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Impact of External Debts and FDI Inflows on Export Performance of Nepal: An Application of Gravity Modelling Approach

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Abstract

As export promotion garners considerable attention from policymakers, export-led growth rapidly becomes the officially proclaimed development plan in many least-developed and developing economies. In recent years, increasingly burdensome external debts, negligible foreign direct investment (FDI) inflows, and poor export performance have become the issue of debate among policymakers. This study uses balanced panel data of Nepal and its top 25 trading partners from 2007 to 2019 to analyze how external debt and FDI inflows affect Nepalese exports employing gravity modeling techniques. The results of the study show that FDI inflows and external debts positively impact Nepal's export performance. The study also found that gravity factors, population, and gross domestic product (GDP) of both Nepal and its trading partners had a substantial impact on the exports of the given country. Distance, which acts as a stand-in for transportation costs, has a detrimental effect. The study suggests leveraging debt to finance trade policy and logistics to improve the export-oriented production system and infrastructure development that prioritizes trade and GDP growth.

Keywords: *Exports, FDI, External debts, Gravity model*
JEL Classification: *F14; F21; F34*

Introduction

International trade, particularly the export-led growth hypothesis, is increasingly becoming the officially announced development strategy in many least-developed and developing economies. Many countries in South Asia have embarked upon bold plans to increase exports by creating an export-friendly environment with major reforms in the legal and tax system and generous

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incentive structures for exporters. The rapid growth of East Asian economies in the last decade is attributed primarily to their export boom (Jimenez & Hernandez, 2013).

Nepal is the least developed country (LDC) in South Asia, with a growing burden of domestic and external debts. The Nepalese government began taking domestic loans in 1962, while external debt accumulation started after the initiation of budgetary practices (Bhattarai, 2015). It is indicated that the turning point for the debt-to-GDP ratio lies specifically around 35 to 40 percent, while the export-debt ratio stands at approximately 160 to 170 percent (Shamim et al., 2017). Despite the fact that the debt-to-GDP ratio of Nepal is about 40 percent, there has been a notable absence of substantial positive effects. Even though the seemingly manageable level of debt, the anticipated impact on the economic performance of the country has not been realized. Furthermore, researchers suggest that low levels of external debt utilization positively affect the socio-economic development of a nation. However, if the debt remains underutilized, it can have detrimental effects on the overall economic well-being of the country.

Debt utilization has primarily focused on current expenditures rather than capital expenditures. For the debt to be considered productive and export-oriented, it needs to be channeled towards investment-oriented projects, such as infrastructure development, power generation, or advancements in domestic manufacturing. Indeed, it is crucial to conduct a thorough analysis to determine whether the external debt of Nepal has been effectively utilized in export-oriented sectors or if it has instead created a burdensome impact.

The Nepal government viewed FDI as a promising source of finance that wouldn't create additional debt while also providing valuable assets such as capital, technology, access to foreign markets, employment opportunities, skills, and management techniques. They believed that FDI could address issues like slow income growth, low investment-saving levels, export deficits, and high unemployment rates by serving with capital to harness its enormous natural resources to the optimum advantage. The effective use of external debt and FDI can help to achieve this development strategy. However, Nepal is still behind on basic infrastructure, such as roads and electricity, which can discourage investors. Despite deliberate efforts made by the Nepal government to attract FDI into the country with a view and aim of improving exports and economic performance, the FDI in Nepal is only 0.61 percent of GDP as of 2019, and FDI inflows in Nepal have always been less than one percent of the GDP (UNCTAD[3], 2020).

Following these backgrounds, the main objective of this paper is to test the impact of external debts and FDI inflows on exports by aligning with the extended gravity model of international trade. The reason for the name gravity model is the analogy to the 'Law of Gravity' developed by Newton. It is just

3 See: https://unctad.org/system/files/official-document/dom2020_en.pdf for conference and data status.

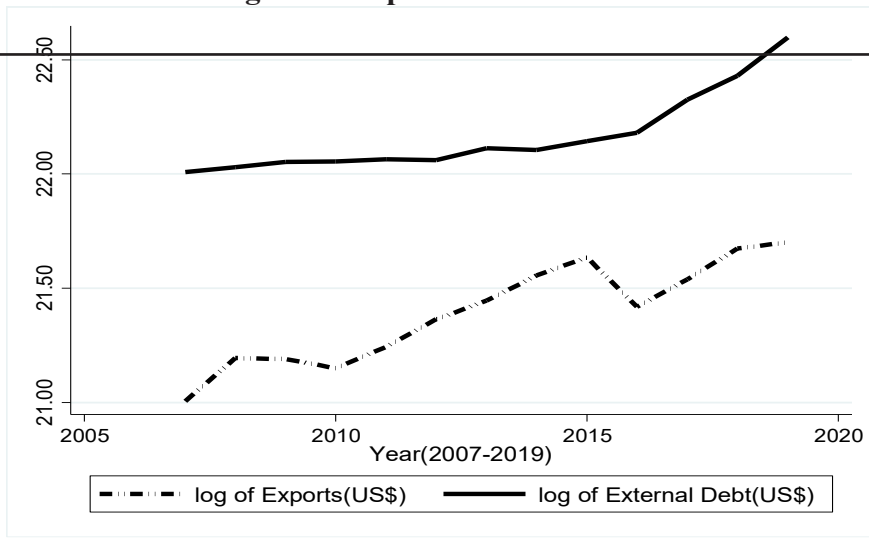
as the gravitational attraction between any two objects is proportional to the products of their masses and diminishes with distance and the trade between any two countries is, other things being equal, proportional to the products of their GDPs and diminishes with distance (Krugman & Obstfeld, 2009). It identifies and measures export value-determining factors of Nepal with major 25 trade partners in the gravity model. Similarly, this study examines the gravity model as a determinant for imports and trade balance as well. Based on the regression results with the gravity model, policymakers can gain insights into whether the debt and FDI have been utilized optimally to enhance the export capacity of Nepal or if it has led to an unsustainable burden. Such a study would provide valuable insights for future policy decisions and help ensure that external debts and FDI inflows are channeled toward productive and export-oriented investments.

This paper is structured as follows. The following section presents trends and patterns of external debts, FDI inflows, and exports. Section third is about the review of literature covering the theoretical and empirical foundations of the paper. Section four highlights the research methodology of the paper followed by the results and discussions in section five. The final section is the conclusion and recommendations based on the results of the study.

Trends and Patterns of Exports, External Debts, and FDI Inflows

This section presents the trends of exports, external debt, and FDI inflows in Nepal. To achieve this, we have collected data for these variables spanning 13 years from 2007 to 2019.

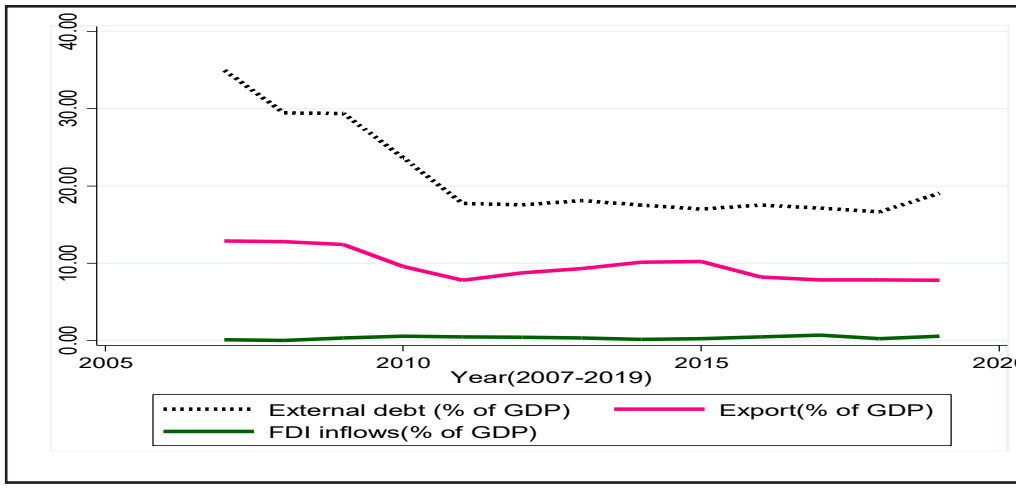
Figure 1: Exports and External Debts



Source: World Bank, 2020.

Figure 1 illustrates the natural logarithm values of the exports and external debt stocks of Nepal expressed in U.S.$ spanning the period from 2007 to 2019. The figure reveals a pronounced upward trajectory in the external debt stocks of Nepal. While the exports of Nepal exhibit significant fluctuations, the external debt stocks remain relatively stable. Nepal heavily relies on external debt sources such as the International Monetary Fund (IMF) and the World Bank, with notable contributions from countries like India, China, Japan, and the USA. Throughout the study period, the external debt stock consistently surpasses the value of exports. The figure also highlights an upward trend in exports, particularly after the year 2016, following a sharp decline in 2015. One plausible explanation for this upswing may be the significant earthquake that hit Nepal in 2015.

Figure 2: Share of Exports, External Debts, and FDI Inflows in GDP (in Percent)



Source: World Bank, 2020.

Figure 2 provides a depiction of the proportions of external debts, FDI inflows, and exports with the GDP of Nepal expressed in percent for the same time frame. The figure reveals the fluctuating nature of both exports and external debt shares over the observed period, contrasted with the consistent upward trajectory of FDI inflows as a percent of GDP. The proportion of external debts concerning GDP reached its peak in 2007, accounting for 36 percent of the of GDP Nepal. Over time, the gap between external debts and exports as a share of GDP has widened, and it's evident that these two ratios follow a similar trend. The share of exports in GDP hit its lowest point at 5 percent in 2012 and the highest in 2007.

In general, the figure underscores that throughout the study periods, foreign investment as a proportion of GDP remains around zero percent with the highest recorded value of 0.68 percent occurring in 2017 over the past 13 years. The persistent trend toward minimal FDI inflows can be attributed to non-economic factors, such as natural disasters and political instability. The continued trend towards zero FDI inflows might also be linked to political turmoil resulting

from significant disagreements between political parties following elections and parliamentary issues. The dip in 2007/08 is indicative of the global financial crisis which had a visible impact on the Nepalese economy.

Review of Literature

Theoretical Foundation

External Debts and Export Performance

The level of debt has long influenced the success of exports of developing countries. The traditional ideas of public debts and their detractors are used to emphasize how export performance and external debts are related. In the 18th century, Adam Smith developed the traditional notion of governmental debts with the idea that a country must look to foreign countries or organizations for financial assistance when its domestic revenue is insufficient to pay for bills or basic demands. Current spending generates economic activities that spur the economy to increase production in export-oriented sectors. Contrasted with capital expenditures, which are costs associated with long-term assets, are capitalized and depreciated during their useful lives. It also applies to the construction of infrastructure like roads and industrial buildings. There has not been much research done to investigate the connection between debts and trade. Regarding the association between the two factors, the study came to a variety of conclusions which are detailed as follows.

Shamim et al. (2017) investigated how Pakistan's export performance changed from 1972 to 2014 due to its external debts. The co-integration analysis revealed a unidirectional association between debts and exports and a substantial negative relationship between export performance and external debts. The results of the error correction model revealed a superficial link between the variables in the short run. Awan and Qasim (2020) suggested that Pakistan should lower its level of external debt and produce resources through taxation, exports, efficiency, and productivity.

Cheruiyot and Ombaba (2020) investigated the impact of foreign debts on Kenyan flower companies' export revenues to assess the relationship between changes in the rate of foreign debts and those revenues. The findings of the regression analysis revealed a strong positive and statistically significant impact of public debts on the revenue through exports of flower companies. The report suggested that the public debts of the nation be kept at an ideal level. In contrast to relying on external debts. Hussain et al. (2016) stressed that trade openness and exports are the best sources for supporting emerging countries.

Bhatta and Mishra (2020) looked at how economic growth and investment, trade liberalization, population growth, domestic savings, and government debts related to Nepal from 1976 to 2019. The findings demonstrated the short-term and long-term effects of debt on economic growth with a 33 percent public debt-

to-GDP ratio being determined to be the right amount for Nepal. According to the suggested course of action, the Nepal government should ensure public debt management in accordance with the level of debts that would foster growth.

FDI Inflows and Export Performance

The theories of international trade and FDI have looked at how FDI and exports are related. It is asserted that FDI is a different manner of exporting by the principle of internationalization. A global company first penetrates overseas markets by exporting its goods. Depending on the results, it might then use FDI to establish production facilities in a foreign market and begin providing services to local customers there. According to the Hecksher-Ohlin theory, different countries have varying factor endowments, explaining why some are more suited to conducting international trade than others. The 'Product Life Cycle' theory of Vernon (1992) is another important theory when it comes to studying FDI that highlights the importance of innovation and economies of scale in setting trade patterns. By introducing new technology, capital equipment, and managerial know-how, FDI helps local businesses become more productive and competitive while simultaneously expanding their exports.

As per the commonly held belief, FDI helps exports of host countries by transferring technology connecting to new international markets, offering local workers training, and improving managerial capabilities. Based on the findings of several research, it can be suggested that FDI had both favorable and unfavorable effects on export performance. It is pertinent to point out that many studies have found that FDI promotes the manufactured exports of recipient countries such as in China and other East Asian countries' context.

Buckley et al. (2002) argued that the contribution of FDI to growth depends on the economic and social conditions in the receiving countries. They found that countries with a high rate of savings, open trade systems, and high technical levels would more benefit from the increase in FDI. Wen (2005) examined how FDIs have affected regional exports and the growth of income in East, Central, and West China. FDI infusion was found to have a detrimental impact on regional export orientation in Central China, whereas, it promoted exports in East China due to geographical advantages in exports.

Prasanna (2010) explored the impact of FDI inflows on India's manufactured export performance from 1991 to 2007. The study found that the impact of FDI inflows is significantly positive. The study suggested that the policy regarding domestic efforts to enhance manufacturing exports needs reassessment in line with the FDI policy framework to reap maximum and long-term benefits.

Sultanuzzaman et al. (2018) examined the short-run and long-run relationship between FDI inflows, exports, and economic growth in Sri Lanka from 1980 to 2016 using the ARDL testing approach. They revealed that FDI inflows have a

positive and significant relationship with economic growth in both of short-run and long-run.

Duasa (2007) examined the causality between FDI and growth of output as no-burly evidence of a causal relationship between FDI and economic growth in Malaysia. While Gebremariam and Ying (2022) studied the relationship between FDI and export performance in Ethiopia using annual time series data from 1992 to 2018 and applied the ARDL model, they found an insignificant relationship between them.

Empirical Review

According to the gravity model, trade between nations depends positively on the size of the trading nations and negatively on the distance between them. It was first presented by Tinbergen (1962). Linnemann (1966) extended the equation by Tinbergen to bilateral trade and introduced the population size of i^{th} and j^{th} countries, also including the factors of artificial trade resistance. According to the model, countries are trading as per their proximity and size of GDP. Big countries trade a lot with each other, e.g., the USA and Canada on the same continent or the USA and Germany on different continents. Smaller countries like Nepal do not have such an impact on the scale of world trade. The size of exports/imports is also influenced by the fact of whether they are part of some trading association, e.g., the SAFTA / SAARC in South Asia. A few examples that incorporate the gravity model of trade include Carrere (2006), who used a gravity model of trade to assess ex-post regional trade agreements, including 130 countries with panel data for the period of 1962–1996. The paper examined the trade creation and trade diversion effects. The results showed that regional agreements have generated a significant increase in trade between member countries of Europe.

Hatab et al. (2010) have identified the determinants of exports in Sudan using a sample of 31 trading partners from 1995-2011. The gravity modeling results showed that the GDP and population size of importers positively and significantly impact agricultural exports. The results also showed that the infrastructures of both domestic and trading partners have a positive and significant role in export performance. The impact of geographical distance was found to be negative.

Greene (2013) applied an augmented gravity model of international trade with a two-step regression procedure to empirically estimate the impact of market access policies in India on the exports of goods produced by using advanced technology of the United States of America. based on panel data with a fixed-effect model for the study period from 1990 to 2011. The results showed that per-capita income, trade freedom, geographical/physical land area of import countries, stage of economic development of India, common culture, trading with island partners, and common membership in a free trade agreement as

significant determinants of the exports of U.S.A. and also transaction costs (distance) showed a significant but negative impact on the exports of the goods produces by using advanced technology of U.S.A.

Paudel (2019) analyzed the export performance of Nepal based on the typical gravity modeling technique using the study period from 2005 to 2018. The study using the data based on the standard international trade classification (SITC) with 5-digit codes showed that liberalization and the GDP of partner countries have a positive impact on the export growth of Nepal, while the distance between partner countries had a negative relationship with exports. The study suggests that concentrating on high-value products with low weight could potentially eliminate transportation costs. The findings largely hold even in different models using different databases as discussed in Paudel (2018) and Paudel et al. (2020).

Research Gap

The literature review observes that the role of external debts and FDI inflows in the export performance of Nepal has not been investigated using the latest dataset and advanced econometric analysis. This paper attempts to conduct a thorough analysis to bridge this research gap.

Research Methodology

This study utilizes secondary data to examine the broader impact of the foreign resources of Nepal which are external debts and FDI inflows on export performance. It employs a gravity modeling approach with panel data specifically analyzing exports from Nepal to its trading partners. These trading partners are chosen based on their roles as importers from Nepal, encompassing 25 major countries that have engaged in imports from Nepal.

Data and Sources

The primary source of data for gravity variables is CEPII (2021). The data for the external debt has been compiled from the World Bank (2020) dataset. The FDI inflows are carried out for the study by the United Nations Conference on Trade and Development (UNCTAD, 2020).

Models and Variables

The gravity model is very common in studying FDI and bilateral trade. Examples of studies that used the gravity model specification for bilateral trade include Grubert and Mutti (1991); and Brainard (1997). In this study, exports are assumed to be associated with the GDP. Similarly, the size of the population of Nepal and its trading partners, the distance between the most populated cities of Nepal and its partners, and other gravity variables, as discussed in the literature, may have a significant impact on the export performance of Nepal. Therefore,

this section focuses on analyzing the patterns of exports of Nepal to its trading partners by employing an augmented gravity model. The analysis uses a balanced panel data set from the top 25 trading groups / partners of Nepal for 13 years as mentioned earlier. Hence, the number of observations becomes 325. By applying this model, the study aims to gain insights into the factors influencing exports of Nepal and understand the dynamics of its trade relationships with various countries during the given study periods. The standard gravity equation argues that bilateral exports are positively determined by the size of the economy and negatively by bilateral distance. The study uses the following gravity models as a point of departure.

Benchmark Gravity Model

$$\mathbf{lnEXP_{ij,t} = \beta_0 + \beta_1 lnGDP_{i,t} + \beta_2 lnPOP_{i,t} + \beta_3 lnGDP_{j,t} + \beta_4 lnPOP_{j,t} + \beta_5 lnDIST_{ij,t} + \varepsilon_{ij,t}}$$

Where, $lnEXP_{ijt}$ is the natural logarithm of total exports of Nepal to country 'j' where j refers to trading partners, 't' is the year, β_0 is constant intercepts, and β_1- β_5 are coefficients of independent variables, respectively. Also, lnGDP is the natural log of the GDP of Nepal and its trading partners measured in US$, lnPOP is the natural log of the population of Nepal and its trading partners, lnDIST is the natural log of the distance between the most populated cities of Nepal and trading partners measured in kilometers.

Augmented Gravity Models

The benchmark model is augmented using more independent and control variables. The model is estimated using the fixed effect (FE) and random effect (RE) estimation methods, considering that the partner countries may have specific fixed effects as discussed in Borenstein et al. (2010).

Model - 1: $$lnEXP_{ij,t} = \beta_0 + \beta_1 lnEXD_{i,t} + \beta_2 lnPOP_{i,t} + \beta_3 lnPOP_{j,t} + \beta_4 lnGDP_{i,t} + \beta_5 lnGDP_{j,t} + \beta_6 lnDIST_{ij,t} + \varepsilon_{ij,t} \ldots\ldots\ldots\ldots (1)$$

Where, ln refers to the natural log, EXD is total external debt stocks measured in US$ and the rest of the variables are as explained earlier.

Model - 2: $$lnEXP_{ij,t} = \beta_0 + \beta_1 lnFDI_{i,t-1} + \beta_2 lnPOP_{i,t} + \beta_3 lnTPPOP_{j,t} + \beta_4 lnGDP_{i,t} + \beta_5 lnTPGDP_{j,t} + \beta_6 lnDIST_{ij,t} + \varepsilon_{ij,t} \ldots\ldots\ldots (2)$$

Where, $FDI_{i,t-1}$ = FDI inflow with a one-year lag in time measured in US$ that allow for the lags in the execution of FDI projects. Rest variables are similar to the Model-1

Model - 3: $\mathbf{\varepsilon_{ij,t} = \mu_{ij,t} + \theta_t + \varphi_{ij,t}}$ ……(3) as the error term

Where, $\mu_{ij,t}$ = Fixed effect that might be correlated with explanatory variables; θ_t = Time-specific effects common to all cross-section units; and φ_{ij} i = An error term uncorrelated across cross-section units and overtime periods.

Econometrics

The study tests the different specifications of the model using fixed effect (FE) and random effect (RE) estimation methods. It is noted that the partner countries may have specific fixed effects as discussed in Borenstein et al. (2010). Therefore, the study estimates the benchmark model using FE at the first step. At the same point, the study faced a problem with the estimated results of FE that it drops the time-invariant variables. Considering this limitation of FE, once the coefficients of the estimated variables are found, the study estimates the benchmark model using RE so that gravity variables, such as, distance is used in the estimation. Then, RE is followed to check the robustness of the alternative specifications of the model.

Results and Discussion

To compare the gravity factors of trade, the given table reports the estimated coefficients after estimating the basic gravity model on exports. Where export is the function of the GDP and population of Nepal, the population and GDP of 25 major partner countries, and the distance of Nepal to the most populated cities. The main independent variables are external debts and FDI inflows which are also presented after estimating FE and RE. The result indicates that a few variables are highly significant and the R-squares indicate that the model explains much of the variation in exports as the dependent variable respectively.

The results for the external debt (lnEXD) show that it has a strong positive association with export performance in Nepal. It is significant at a one percent level with a coefficient of 0.15 in both FE and RE estimations. Contrary to these assumptions of the classical theory of debt, the result shows that external debts contribute to the export performance in Nepal by supplying the required capital through infrastructure and industries in the economy. The result also contradicts Shamim et al. (2017) who found a significant but negative relationship between external debts and exports in Pakistan.

The results of the FDI inflows on exports are quite like to some extent. The results show that the inward FDI in Nepal is also export-oriented. The result is positively significant at a one percent level in both FE and RE estimations with a coefficient of 0.018. This result supports many theories and pieces of literature, including product life cycle theory, which shows that FDI emphasizes the role of innovation and economies of scale in determining trade patterns. The GDP (lnGDP) as the income variable of Nepal is strongly significant and positive in both FE and RE estimation. It shows that an increase in the GDP of Nepal develops the export performance. The population of Nepal (lnPOP) also

shows a strong positive and significant in both RE and FE models. It indicates a productive human capital that helps production and trade facilitation.

Table 1: Results of Gravity Models (2007 – 2019)

Dependent Variable: lnEXP	**Fixed Effect**	**Random Effect**	**Fixed Effect**	**Random Effect**
External Debt-log (ln EXDi)	0.152*** (0.006)	0.147*** (0.004)	-	-
FDI-log US$ (ln FDI_{t-1})	-	-	0.018*** (0.000)	0.019*** (0.000)
Population of Nepal-log (ln POPi)	2.570*** (0.021)	2.589*** (0.010)	2.777*** (0.025)	2.787*** (0.015)
Population-trading partners-log (ln POPj)	0.019 (0.043)	- 0.002 (0.001)	- 0.002 (0.029)	- 0.002* (0.001)
GDP of Nepal-log (ln GDPi)	0.350*** (0.003)	0.356*** (0.000)	0.267*** (0.005)	0.278*** (0.002)
GDP-trading partners-log U.S.$ (ln GDPj)	0.020 (0.015)	0.002 (0.002)	0.030* (0.016)	0.003 (0.002)
Distance-log-km (ln DISTij)	Dropped	- 0.003* (0.002)	Dropped	- 0.006 (0.003)
F-Stat (FE)	31315	-	18232	-
R - squared	0.883	-	0.886	-
Correlation (FE)	- 0.309	-	- 0.270	-

Source: Authors calculation.

Note: ****, ** and * indicate that the statistics are significant at 1%, 5% and 10% level of significance. The figures in the parenthesis are the standard error.*

Based on the analysis, the population of trading partners indicates a significant sign in the RE model with a negative sign and a lower coefficient value. It indicates that the population of Nepal with trading partners doesn't affect the export pattern of Nepal, but population remains the core driving factor. It appears that when it is considered the GDP of the trading partners as a measure of their economic size, we observe that a one percent growth in their GDP leads to an average increase of 0.03 percent in export performance at a lower significant level. This suggests that enhancing trade partnerships with larger economies can contribute to an improvement in export performance.

As anticipated, the estimated coefficient of distance on exports is found to be statistically negative at the 10 level in the RE estimation. However, this variable is excluded from the FE model as it is time invariant variable. The significance of the coefficient indicates that when the destination countries are located farther from the most populated city of Nepal, the level of exports to these countries tends to be smaller. This relationship can be attributed to the expected rise in transportation costs associated with greater geographical distance between the two countries.

Conclusion and Policy Recommendations

Nepal possesses untapped potential in its export sector which has yet to be fully utilized on a global scale. The country can domestically produce goods such as agricultural products, textiles, and garments for both domestic consumption and export purposes. To transform the economy of Nepa from its traditional agriculture-based activities to industrialization, the Nepalese government should leverage the export capacity of the country. Empirical results align with the predictions of the gravity model. It indicates that Nepal primarily exports labor-intensive goods and imports essential commodities. Positive and significant coefficients indicate that trade in Nepal is determined by its comparative advantages with different economies.

The result from the econometric estimation reveals that external debt and FDI inflows have a positive and significant impact on the export performance of Nepal. The GDP of importing countries also plays a crucial role in Nepalese exports. The positive relationship with FDI inflows may be attributed that FDI inflow in Nepal brings advanced technologies at a higher level supporting domestic investments and primarily targeting the international market leading to increasing exports.

Notably, the GDP of Nepal has emerged as a critical driving factor for its exports. However, the study confirms that the export performance of Nepal is not significantly influenced by the GDP and population of its trading partners. The coefficient for distance indicates that the exports of Nepal are concentrated with closer trading partners and the country heavily relies on trade with India. To mitigate excessive and risky dependence on India, it is suggested that Nepal redirects its trading activities toward China and other nearby countries to diversify its markets and expand its export potential.

The key policy implications of the study include implementing macroeconomic policy reforms that consider both demand and supply factors, adopting trade-related debt policies when acquiring external debts, and developing trade and manufacturing-focused infrastructure to enhance competitiveness and reduce the impact of distance. Nepal should also capitalize on its favorable geographical location by promoting strategies that facilitate bilateral trade. Strengthening the connection between multinational corporations and local research institutions, such as public universities and institutions can serve as a robust channel for technology transfer that could improve the productivity and export orientation of FDI inflows. Furthermore, the government needs to address the structural challenges faced by exporters and businesses.

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