpt	ratio	28	Bank of Mongolia

Model 2:

According to Model 2, the dependent variable is economic growth, independent variables are Cashmere export, Mineral export, Agriculture export, Other export and Real exchange rate. Time series data of Mongolia, including between 1991 and 2019, is used in this analysis. The Cashmere export, Mineral export, Agriculture export, and other export variables used in the assessment were all

converted to real indicator, based on 2010 year price index.

$$\ln GDP_t = \alpha_0 + \alpha_1 \ln XCash_t + \alpha_2 \ln XMin_t + \alpha_3 \ln XAg_t + \alpha_4 \ln XO_t + \alpha_5 \ln RER_t + e_t$$

Table 2: Data description

Variables	Meaning	Measurement	Number of observations	Data source
GDP_growth	Economic growth	Million USD	26	www.data.worldbank.org
XCash	Cashmere export	Million USD	26	National Statistics Office of Mongolia
XMin	Mineral export	Million USD	26	National Statistics Office of Mongolia
XAg	Agriculture export	Million USD	26	National Statistics Office of Mongolia
XO	Other export	Million USD	26	National Statistics Office of Mongolia
RER	Real exchange rate	eP/P ratio	26	National Statistics Office of Mongolia

3. Results

ADF test result

This study analyzes time series annual data from 29 observations in Mongolia between 1991 and 2019. To do analyze the time series data, the ADF test was tested on all variables. The results of the ADF test are shown in Table 6. The result of the ADF test shows that the variables GDP_Growth, Labor_Growth, and Openness are stationary. (Table 7).

As for the INV variable, it was not stationary, first difference of INV variable tested ADF test. As a result of ADF test, the first difference of INV variable is stationary. As the export variable was non-stationary, it became stationary after taking the logarithm and taking the first difference. Therefore, this variable will be used for estimation in the analysis.

Table 3: ADF test result

Variable	Critical value	Level		First Difference	
		T-Statistic	Probability	T-Statistic	Probability
GDP_Growth					
1% level	-3.689194	-3.03	0.0446	-	-
5% level	-2.971853				
10% level	-2.625121				
Labor					
1% level	-3.689194	-3.78	0.0080	-	-
5% level	-2.971853				
10% level	-2.625121				
Inv					
1% level	-3.689194	-1.92	0.3178	-5.92	0.0000
5% level	-2.971853				

Variable	Critical value	Level		First Difference	
		T-Statistic	Probability	T-Statistic	Probability
10% level	-2.625121				
Open					
1% level	-3.689194	-4.17	0.0031	-	-
5% level	-2.971853				
10% level	-2.625121				
X					
1% level	-3.711457	2.63	1.0000	-5.95*	0.0000
5% level	-2.981038				
10% level	-2.629906				

Table 8 shows the data to be used for the estimation of Model 1.

Table 4: Raw data

	GDP_Growth	Labor	ΔX	Open	ΔI/Y
1991	-0.09	0.03	NA	0.899272	NA
1992	-0.09	0.03	0.11	0.574877	-0.11
1993	-0.03	0.03	-0.02	1.020451	-0.10
1994	0.02	0.02	-0.07	0.658158	0.14
1995	0.06	0.02	0.28	0.610577	-0.04
1996	0.02	0.02	-0.11	0.650794	0.07
1997	0.04	0.02	0.29	0.87766	-0.06
1998	0.03	0.02	-0.21	0.857995	0.01
1999	0.03	0.02	-0.02	0.914448	0.00
2000	0.01	0.03	0.17	1.011602	0.04
2001	0.03	0.03	-0.03	0.914241	0.00
2002	0.05	0.03	0.00	0.869862	0.00
2003	0.07	0.03	0.16	0.888165	-0.01
2004	0.11	0.02	0.35	0.949101	-0.01
2005	0.07	0.02	0.20	0.888181	-0.02

	GDP_Growth	Labor	ΔX	Open	$\Delta I/Y$
2006	0.09	0.02	0.37	0.87191	0.02
2007	0.10	0.02	0.23	0.946705	-0.02
2008	0.09	0.02	0.26	1.027964	0.02
2009	-0.01	0.02	-0.30	0.877732	0.02
2010	0.06	0.02	0.43	0.849267	0.05
2011	0.17	0.03	0.50	1.096662	0.08
2012	0.12	0.00	-0.09	0.906062	0.22
2013	0.12	0.02	-0.03	0.845595	0.01
2014	0.08	0.02	0.30	0.900753	0.10
2015	0.02	0.01	-0.21	0.72073	-0.50
2016	0.01	(0.01)	0.05	0.742243	0.10
2017	0.05	0.02	0.23	0.922616	0.21
2018	0.07	0.02	0.12	0.983141	0.06
2019	0.05	0.05	0.08	0.98232	-0.02

Estimation result

According to Model 1, the impact of export, investment, labor, and foreign trade openness on Mongolia's economic growth has been estimated in time series data over 1991-2019. The results of the estimation show that investment, export and trade openness have a positive impact on economic growth. Labor force, on the other hand, is an insignificant variable and appears to have a negative effect.

The estimation result shows that 1 percent increase in exports have 0.09 percent positive effect on economic growth. The result confirms that the research hypothesis that exports have a positive effect on economic growth. This economic model is capable of explaining 52 percent of Mongolia's economic growth and R squared 0.52. In terms of investment variables, it has a positive effect on economic growth, with one percent growth showing 0.05 percent economic growth. In addition, for the trade openness variable, a rise of 1 unit increases economic growth by 0.16 percent. (Table 9) The result of the estimation shows that Mongolia's export promotion policy has the potential to boost economic growth.

Table 5: Model 1 estimation result

Dependent variable: GDP Growth	
Variables	Coefficient (t-statistic)
LABOR	-1.10 (-1.21)
d(I/Y)	0.05 (0.73)
d(X)	0.09** (2.14)
OPEN	0.16** (2.26)
C	-0.07 (-1.25)
R-squared	0.52
Adjusted R-squared	0.42
DW stat	1.17
Observations	28
Method	Least Squares

* If p-value <0.01 reject H0 at the 1% level.
 ** If p-value <0.05 reject H0 at the 5% level.
 *** If p-value <0.10 reject H0 at the 10% level.

No autocorrelation was detected and the results are shown below. (Table 10)

Table 6: Autocorrelation test result

Dependent Variable: RESID01				
Method: Least Squares				
Sample (adjusted): 1993 2019				
Included observations: 27 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003189	0.006802	0.468875	0.6432
RESID01(-1)	0.343213	0.171649	1.999502	0.0565
R-squared	0.137872	Mean dependent var	0.002945	
Adjusted R-squared	0.103387	S.D. dependent var	0.037318	
S.E. of regression	0.035336	Akaike info criterion	-3.776634	
Sum squared resid	0.031216	Schwarz criterion	-3.680646	
Log likelihood	52.98456	Hannan-Quinn criter.	-3.748092	
F-statistic	3.998010	Durbin-Watson stat	2.054271	
Prob(F-statistic)	0.056533			

The Breusch-Pagan-Godfrey test was used to check whether the variance of the residual of the regression equation evaluated using the least squares method is not constant or heteroskedastic. As a result, homoskedastic conditions were met. (Table 11)

Table 7: Heteroskedasticity test result

Heteroskedasticity Test: Breusch-Pagan-Godfrey				
Null hypothesis: Homoskedasticity				
F-statistic	0.001739	Prob. F(1,25)	0.9671	
Obs*R-squared	0.001878	Prob. Chi-Square(1)	0.9654	
Scaled explained SS	0.001237	Prob. Chi-Square(1)	0.9719	
Dependent Variable: RESID^2				
Method: Least Squares				
Sample: 1993 2019				
Included observations: 27				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001156	0.000287	4.034541	0.0005
RESID01(-1)	0.000302	0.007233	0.041701	0.9671
R-squared	0.000070	Mean dependent var	0.001156	
Adjusted R-squared	-0.039928	S.D. dependent var	0.001460	
S.E. of regression	0.001489	Akaike info criterion	-10.11015	
Sum squared resid	5.54E-05	Schwarz criterion	-10.01417	
Log likelihood	138.4871	Hannan-Quinn criter.	-10.08161	
F-statistic	0.001739	Durbin-Watson stat	1.839141	
Prob(F-statistic)	0.967068			

Model 2 result

ADF test result

The Model 2 analyzes time series annual data from 25 observations in Mongolia between 1995 and 2019. To do analyze the time series data, the ADF test was tested on all variables. The results of the ADF test are shown in Table 12. The result of the ADF test shows that the GDP Growth variable is stationary. (Table 12)

As for the RER variable, it was not stationary, first difference of this variable tested ADF test. As a result of ADF test, the first difference of variable is stationary. As the XCASH, XAG, XOther and XMin variables was non-stationary, it became stationary after taking the

logarithm and taking the first difference. Therefore, this variables will be used for estimation in the analysis.

Table 8: ADF test result

Variable	Critical value	Level		First Difference	
		T-Statistic	Probability	T-Statistic	Probability
GDP_Growth		-3.19	0.0332	-	-
1% level	-3.737853				
5% level	-2.991878				
10% level	-2.635542				
XCASH		-3.37	0.0223	-4.88	0.0008
1% level	-3.737853				
5% level	-2.991878				
10% level	-2.635542				
XAG		-2.50	0.1270	-4.62	0.0014
1% level	-3.724070				
5% level	-2.986225				
10% level	-2.632604				
XOther		-1.12	0.6911	-6.84	0.0000
1% level	-3.752946				
5% level	-2.998064				
10% level	-2.638752				
XMin		-1.69	0.4211	-5.14	0.0004
1% level	-3.724070				
5% level	-2.986225				
10% level	-2.632604				
RER		-1.50	0.5142	-8.63	0.0000
1% level	-3.711457				
5% level	-2.981038				
10% level	-2.629906				

Table 9 shows the data to be used for the estimation of Model 2.

Table 9: Raw data

	GDP Growth	ΔLog (XAg)	ΔLog (XMin)	ΔLog (XCash)	ΔLog (XOther)	ΔRER
1995	0.06					
1996	0.02	-0.37	-0.75	-0.14	0.83	1.95
1997	0.04	-0.15	0.11	-0.57	-0.07	-1.46
1998	0.03	-0.17	-0.90	-0.46	0.79	-0.67
1999	0.03	0.04	-0.17	0.54	-0.20	2.16
2000	0.01	0.12	0.14	0.10	-0.05	0.13
2001	0.03	0.15	-0.15	-0.35	-0.02	1.63
2002	0.05	-0.11	0.48	-0.58	-0.48	-8.97
2003	0.07	-0.03	0.14	0.07	0.12	-0.95
2004	0.11	-0.66	0.45	0.15	0.07	5.28
2005	0.07	0.06	0.15	0.27	-0.24	0
2006	0.09	0.29	0.35	0.72	-0.08	1.44
2007	0.10	-0.10	0.19	0.11	-0.13	0.47
2008	0.09	-0.14	0.07	-0.26	-0.21	16.42
2009	-0.01	-0.12	-0.39	-0.17	-0.50	-20.14
2010	0.06	-0.07	0.38	-0.01	0.35	26.24
2011	0.17	-0.10	0.47	0.01	0.19	-7.13
2012	0.12	-0.56	-0.21	-0.11	-0.62	8.42
2013	0.12	0.01	-0.16	0.14	0.22	-9.28
2014	0.08	-0.15	0.20	0.04	0.23	10.03
2015	0.02	0.17	-0.28	-0.24	-0.17	-0.95

	GDP Growth	ΔLog (XAg)	ΔLog (XMin)	ΔLog (XCash)	ΔLog (XOther)	ΔRER
2016	0.01	-0.09	0.01	-0.06	0.56	-23.24
2017	0.05	0.42	0.23	0.04	-0.31	2.11
2018	0.07	0.16	0.05	0.16	0.14	3.75
2019	0.05	-0.20	0.01	0.00	0.09	-1.39

Estimation result

According to Model 2, the impact of cashmere export, mineral export, agriculture export, real exchange rate and other exports on Mongolia's economic growth has been estimated in time series data between 1995-2019. The results of the estimation show that cashmere export, mineral export, other export and real exchange rate have a positive impact on economic growth. Agriculture export appears to have a negative effect. (Table 11)

The results of the estimation show that cashmere exports have a positive impact on economic growth, as expected. Mineral exports have the highest impact on the economy, as it shows that our economy is completely dependent on the mining sector. The estimation result shows that 1 percent increase in cashmere export have 0.04 percent positive effect on GDP growth. For mineral export, 1 percent increase mineral export have 0.05 percent positive effect on GDP growth. This economic model is capable of explaining 49 percent of Mongolia's economic growth and R squared 0.49.

Table 10: Model 2 estimation result

Dependent variable: GDP Growth	
Variable	Coefficient (t-statistic)
d(XCASH)	0.04** (2.41)
d(XAG)	-0.06*** (-1.91)
d(XMIN)	0.05*** (2.41)
d(XOTHER)	0.005 (0.23)
d(RER)	0.002** (2.12)
C	-0.09 (-1.34)
R-squared	0.49
Adjusted R-squared	0.36
DW stat	1.89
Observations	24
Method	Least Squares

* If p-value < 0.01 reject H₀ at the 1% level.

** If p-value < 0.05 reject H₀ at the 5% level.

*** If p-value < 0.10 reject H₀ at the 10% level.

No autocorrelation was detected and the results are shown below. (Table 15)

Table 11: Autocorrelation test result

Dependent Variable: RESID01				
Method: Least Squares				
Sample (adjusted): 1997 2019				
Included observations: 23 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000318	0.006125	0.051862	0.9591
RESID01(-1)	0.059754	0.219051	0.272786	0.7877
R-squared	0.003531	Mean dependent var		0.000360
Adjusted R-squared	-0.043920	S.D. dependent var		0.028741

S.E. of regression	0.029365	Akaike info criterion	-4.135080
Sum squared resid	0.018108	Schwarz criterion	-4.036341
Log likelihood	49.55342	Hannan-Quinn criter.	-4.110247
F-statistic	0.074412	Durbin-Watson stat	1.956037
Prob(F-statistic)	0.787682		

The Breusch-Pagan-Godfrey test was used to check whether the variance of the residual of the regression equation evaluated using the least squares method is not constant or heteroskedastic. As a result, homoskedastic conditions were met. (Table 16)

Table 12: Heteroskedasticity Test result

Heteroskedasticity Test: Breusch-Pagan-Godfrey				
Null hypothesis: Homoskedasticity				
F-statistic	2.483701	Prob. F(1,21)	0.1300	
Obs*R-squared	2.432543	Prob. Chi-Square(1)	0.1188	
Scaled explained SS	1.283929	Prob. Chi-Square(1)	0.2572	
Test Equation:				
Dependent Variable: RESID^2				
Method: Least Squares				
Sample: 1997 2019				
Included observations: 23				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000795	0.000183	4.344735	0.0003
RESID01(-1)	-0.010308	0.006541	-1.575976	0.1300
R-squared	0.105763	Mean dependent var	0.000787	
Adjusted R-squared	0.063180	S.D. dependent var	0.000906	
S.E. of regression	0.000877	Akaike info criterion	-11.15766	
Sum squared resid	1.61E-05	Schwarz criterion	-11.05892	
Log likelihood	130.3130	Hannan-Quinn criter.	-11.13282	
F-statistic	2.483701	Durbin-Watson stat	1.547823	
Prob(F-statistic)	0.129977			

4. Discussion

A developing and resource-rich country, Mongolia needs to diversify other export service and product. Livestock resource-based agriculture is the next sector to play a key role in export diversification. For a country with 40% of the world's cashmere reserves, developing the cashmere industry can boost economic growth.

Most cashmere stocks are unprocessed and exported as raw materials. In addition, cashmere processing industries are underdeveloped and exports of value-added end products are low. Therefore, in order to process cashmere and export more value-added products, it is necessary to support enterprises and make equipment loans more accessible.

Due to the global epidemic, sales of goods dependent on the economy, especially tourism, have declined. Therefore, cashmere producers face the need to improve and integrate distribution channels and increase international distribution channels.

According to the empirical study results, cashmere exports have had a positive impact on the economy. The estimation result shows that 1 percent increase in exports have 0.09

percent effect on economic growth and 1 percent increase in cashmere export have 0.04 percent effect on GDP growth. Therefore, policy support for cashmere exports has an important impact on economic growth.

References

- [1] Ahmad, J. (2001). Casually between exports and economic growth: What do the econometric studies tell us? *Pacific Economic Review*, 6(1), 147-167
- [2] Balassa, B. (1978). Exports and growth: further evidence. *Journal of Development Economics*, (5), 181-9
- [3] Batsukh, Ts. & Avralt-Od, P. (2012). Risk Assessment of Dutch Disease in Mongolia due to a Major Resource and Expected Massive Capital Inflow. *ERI Discussion Paper Series*. (1), 25-85
- [4] Tang, C., Lai, Y. & Ozturk, I. (2014). How stable is the export-led growth hypothesis? Evidence from Asia's Four Little Dragons. *Economic Modelling* 44(2015), 229-235
- [5] Dawson, P. & Hubbard, L. (2004). Exports and economic growth in Central and East European countries during transition. *Applied Economics*, 36, 1819-1824
- [6] Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: Evidence from 95 LDCs, 1976-1985. *Economic Development and Cultural Change*, 40(3), 523-44
- [7] Edwards, S. (1993). Openness, trade liberalization, and growth in developing countries. *Journal of Economic Literature*, 31, 1358-1393
- [8] Ekayanake, E. (1999). Exports and Economic Growth in Developing Countries: Cointegration and Error-Correction Models. *Journal of Economic Development*, 24(2), 43-56
- [9] Feder, G. (1983). On exports and economic growth. *Journal of Development Economics*, 12(1/2), 59-73
- [10] Fisher, B., Tuvshintugs, B. & Others (2011). The Development of the Oyu Tolgoi Copper Mine: and Assessment of the Macroeconomic Consequences for Mongolia. *BAE Report*, Canberra.
- [11] Frankel, J. & Romer, D. (1999). Does trade cause growth? *The American Economic Review*, 89(3), 379-399
- [12] Harrison, A. (1996). Openness and growth: A time series, cross-country analysis for developing countries. *Journal of Development Economics*, 48(2), 419-47
- [13] Harrod, R. (1939). An Essay in Dynamic Theory. *The Economic Journal*, 49(193), 14-33
- [14] Heckscher, E. (1919). The effect of foreign trade on the distribution of income. *Ekonomisk Tidskrift*, 497-512
- [15] Helliwell, J. & Chung, A. (1991). Macroeconomic Convergence: International Transmission of Growth and Technical Progress. *NBER Chapter: International Economic Transactions: Issues in Measurement and Empirical Research*, 388-436
- [16] Hultman, C. (1967). Exports and economic growth:

- A survey. *Land Economics*, 43(2), 148-157
- [17] Jung, W. & Marshall, P. (1985). Exports, growth and causality in developing countries. *Journal of Development Economics*, 1 (4/5), 1-12
- [18] Ibrahim, I. (2002). On Exports and Economic Growth. *Journal Pengurusan*, 3-18
- [19] Keynes, J. (1936). *The General Theory of Employment, Interest and Money*. London, Macmillian
- [20] Khashchuluun, Ch. (2011). The Challenge of Dutch Disease, Structural Change, and Economic Diversification. *National Development and Innovation Committee of Mongolia*
- [21] Lin, J.Y. & Li, Y. (2002). Exports and Economic Growth in China: A Demand-Oriented Analysis. *China Economic Quarterly*, 2(4), 779-794
- [22] Quah, D. and Rauch, J. (1990). Openness and the Rate of Economic Growth. *Working paper, University of California*
- [23] Ram, R. (1985). Exports and economic growth: Some additional evidence. *Economic Development and Cultural Change*, 33(2), 415-425
- [24] Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: Evidence from 95 LDCs, 1976-1985. *Economic Development and Cultural Change*, 40(3), 523-44
- [25] Edwards, S. (1993). Openness, trade liberalization, and growth in developing countries. *Journal of Economic Literature*, 31, 1358-1393
- [26] Ekayanake, E. (1999). Exports and Economic Growth in Developing Countries: Cointegration and Error-Correction Models. *Journal of Economic Development*, 24(2), 43-56
- [27] Feder, G. (1983). On exports and economic growth. *Journal of Development Economics*, 12(1/2), 59-73
- [28] Fisher, B., Tuvshintugs, B. & Others (2011). The Development of the Oyu Tolgoi Copper Mine: and Assessment of the Macroeconomic Consequences for Mongolia. *BAE Report*, Canberra.
- [29] Frankel, J. & Romer, D. (1999). Does trade cause growth? *The American Economic Review*, 89(3), 379-399
- [30] Harrison, A. (1996). Openness and growth: A time series, cross-country analysis for developing countries. *Journal of Development Economics*, 48(2), 419-47
- [31] Harrod, R. (1939). An Essay in Dynamic Theory. *The Economic Journal*, 49(193), 14-33
- [32] Heckscher, E. (1919). The effect of foreign trade on the distribution of income. *Ekonomisk Tidskrift*, 497-512
- [33] Helliwell, J. & Chung, A. (1991). Macroeconomic Convergence: International Transmission of Growth and Technical Progress. *NBER Chapter: International Economic Transactions: Issues in Measurement and Empirical Research*, 388-436
- [34] Hultman, C. (1967). Exports and economic growth: A survey. *Land Economics*, 43(2), 148-157
- [35] Jung, W. & Marshall, P. (1985). Exports, growth and causality in developing countries. *Journal of Development Economics*, 1 (4/5), 1-12
- [36] Ibrahim, I. (2002). On Exports and Economic Growth. *Journal Pengurusan*, 3-18
- [37] Keynes, J. (1936). *The General Theory of Employment, Interest and Money*. London, Macmillian
- [38] Khashchuluun, Ch. (2011). The Challenge of Dutch Disease, Structural Change, and Economic Diversification. *National Development and Innovation Committee of Mongolia*
- [39] Lin, J.Y. & Li, Y. (2002). Exports and Economic Growth in China: A Demand-Oriented Analysis. *China Economic Quarterly*, 2(4), 779-794
- [40] Muhammad, S., Saroja, S. & Athula, N. (2017). The role of export composition in export-led growth in Australia and its regions, *Economic Analysis and Policy*, 53(2017), 62-76
- [41] Quah, D. & Rauch, J. (1990). Openness and the Rate of Economic Growth. *Working paper, University of California*
- [42] Ram, R. (1985). Exports and economic growth: Some additional evidence. *Economic Development and Cultural Change*, 33(2), 415-425
- [43] Sunanda, S. (2010). International trade theory and policy: A review of the Literature, *Working Paper, No. 635, Economics Institute of Bard College*
- [44] Solow, R. (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, 70(1), 65-94
- [45] Squalli, J. & Wilson, K. (2011). A New Measure of Trade Openness. *The World Economy*, 34(10), 1745-1770
- [46] Thungsuwan, S. & Thompson, H. (2003). Exports and Economic Growth in Thailand: An Empirical Analysis. *BU Academic review*, 2(1), 10-20
- [47] Tselvelmaa, Kh. (2017), Trade and Green Economy in Mongolia, Technical Study
- [48] Ullah, S., Zaman, B. & Others (2009). Cointegration and Causality between Exports and Economic Growth in Pakistan. *European Journal of Social Sciences*, 10(2), 264-272