المجلة الدولية للأداء الاقتصادي
International journal of economic performance
ISSN: 2661-7161 EISSN:2716-9073
Publications are Open Access in this journal
journal home page : https://ijep.dz/index.php/IJEP/index

# Reflections of the trade-led-growth hypothesis on the Nepalese economy

Arjun Kumar Dahal *, Khagendra Kumar Thapa
arjun.dahal@memc.tu.edu.np, Mechi Multiple Campus, Bhadrapur, Jhapa (Nepal)
tkhagendra25@gmail.com, Mechi Multiple Campus, Bhadrapur, Jhapa (Nepal)

**ARTICLE INFO**

**Article history**:
Received : 27/05/2026
Accepted : 24/06/2026
Published: 30/06/2026

**Keywords:**
Trade volume, export-led growth hypothesis, exports, imports, protectionism

**Jel Codes:**
F40, F43, F63.

**ABSTRACT**

This study examines the effect of foreign trade on Nepal's economic growth. It comprises export, import, and total foreign trade volume as economic growth determinants. It is based on secondary data collected from numerous economic surveys of Nepal encompassing 34 data points from fiscal years 1998/99 to 2021/22. To examine the short-run and long-run relationship between export, import, and total foreign trade volume in promoting Nepal's economic growth, descriptive and exploratory research designs are utilized. EViews 12 is used to analyze the data. Graphs and some statistical tools of econometrics, like correlation analysis, Descriptive statistics, unit root testing, ARDL Bound testing approach, heteroskedasticity, serial correlation LM test, CUSUM and CUSUM square, and error correction model, are used. There is a high degree of positive correlation found between foreign trade and economic growth. The GDP, import, export, and total trade volume have long-run co-integration. In the long run, no variable has an individually statistically significant impact on determining the dependent (GDP) variable. Still, in the short run, a one percent increase in foreign trade leads to a 0.845 percent increase in the GDP of Nepal. Import and economic growth have negative relations. A one percent increase in imports decreased the GDP by 0.686 percent in Nepal. Foreign trade explains 94.92 percent of the variation in Nepal's GDP in the long run, but only 39.97 percent in the short run. Only a small number of data, countries, variables, methods, and instruments are used. Therefore, further inquiry is required.



* *Corresponding author, E-mail address: arjun.dahal@memc.tu.edu.np*

## Introduction

Foreign trade states the transnational exchange of products and services, technology, and intellectual property (Marin, 1992). Foreign trade is essential to the expansion of the economy. A nation's economy can grow steadily through increasing exports, lowering trade deficits, eliminating trade obstacles, diversifying trade, and investing in infrastructure (Orhan et al., 2022). A long-term data-based topic, the relationship between foreign trade and economic growth may be traced back to the mercantilist era. The mercantilists supported trade protectionism, whereas classical economists supported free trade policies. According to them, a free trade policy is essential for advancing the economy (Nursini, 2017).

Nepal is a landlocked nation whose economic development is highly dependent on foreign trade. By boosting technological advancement, attracting investment, and increasing the market, foreign commerce has a substantial impact on Nepal's economic development. A key factor in Nepal's economic growth has been the export of goods like clothing, carpets, handicrafts, medicinal plants, and tourism services. Higher production, employment, and money generation can result from increased exports. Nepal is significantly dependent on imports, especially for consumer items, machinery, vehicles, and petroleum products. The balance of payments is strained, and sustainable economic growth is hampered by persistent trade deficits when imports outpace exports (Acharya, 2019). Nepal faces various trade barriers, including high transportation costs, infrastructure limitations, bureaucratic procedures, and limited access to the international market. These challenges hinder the country’s trade competitiveness and economic growth potential (Chhetri, 2022).

During the early years of its existence, Nepal's foreign trade primarily relied on barter systems and traditional routes. However, with the advent of modern transportation and communication systems, Nepal gradually shifted towards formal trade mechanisms (Bastola and Sapkota, 2015). In recent years, Nepal's foreign trade has mainly been dominated by its neighboring countries, particularly India and China. India has been Nepal's largest trading partner, with the majority of imports coming from India and exports primarily consisting of agricultural products (Magar, 2021). China has also emerged as a significant trade partner for Nepal, particularly in terms of imports, including machinery, electrical equipment, and construction materials (Chhetri, 2022).

One of the significant challenges Nepal faces in foreign trade is its trade deficit, where imports exceed exports. This trade imbalance can be attributed to various factors such as the country's heavy reliance on imports for essential goods, limited export diversification, and infrastructure constraints (Sharma and Bhandari, 2005). Nepal has taken measures to resolve these challenges and boost its international trade. It has participated actively in regional trade agreements and initiatives, such as the South

Asian Association for Regional Cooperation (SAARC) and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC). In addition, Nepal has investigated trade opportunities with countries other than its immediate neighbors (Pokhrel, 2022).

Foreign trade plays a significant role in the economic development of nations worldwide. Foreign trade is essential for expanding a nation's economic activities beyond its borders. The relationship between international trade and economic growth has been the subject of extensive research, as it helps policymakers comprehend the dynamics and applications of international trade on a nation's economic performance as a whole. This study intends to investigate the connection between foreign trade and economic development in Nepal. It also seeks to investigate imports and exports to calculate Nepal's GDP.

This study is broken up into five sections. The remaining chapters are organized as follows: Chapter 2 discusses reviews of the relevant theoretical and empirical literature on this topic. Materials and methods are presented in chapter three. Data and outcomes are given and described in Chapter 4. The study's conclusions, policy ramifications, and limitations are all given in the final chapter.

**Literature Review**

The relationship between GDP growth and international trade has been the subject of a plethora of theoretical and empirical studies. Numerous academics have noted a long-term correlation between GDP, exports, and international trade, but they have not yet determined whether imports have a beneficial or negative impact. The theoretical and empirical literature are briefly covered in this section.

Three hypotheses are developed that establish the relationship between economic growth and foreign trade. The export-led growth hypothesis suggests that an increase in exports, particularly in manufactured goods, can stimulate overall economic growth by creating employment, generating foreign exchange earnings, attracting foreign investment, and encouraging technological advancement (Rodrik, 2018). The export-led growth hypothesis gained prominence in the 1980s and 1990s, particularly in the context of developing countries seeking strategies for economic development. Ragnar Nurkse and Albert O. Hirschman were in favor of this hypothesis (Dollar and Kraay, 2003).

The import-led growth hypothesis suggests that a country's economic growth is driven by an increase in imports, rather than relying solely on exports or domestic consumption. It argues that importing goods and services can stimulate domestic production, promote technology transfer, and enhance competitiveness. It believes that countries can benefit from importing goods that they are not efficient at producing, allowing them to focus their resources on areas of competitive advantage (Celiendo and Rossi-Hansberg, 2012).

The trade-led growth hypothesis suggests that international trade can drive economic growth and economic development (Imbs and Wacziarg, 2003). It proposes that countries can take benefit from international trade in producing specific goods and services, and by engaging in trade with other countries, they can access new markets, technologies, and knowledge (Romer, 1993).

Acharya (2019) noted the contribution of international trade to Nepal's economic development. The study demonstrates the significance of Nepal's economic development. A one percent increase in the amount of international trade has led to a 0.61 percent increase in GDP. The impact of the export and import of goods and services is significant on Nepal's economic development, according to Sharma and Bhandari (2005). They discovered a positive and significant impact on Nepal's economic growth.

Magar (2021) observed an analysis of Nepal's economic development and foreign trade trends. The fundamental driver of economic growth is the rise in exports and imports. Export commerce has a less favorable impact than import trade. Pokhrel (2022) noted the large and favorable impact of foreign trade on Nepal's economic progress.

Vamvakidis (2002), Eris and Ulasan (2013), Rahaman and Mamun (2016), and Busse and Koniger (2012) found that international trade positively influences economic growth. Economic expansion and international trade have both short- and long-term associations.

Purnama (2019) observed the long-run co-integration between international trade and economic performance in ASEAN countries. Hye et al. (2013) found the validity of the export-led-growth model in South Asian countries, except Bangladesh, while the import-led-growth model is relevant to all South Asian Countries.

Adeleye et al. (2015), Belloumi (2014), Chaudhari et al. (2016), Hayat (2018), Uddin et al. (2017), and Zahonogo (2016) observed the positive relationship between foreign trade and economic growth. Individually, exports have a positive impact, and imports hurt the GDP.

Baldwin and Lopez-Gonzalez (2015) pointed out that imports can contribute to a trade deficit. This can hurt GDP as it implies that the country is spending more on imports than it is earning from exports, reducing overall economic output. Feenstra (1998) and Keller (2004) argued that imports can stimulate consumption and investment by providing access to a wider variety of goods and raw materials at competitive prices.

## 3. Materials and Methods

### Research Design

The overall plan that the researcher develops to investigate the specific phenomena. Descriptive and exploratory research designs are used as a blueprint for the entire research process. In this analysis, 34 yearly data points are used. EViews12 is used to explore the relation, and the descriptive method is used to describe and analyze the results.

**Data and Data Processing**

The secondary data are used in this study. The secondary data of GDP, export, import, and total foreign trade volume are collected from various economic surveys and bulletins of Nepal Rastra Bank. It covers the data of 34 fiscal years from 1989/90 to 2021/22. The data is processed with the help of Office 365 and EViews 12.

**Variables and Model Specification**

Four variables, like GDP, exports, imports, and total foreign trade volume, are included. The economic growth or increase in GDP is taken as a dependent variable, and imports, exports, and total trade volume are taken as independent variables. The economic growth or increase in GDP is the function of export (EXP), imports (IMP), and total foreign trade volume (TTV). In this sense,

$GDP = f(EXP, IMP, TTV)$ (1)

After converting the logarithmic form:

$LNGDP = f(LNEXP, LNIMP, LNTTV)$ (2)

In simple regression form:

$LNGDP = \beta_o + \beta_1 LNEXP + \beta_2 LNIMP + \beta_3 LNTTV + \mu_t$ (3)

In equation 3, $\beta_0$ shows the intercept of the regression line. $\beta_1$, $\beta_2$, and $\beta_3$ are the coefficients of exports, imports, and the total foreign trade amount, respectively. $\mu_t$ is the error term or residual term. It captures all the factors that affect the dependent variable but are not accounted for in the regression model.

The Autoregressive Distributed Lag (ARDL) model is used to analyze the long-run and short-run relationship between two or more variables. The ARDL model can estimate the error correction mechanism and measure the speed of adjustment toward long-run equilibrium (Shahbaz and Rahman,2012). The ARDL model can be utilized whether the concerned variables are of order I(0), I(1), or both (Nkoro and Uko, 2016).

A simple ARDL model is specified as:

$$Zt = \beta 0 + \sum_{i=1}^{i=p} \beta i \, Zt - i + \sum_{i=1}^{i=q} \beta i \, Yt - i + \mu t \quad (4)$$

In this equation, p and q are the lags of the dependent and independent variables. In the other sense, p indicates the autoregressive, and q indicates the distributive lag terms.

The ARDL (1, 1, 1, 1) model equation can be written as follows:

$$\Delta LNGDP = \alpha_0 + \Sigma_i (\beta_{1i} * \Delta LNGDP_{-i}) + \Sigma_j (\beta_{2j} * \Delta LNEXP_{-j}) + \Sigma_k (\beta_{3k} * \Delta LNIMP_{-k}) + \Sigma_l (\beta_{4l} * \Delta LNTTV_{-l}) + \mu_t \quad (5)$$

In this equation, ΔLNGDP represents the first difference in GDP, ΔLNEXP represents the first difference in exports, ΔLNIMP represents the first difference in imports, and ΔLNTTV represents the first difference in total trade volume. The subscript indices (i, j, k, l) represent the lag orders for each variable.

More specifically, the optimum ARDL (1,1,1,.1) model is developed:

D(LNGDP) C D(LNGDP(-1)) D(LNEXP(-1)) D(LNIMP(-1)) D(LNTTV(-1)) GDP(-1) EXP(-1) IMP(-1) TTV(-1) (6)

Where LNGDP are dependent variables, and all others are independent variables. For the short-run dynamics, an error correction mechanism model is introduced:

$$\Delta LNGDP = \beta 0 + \beta_1 \Delta LNGDP(-1) + \beta_2 \Delta LNEXP(-1) + \beta_3 \Delta LNIMP(-1) + \beta_4 \Delta LNTTV + \lambda ECT(-1) \quad (7)$$

In this model, the short-run dynamics capture the immediate impact and adjustment process between variables. At the same time, the error correction mechanism accounts for the long-run relationship and corrections that bring the variables back to equilibrium over time.

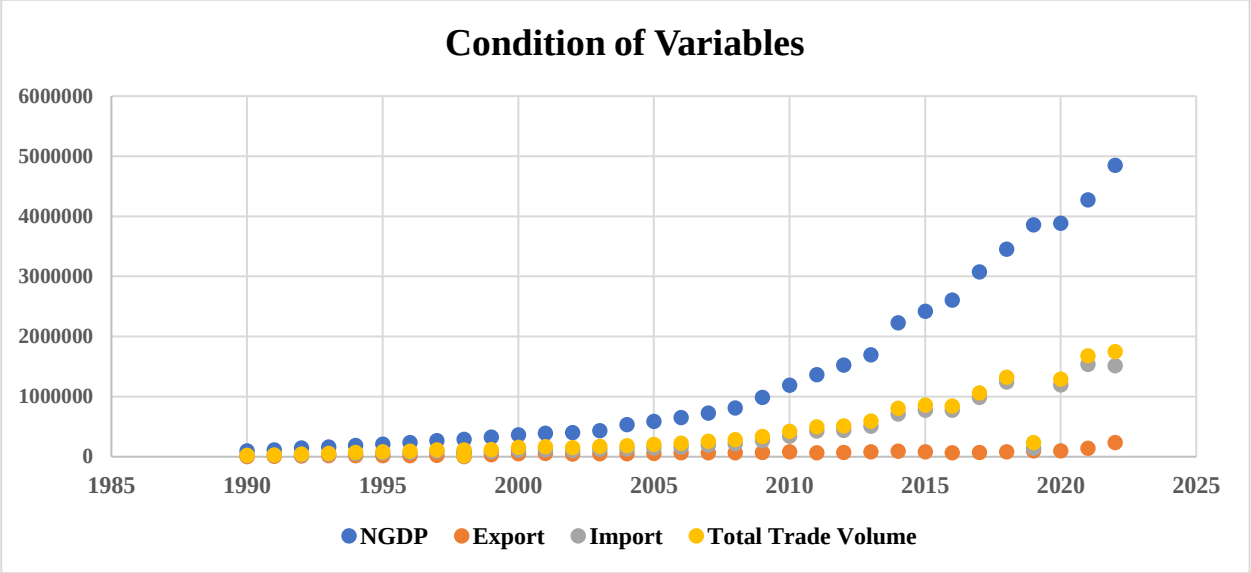
## 4. Results and Discussions

### 4.1 Condition of Variables

Four variables, GDP, export, import, and the total amount of foreign trade, are included in the analysis. It examines the impact of foreign trade on the economic growth of Nepal. The maximum and minimum values of GDP, export, import, and total trade volume range from 4851600 to 85831, 237728.4 to 4195.3, 1539837.0 to 16263.7, and 1751427.6 to 20459.0 million rupees, respectively. The condition of the dependent variable (GDP) and independent variables (export, import, and total trade volume) are displayed in Figure 1.

**Figure 1**

*Condition of GDP, export, import, and total foreign trade of Nepal from F/Y 1998/1999 to 2021/2022*




According to Figure 1, all variables are in increasing trend with slight variation in some years.

### 4.2 Descriptive Statistics

Descriptive statistics is a subfield of statistics involving the accumulation, organization, analysis, and interpretation of data to provide an overview or summary of the essential

characteristics of a data set. Descriptive statistics provide a meaningful description and summary of data, as well as an interpretation that is simple to comprehend. Included in descriptive statistics are numerous measures, such as measures of central tendency (such as mean, median, and mode), measures of variability such as range, standard deviation, and variance, and measures of distribution such as skewness and kurtosis. These measures can aid in identifying the data's trends and patterns and provide insight into the data set's behavior. Table 1 presents the measures of central tendency, dispersion, and distribution.

**Table 1**

*Measures of central values, dispersion, and distribution of variables.*

| Headings | LNGDP | LNEXP | LNIMP | LNTTV |
|---|---|---|---|---|
| Mean | 13.446 | 10.696 | 12.109 | 12.355 |
| Median | 13.338 | 11.036 | 11.882 | 12.289 |
| Maximum | 15.394 | 12.379 | 14.247 | 14.375 |
| Minimum | 11.360 | 8.342 | 9.696 | 9.926 |
| Std. Dev. | 1.2111 | 0.919 | 1.293 | 1.219 |
| Skewness | 0.042 | -0.943 | 0.005 | -0.138 |
| Kurtosis | 1.813 | 3.433 | 2.117 | 2.259 |
| Coefficient of Variation | 9.007% | 8.592% | 10.678% | 9.866% |
| Jarque-Bera | 2.007 | 5.308 | 1.104 | 0.884 |
| Probability | 0.367 | 0.070 | 0.575 | 0.643 |
| Sum Sq. Dev. | 48.406 | 27.915 | 55.239 | 49.049 |
| Observations | 34 | 34 | 34 | 34 |

Table 1 shows the descriptive statistics of the concerned variables in log-transformed form. The GDP ranges from a maximum of 15.394 to a minimum of 11.360. The export ranges from a maximum of 12.379 to a minimum of 8,342, the import ranges from 14.247 to a minimum of 9.696, and the total trade volume ranges from 14.375 to a minimum of 9.926. The standard deviation value of imports is 0.919, the lowest value among others. Therefore, it can be concluded that the mean of imports is more representative than other variables. The coefficient of variation of exports is less than that of other variables. So, the export data is more consistent than other variables like GDP, imports, and total trade. The data on GDP and imports are positively skewed, but the export and total trade data are negatively skewed. Kurtosis values of GDP, imports, and total trade volume are less than three. Hence, the distribution of these variables is platykurtic (mean>median), whereas the export distribution is Leptokurtic, which is mean<median.

**4.3 Correlation Analysis Between Variables**

The statistical method of correlation analysis measures the strength and direction of the relationship between variables. It measures the degree of association between two variables. Importantly, the correlation does not suggest caution. Correlation between

two variables does not imply that one variable causes the other. It is also conceivable that the correlation is the result of a third variable that influences both variables under consideration. Table 2 displays the intensity and direction of the relationships between various pairs of variables.

**Table 2**

*Strength and direction of the relationship between variables*

| Variables | LNGDP | LNEXP | LNIMP | LNTTV |
|---|---|---|---|---|
| LNGDP | 1.000 | 0.9048 | 0.9551 | 0.9632 |
| LNEXP | 0.9048 | 1.000 | 0.8965 | 0.9231 |
| LNIMP | 0.9551 | 0.8965 | 1.000 | 0.9976 |
| LNTTV | 0.9632 | 0.9231 | 0.9976 | 1.000 |

This table shows the results of a correlation analysis between four variables: LNGDP (log of GDP), LNEXP (log of exports), LNIMP (log of imports), and LNTTV (log of total trade volume). The values in the table represent the Pearson correlation coefficients between each pair of variables. Looking at the table, we can see that all the correlation coefficients are positive, indicating that as one variable increases, the other also tends to increase. The values range from 0.8965 to 0.9976, which suggests a strong positive relationship between these variables.

In particular, LNGDP and the other three variables have a very high correlation. The correlation coefficient between LNGDP and LNEXP is 0.9048, between LNGDP and LNIMP is 0.9551, and between LNGDP and LNTTV is 0.9632. This suggests a strong positive relationship exists between GDP and exports, imports, and total trade volume. Overall, this correlation analysis suggests that these four variables are positively correlated, consistent with what we would expect for international trade and economic activity variables. However, it is essential to note that correlation does not imply causation, and further analysis would be needed to establish any causal relationships between these variables.

### 4.4 Stationary and Non-stationary Test of Data

In statistics and econometrics, stationary and non-stationary are used to describe the behavior of time series data over time. A stationary time series is one whose statistical properties remain constant over time. This means that the series's mean, variance, and autocorrelation do not change over time. In contrast, non-stationary time series data is one whose statistical properties change over time. The Augmented Dickey-Fuller (ADF) test checks the stationarity or non-stationarity of data. Data must be stationary to predict anything. The results of the Augmented Dickey-Fuller tests are presented in Table 3

**Table 3**

*Augmented Dickey-Fuller test to check the stationarity*

| Variables | Base | Level | | First difference | | Decision |
|---|---|---|---|---|---|---|
| | | Intercept | Intercept and trend | Intercept | Intercept and trend | |
| LNGDP | ADF-test<br>P-value<br>t-Stat. | 0.933<br>0.764<br>-2.954 | -4.219<br>0..014<br>-3.603 | -5.043<br>0.0003<br>-2.957 | -5.019<br>0.002<br>-3.557 | Stationary in level |
| LNIMP | ADF-test<br>P-value<br>t-Stat. | -1.516<br>0.512<br>-2.964 | -5.367<br>0.001<br>-3.553 | -4.195<br>0.003<br>-2.964 | -4.184<br>0.013<br>-3.568 | Stationary in level |
| LNEXP | ADF-test<br>P-value<br>t-Stat. | -1.389<br>0.545<br>-2.960 | -3.245<br>0.094<br>-3.557 | -2.743<br>0.034<br>-2.960 | -2.536<br>0.310<br>3.557 | Stationary after the first difference |
| LNTTV | ADF-test<br>P-value<br>t-Stat. | -1.859<br>0.346<br>-2.964 | -5.032<br>0.002<br>-3.553 | -4.036<br>0.004<br>-2.964 | -4.092<br>0.016<br>-5.568 | Stationary in level |

The table displays the results of Augmented Dickey-Fuller (ADF) tests conducted on four variables: LNGDP, LNIMP, LNEXP, and LNTTV, representing the gross domestic product, import, export, and total trade volume, respectively. The ADF test is a statistical test that helps determine whether a given time series is stationary. The ADF-test statistics are reported as follows: the p-value, t-statistic, and the critical values of the test. Suppose the p-value is less than a chosen level of significance, typically 0.05. In that case, we reject the null hypothesis that the series has a unit root and conclude that the series is stationary. The table shows that GDP and imports are stationary in level, as evidenced by the ADF-test statistics for the intercept-only and intercept and trend models.

On the other hand, export requires first differencing to achieve stationarity. The ADF-test statistics for total trade volume suggest it is stationary in level, but only after adding an intercept and a linear trend to the regression model. GDP, import, and total trade volume are stationary at the level, and export is stationary after the first difference. In this case, the ARDL model can be applied to observe the connection between dependent and independent variables.

### 4.5 Lag Selection of Variables

Lag selection determines the optimal number of lags to include in a time series model. The choice of lags is usually based on statistical criteria that evaluate the model's goodness of fit. In the time series model, the lag order represents the number of past observations included in the model. The selection of the lag order is essential because

having too few lags may result in the omission of important information, leading to an underfit model, while including too many lags may lead to overfitting and poor out-of-sample performance. The results of lag selection methods are presented in Table 4.

**Table 4**

*Selection of lag order by various methods*

| Lag number | Akaike information criterion (AIC) | Schwarz criterion (SC) | Hannan-Quinn (HQ) criterion. |
|---|---|---|---|
| 1 | -3.0709 | -2.7081 | -2.9488 |
| 2 | -2.8271 | -2.2775 | -2.6449 |
| 3 | -2.0861 | -1.9450 | -2.4449 |

The table shows the values of the Akaike information criterion (AIC), Schwarz criterion (SC), and Hannan-Quinn (HQ) criterion for different lag numbers in a time series model. These criteria select the best model among a set of candidate models, with lower values indicating a better fit. The lag number refers to the number of lags included in an autoregressive model, a time series model that uses past observations as predictors for future values. In this case, the compared models have 1, 2, and 3 lags, respectively. The value of the Akaike information criterion (AIC) is -3.0709, the Schwarz criterion (SC) is -2.7081, and the Hannan-Quinn (HQ) criterion is -2.9488 in lag order one. The value of the AIC, SC, and HQ criteria is smaller in lag order one than in other lag orders. So, the lag one is selected to fit the model. Recall that a lower AIC, SC, and HQ criterion value indicates a better lag length.

### 4. 6 Autoregressive Distributed Lag (ARDL) Model

The ARDL model was first introduced by Pesaran and Shin in 1998 in their paper 'Generalized Impulse Response Analysis in Linear Multivariate Models' (Czturk and Acaravci, 2013). The ARDL model is based on the notion that if the variables are non-stationary, they can still be used in a regression equation by first differencing the series, which makes them stationary (Pesaran and Shin, 1998). The ARDL model then allows for the inclusion of lagged values of the dependent variables and the differences between these variables in the regression equation (Apergis and Payne, 2014). In this analysis, some variables are stationary at the level, and some are stationary after the first difference. So, the ARDL model can be applied in this condition. The optimal lags of dependent and independent variables were found in ARDL (1, 1, 1, 1). The selected model is presented in Table 5.

**Table 5**

*ARDL model with optimal lags*

Dependent Variable: LNGDP

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| LNGDP(-1) | 1.023 | 0.043 | 23.646 | 0.000 |
| LNIMP | -0.686 | 0.5278 | -1.299 | 0.025 |
| LNIMP(-1) | 1.508 | 0.577 | 2.613 | 0.0150 |
| LNEXP | -0.053 | 0.125 | -0.423 | 0.676 |
| LNEXP(-1) | 0.238 | 0.143 | 1.667 | 0.108 |
| LNTTV | 0.844 | 0.655 | 1.291 | 0.208 |
| LNTTV(-1) | -1.866 | 0.732 | -2.551 | 0.017 |
| C | 0.477 | 0.189 | 2.522 | 0.018 |
| R-squared | 0.9987 | Mean dependent var | | 13.510 |
| Adjusted R-squared | 0.9983 | S.D. dependent var | | 1.1715 |
| F-statistic | 2838.874 | Durbin-Watson stat | | 2.050 |
| Prob(F-statistic) | 0.000 | | | |

Serial correlation LM test P-value 0.8620 Heteroskedasticity P-value 0.7593

In Table 5, the ARDL model with optimal lags is presented. The dependent variable GDP is modeled as a function of its lagged value LNGDP (-1) and the lagged values of other independent variables, namely import (LNIMP), LNIMP (-1), export (LNEXP), LNEXP (-1), total trade volume (LNTTV), LNTTV (-1), and a constant term (C). The coefficient of the model shows the change in the dependent variable for a unit change in the respective variables, holding all other variables constant. The coefficient of LNGDP (-1) is positive and statistically significant on the current GDP. That is expected as the current GDP is influenced by the past values of GDP. The coefficient of import (LNIMP) is negative but not statistically significant, indicating that the current value of imports doesn't have a significant impact on GDP. However, the lagged value of imports has a positive and statistically significant effect on GDP, indicating that the past value of imports has a positive impact on the current GDP. The export has a negative but not statistically significant impact on economic growth in Nepal. However, the lagged value of export has a positive and statistically significant impact on economic growth, indicating that the past value of export has a positive impact on the current GDP of Nepal. Orhan et.al. (2020) found the export-led hypothesis on the Turkish economy. They found that a one percent increase in exports has increased GDP by 1.36 percent. The coefficient of total trade volume (TTV) is positive but not statistically significant. Vamvakidis (2002), Eris and Ulasan (2013), Rahaman and Mamun (2016), and Busse and Koniger (2012) observed a positive impact of foreign trade on economic growth. However, the lagged value of TTV has a negative and statistically significant effect on GDP, indicating that the past value of TTV hurts the current GDP. In Nepalese foreign trade, imports are many times more than exports. So, the total foreign trade amount harms economic growth. The constant term (C) is

positive and statistically significant, indicating that other factors are not included in this model that affect the GDP.

The value of R-squared is very high at 0.9987, indicating that the model explains a large portion of the variation in the dependent variable. The adjusted R-squared value is also high at 0.9983, indicating that the model is not overfitting the data. The f-statistic is very high at 2838.874, and the associated p-value is very low at 0.00, indicating that the model as a whole is statistically significant. The Durbin-Watson statistic is 2.050, indicating that there is no significant autocorrelation in the model residuals.

The ARDL model (1,1,1,1) is far from the problem of serial correlation because the p-value of the observed Chi-square is 0.8620, which is more than 0.05. Similarly, there is no problem with heteroskedasticity because the p-value is 0.7593, which is more than 0.05. This model is stable, as can be seen from the CUSUM and CUSUM square test, which is presented in Figure 2.

**Figure 2**

*CUSUM and CUSUM square test for stability analysis*

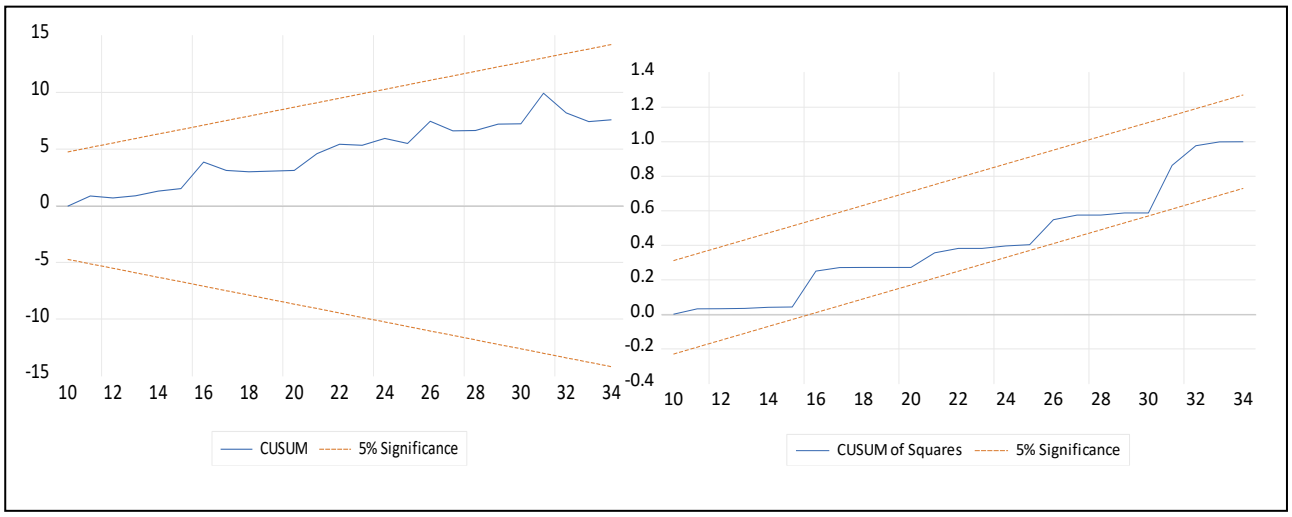
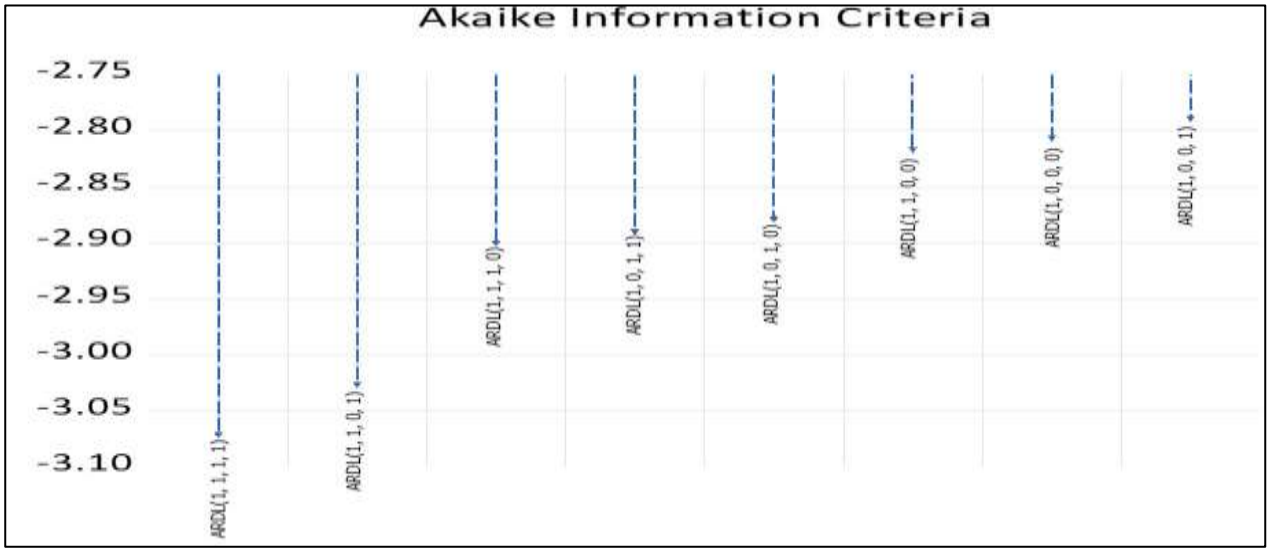



Figure 2 is presented to check the stability of this model. Cumulative Sum (CUSUM) and CUSUM square are used mainly for descriptive diagnostic rather than pure significance testing (Plober and Krämer, 1990). The blue line is between two boundary lines (red lines). So, there is no problem with the instability of this model.

In Figure 3, the model selection criteria are presented. The value of Akaike information criteria (AIC) is least at the (1,1,1,1) model than other possible outcomes. The value of AIC is found to be -3.071 in ARDL (1,1,1,1), -3.026 in ARDL (1,1,0,1), -2.9001 in ARDL model (1,1,1,0), -2.8900 in ARDL model (1,0,1,1), -2.879 in the model (1,0,1,0), -2.8169 in model (1,1,0,0), -2.8065 in model (1,0,0,0), and -2.7892 in model (1,0,0,1). So, ARDL (1,1,1,1) is the best analysis model.

**Figure 3**

*Model selection criteria under AIC*




### 4.7 ARDL Bound Testing

The ARDL bound testing is used to estimate the long-run relationship or not between two or more variables (Moutinho and Madaleno,2020). In the bound testing approach, if the value 0f F-statistic is more than the upper bound I(1), then there is a long-run relationship between the response and predictor variables. When the value of the F-statistic is less than the lower bound I(0), there is no long-run relationship between different variables. When the value of the F-statistic lies between I(1) and I(0), the decision is inconclusive. Table 6 displays the results of ARDL bound testing.

**Table 6**

*Results of ARDL F-bound testing*

F-Bounds test Null hypothesis: No levels of relationship

| Test statistic | Value | Significance level | Lower bounds, I(0) | Upper bounds I(1) |
|---|---|---|---|---|
| F statistic | 23.356 | 10% | 2.37 | 3.20 |
| | | 5% | 2.79 | 3.67 |
| | | 1% | 3.65 | 4.66 |

Table 6 shows the F-bound test, which is used in the context of the ARDL model to test the presence of a long-run relationship between dependent and independent variables. The F-statistic value is 23.356. The null hypothesis in the bound test is that there are no levels of relationship between the variables. The test statistic value is compared with the critical value at different significance levels, that is, 10 percent, 5 percent, and 1 percent. The F-statistic value is more than the upper bound I(1) at a 5 percent level of significance. So, there is a long-run relationship between foreign trade and the economic growth of Nepal. The variables are cointegrated so that we can specify both short-run ARDL and long-run VECM models.

**4.8 ARDL Long Run Form**

The long-run ARDL model checks the long-run association ship between dependent and independent variables. The model estimates the coefficients and statistical significance of the variables in equations. The long-run coefficients of the ARDL model are presented in Table 8.

**Table 8**

*Estimation of the long-run ARDL model*

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LNEXP | -8.091 | 13.157 | -0.615 | 0.544 |
| LNIMP | -35.905 | 59.656 | -0.602 | 0.553 |
| LNTTV | 44.582 | 72.184 | 0.618 | 0.542 |
| C | -20.830 | 38.508 | -0.541 | 0.593 |

In the table, the statistical relation of four variables, like GDP export, import, and total foreign trade amount, is explained in the long run. Overall, none of the variables has a statistically significant impact on determining the dependent variable. This implies that the model fails to find strong evidence that any of these variables significantly predict the dependent variables. The probabilities associated with each coefficient indicate that the observed relationships could be due to random chance rather than true effects.

Long-run ARDL regression is estimated as:

LNGDP =-8.0912*LNEXP -35.9046*LNIMP + 44.5826*LNTTV - 20.8305 (8)

**4.9 Estimation of Short-run Dynamics ECM Model**

The short-run error correction model is used to analyze the short-run dynamics of a set of variables. The coefficients of the model provide information about the direction and strength of the relationship between the variables. The t-statistics and the P-value are used to test the statistical significance of the coefficients. The short-run dynamics error correction model is presented in Figure 8.

**Table 8**

*ARDL Error Correction Regression*

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(LNIMP) | -0.686 | 0.432 | -1.586 | 0.125 |
| D(LNEXP) | -0.053 | 0.108 | -0.491 | 0.628 |
| D(LNTTV) | 0.845 | 0.540 | 2.563 | 0.031 |
| ECT(-1)* | -0.0223 | 0.002 | 11.639 | 0.000 |
| R-Squared | 0.3997 | S.E. regression | 0.0436 | |

Table 8 represents the results of an ARDL error correction model, especially focusing on short-run dynamics. In short, the dependent variables are not individually significant in explaining the dependent variable without total foreign trade. Foreign

trade has a statistically significant and positive impact on economic growth in Nepal. Adeleye et al. (2015), Belloumi (2014), Chaudhari et al. (2016), Hayat (2018), Uddin et al. (2017), and Zahonogo (2016) observed the positive relationship between foreign trade and economic growth. Individually, exports have a positive impact, and imports have a negative impact on determining the GDP. In the short run, a one percent increase in foreign trade leads to a 0.845 percent increase in the GDP of Nepal. The Error Correction Term (ECT) is negative and statistically significant. The short-term coefficients are moving towards the long-run equilibrium at a rate of 2.23 percent. The value of R-squared is 0.3997, suggesting that 39.97 percent of the variation in GDP is caused by foreign trade in Nepal. The standard error of the regression is too small (0.0436). So, there is a small distance between the observed values and the predicted values. In summary, the ECM model suggests that the error correction term from the previous period has a significant effect.

## 5. Conclusion, Policy Implications, and Limitations.

This study has identified the relationship between economic growth and foreign trade in Nepal. The GDP, import, export, and total foreign trade amounts are found in an increasing trend with slight variations in a few years. Export is more consistent than GDP, import, and total trade volume during 34 years because it has the smallest value of the coefficient of variation. GDP and foreign trade have a high degree of positive correlation. There is a long-run association ship between the dependent variable (GDP) and the independent variables, that is export, import, and total trade volume in Nepal, because the F- statistic value is more than the upper bound value at a 5 percent level of significance. Import and economic growth have negative associations in Nepal. A one percent increase in imports decreased the GDP by 0.686 percent in Nepal. The previous economic growth led to the present economic growth. It is found that a one percent increase in the GDP of the previous year leads to a 1.023 percent increase in the present GDP of Nepal. More specifically, 94.92 percent of GDP is explained by foreign trade in Nepal, but that percent is only 39.97 percent in the short run. In the long run, none of the independent variables has a statistically significant impact on determining the dependent variable. Hye et al. (2011) concluded that the adverse trade hurts the economic growth of the nation. In the short run, only total foreign trade has a statistically significant and positive impact on economic growth. A one percent increase in foreign trade leads to a 0.845 percent increase in the GDP of Nepal.

The analysis shows the negative impact of imports on the economic growth of Nepal. So, it is suggested to reduce the import of goods and services by promoting domestic industries and products. The impact of exports is not positive. That may be the cause of the export of raw materials to foreign countries. The export of raw materials hurts the economic growth of the country. Therefore, raw materials of the country must be utilized inside the country to increase GDP. For economic growth,

industrial, agricultural, and tertiary sectors must be developed, including foreign trade. The high deficit in foreign trade cannot strongly positively impact the economic growth of Nepal. So, it guides the path of the policymakers to emphasize the sector-wise development of the country.

As a determinant of economic growth, secondary data on imports, exports, and foreign trade volume form the basis of this study. There are only 34 data points between fiscal years 1998/99 and 2021/22. ARDL is used to examine the long-term association between variables. This study identified numerous GDP determinants. Therefore, it is transmitted to other researchers using additional variables, data points, techniques, and methods.

**Declarations**

**Conflict of Interest**

The authors declare no conflict of interest.

**Funding Statement**

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

## References

- Acharya, R. (2019). Foreign Trade and Economic Growth of Nepal: An ARDL Approach. *Economic Review of Nepal, 2*(1), 183-202. DOI: https://doi.org/10.3126/ern.v2i1.53133
- Adeleye, J.O., Adeteye, O.S. & Adewuyi, M.O. (2015). Impact of International Trade on Economic Growth in Nigeria. *International Journal of Financial Research, 6,* 163-172. https://doi.org/10.5430/ijfr.v6n3p163
- Apergis, N., & Payne, J. E. (2014). Renewable energy, output, CO2 emissions, and fossil fuel prices in Central America: Evidence from a nonlinear panel smooth transition vector error correction model. *Energy Economics, 42*, 226-232. https://doi.org/10.1016/j.eneco.2014.01.003
- Bastola, U., & Sapkota, P. (2015). Causality between trade and economic growth in the least developed economy: evidence from Nepal. *The Journal of Developing Areas*, *49*(4), 197–213. http://www.jstor.org/stable/24737371
- Baldwin, R., & Lopez-Gonzalez, J. (2015). Supply-chain Trade: A Portrait of Global Patterns and Several Testable Hypotheses. *The World Economy,* 38(11), 1682-1721. httpa://doi.org/10.1111/twec. 12189
- Belloumi, M. (2014). The Relationship between Trade, FDI, and Economic Growth in Tunisia: An Application of the Autoregressive Distributed Lag Model. *Economic Systems, 38*(2), 269–287. https://doi:10.1016/j.ecosys.2013.09.002

- Busse, M., & Kaniger, J. (2012). Trade and economic growth: A re-examination of the empirical evidence. *Hamburg Institute of International Economics (HWWI) Research papers*, 123 https://econpapers.repec.org/RePEc:zbw:hwwirp:123
- Caliendo, L., & Rossi-Hansberg, E. (2012). The impact of trade on organization and productivity. *The Quarterly Journal of Economics*, *127*(3), 1393–1467. http://www.jstor.org/stable/23251988
- Chaudhary, G. M., Hashmi, S., H., & Khan, M. A. (2016). Exchange Rate and Foreign Trade: A Comparative Study of Major South Asian and South-East Asian Countries. *Procedia-Social and Behavioral Sciences, 230*, 85-93. https://doi:10.1016/j.sbspro.2016.09.01
- Chhetri, H. B. (2022). Foreign Trade, Foreign Direct Investment, and Economic Growth in Nepal. *Janapriya Journal of Interdisciplinary Studies, 11*(1), 75–93. https://doi.org/10.3126/jjis.v11i1.51648
- Dollar, D., Kraay, A. (2003). Institutions, trade, and growth. *Journal of Monetary Economics, 50*(1), 133-162. https://doi.org/10.1016/S0304-3932(02)00206-4.

- Eriș, M., N. & Ulașan, B. (2013). Trade openness and economic growth: Bayesian model averaging estimate of cross-country growth regressions. *Economic Modeling*, 33(C), 867-883. DOI: 10.1016/j.econmod.2013.05.014
- Feenstra, R. C. (1998). Integration of Trade and Disintegration of Production in the Global Economy. *Journal of Economic Perspectives, 12* (4); 31-50. DOI: 10.1257/jep.12.4.31

- Hayat, A. (2018). FDI and economic growth: the role of natural resources? *Journal of Economic Studies, 45*(2), 283-295. https://doi:10.1108/JES-05-2015-0082
- Hye, Q., M., A., Shahida W., & Lau, W., Y. (2013). Trade-led growth hypothesis: An empirical analysis of South Asian countries. *Economic Modelling, 35*, 654-660. https://doi.org/10.1016/j.econmod.2013.07.040
- Imbs, J., & Wacziarg, R. (2003). Stages of Diversification. *American Economic Review, 93* (1): 63-86. DOI: 10.1257/000282803321455160
- Keller, W. (2004). International Technology Diffusion. *Journal of Economic Literature*, 42(3): 752-782. DOI: 10.1257/0022051042177685
- Magar, U. B., R. (2021). The Trend Analysis of Foreign Trade and Economic Growth of Nepal. *The Journal of Economic Concerns*, 12(1), 112-122. https://necs.org.np/wp-content/uploads/2022/03/08
- Marin, D. (1992). Is the Export-Led Growth Hypothesis Valid for Industrialized Countries? *The Review of Economics and Statistics, 74*(4), 678–688. https://doi.org/10.2307/2109382
- Moutinho, V., & Madaleno, M. (2020). Economic growth assessment through an ARDL approach: The case of African OPEC countries. *Energy Reports, 6*(8), 305-311. https://doi.org/10.1016/j.egyr.2020.11.253.

- Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. *Applied Economics, 37*(17), 1979-1990. https://doi.org/10.1080/00036840500278103
- Nkoro, E., & Uko, A., K. (2016). Autoregressive Distributed Lag (ARDL) Cointegrating technique: Application and interpretation. *Journal of Statistics and Econometric Method, 5*(4), http://www.scienpress.com/Upload/JSEM%2fVol%205_4_3.pdf
- Nursini, N. (2017). Effect of Fiscal Policy and Trade Openness on Economic Growth in Indonesia. 1990-2015. *International Journal of Economics and Financial Issues, 7*(1), 358–364. https://www.econjournals.com/index.php/ijefi/article/view/3363
- Orhan, A., Emikönel, M., Emikönel, M., & Castanho, R. A. (2022). Reflections of the "Export-Led Growth" or "Growth-Led Exports" Hypothesis on the Turkish Economy in the 1999–2021 Period. *Economies*, *10*(11), 269-279. http://dx.doi.org/10.3390/economies10110269
- Ozturk, I., & Acaravci, A. (2013). The long-run and causal analysis of energy, growth, openness, and financial development on carbon emissions in Turkey. *Energy Economics, 36*, 262-267. https://doi.org/10.1016/j.eneco.2012.08.025
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics, 16*(3), 289–326. http://www.jstor.org/stable/2678547
- Pesaran, M. H., & Shin, Y. (1998). Generalized impulse response analysis in linear multivariate models. *Economics Letters, 58*(1), 17-29. https://doi.org/10.1016/S0165-1765(97)00214-0
- Ploberger, W., & Krämer, W. (1990). The Local Power of the CUSUM and CUSUM of Squares Tests. *Econometric Theory, 6*(3), 335–347. http://www.jstor.org/stable/3532199
- Pokhrel, Y. (2022). Effect of International Trade on the Economic Growth of Nepal. *International Journal of Economics and Management Studies*, 9(9), 1-7. https://doi.org/10.14445/23939125/IJEMS-V9I9P101
- Purnama, P., & Yao, M. (2019). The relationship between international trade and economic growth. *International Journal of Applied Business Research*, *1*(02), 112-123. https://doi.org/10.35313/ijabr.v1i02.72
- Rahman, M., M., & Mamun, S., K. (2016). Energy use, international trade, and economic growth nexus in Australia: New evidence from an extended growth model. *Renewable and Sustainable Energy Reviews*, 64(C), 806-816. DOI: 10.1016/j.rser.2016.06.039
- Rodrik, D. (2018). *Straight talk on trade: Ideas for a sane world economy*. Princeton University Press. https://a.co/d/5CAq2MJ

- Romer, P. (1993). Idea gaps and object gaps in economic development. *Journal of Monetary Economics, 32*(3), 543-573. https://doi.org/10.1016/0304-3932(93)90029-F.
- Shahbaz, M., & Rahman, M. M. (2012). The dynamic of financial development, imports, foreign direct investment, and economic growth: cointegration and causality analysis in Pakistan. *Global Business Review, 13*(2), 201-219. https://doi.org/10.1177/097215091201300202
- Sharma, O., & Bhandari, R. (2005). Foreign Trade and Its Effects on Nepalese Economic Development. *The Journal of Nepalese Business Studies, 2*(1), DOI: https://doi.org/10.3126/jnbs.v2i1.51
- Uddin, G. A., Salahuddin, M., Alam, K., & Gow. J. (2017). Ecological Footprint and Real Income: Panel Data Evidence from the 27 Highest Emitting Countries. *Ecological Indicators, 77*, 166–175. https://doi:10.1016/j.ecolind.2017.01.003
- Vamvakidis, A. (2002). How Robust is the Growth-Openness Connection? Historical Evidence. *Journal of Economic Growth 7*, 57–80. https://doi.org/10.1023/A:1013418610712
- Zahonogo, P. (2016). Trade and Economic Growth in Developing Countries: Evidence from Sub-Saharan Africa. *Journal of African Trade, 3*(1-2), 41–56. https://doi:10.1016/j.joat.2017.02.001