



Import Substitution Elasticity in Antidumping Measures: A Case Study of Pakistani Firms Behaviour

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Abstract

This study explores the factors that influence firms to file Antidumping cases in Pakistan, focusing on Import Substitution elasticity as a major factor. The study employs the probit regression approach to estimate the potential factors that induce firms to approach the authorities to impose antidumping measures to counter unfair trade practices and shelter the domestic industry. The potential factors are Elasticity of substitution, Real Effective Exchange Rate, Industry competitiveness, Trade liberalization, quality legal system, GDP, and total domestic production of commodities against which antidumping duty is imposed. The estimation result shows that a higher elasticity of substitution, Industrial competitiveness level, real effective exchange rate, and trade openness would increase the probability of imposing antidumping duty. The quality of the Legal system, GDP, and Higher production level would induce a lesser probability of imposition of antidumping duty. This study helps to understand the behavior of the local business entities asking for shelter against the import of competing products and unfair trade practices like dumping, etc. Very few studies exist on the relationship between import substitution elasticity and antidumping measures. For developing countries like Pakistan, this is a kind of pioneer study whose results are contrary to those of Developed countries.

1 Introduction

Companies involved in international business are governed under the various clauses of the World Trade Organization (WTO). The WTO is responsible for promoting free trade among its members. However, it allows some trade barriers to protect the domestic industry, which is hurt through unfair means. For this purpose, the WTO allows member countries to act against exporting companies involved in dumping. Along with dumping duties, WTO also allows countervailing and safeguard measures that do not apply to certain companies but to all importers of the particular country and all countries.

The exporting companies are the biggest victims of antidumping duties. The importing country alleges that a particular company or companies are selling their product below the

price in their domestic market or at less than cost in importing markets. This is not only hurting the domestic industry but also a kind of unfair trade practice. The authorities estimated the dumping margin and imposed an Antidumping duty on all those companies that were found to be involved in dumping practices. Pakistani companies export textile products from the EU and American regions and cement from South African countries.

Countervailing duty is subject to subsidy given by the country to their exporters, which is not allowable under the WTO clauses. This duty is imposed on all those products whose supply originated from that country. Pakistani companies have faced such a countervailing duty by the EU on exporting PET resins, etc. Safeguard duty is implemented to safeguard the domestic industry, which is hurt due to the import surge. This is implemented in all member countries of the WTO. Turkey has imposed a safeguard duty on all cotton textile products.

All these allowable trade barriers ultimately affect export companies. The exporters believe these duties are purely protected domestic industries, which are inefficient and uncompetitive.

On the other hand, a permanent trade deficit is a major issue for all developing countries, and their economic manager devised different strategies to overcome this problem. These strategies include both the promotion of exports and controlling of imports to narrow down the trade gap. Pakistan, a low-income developing country, is facing the same problem. Its trade policies address the promotion of exports through diversification and controlling imports through various import substitution and other restrictive measures. Companies often support antidumping measures on the pretext that dumping or any unfair trade practices are against fair trade's ethical values and practices and should be controlled through rules and regulations. This is evident from various studies like; Felbermayr & Sandkamp (2020), Pistikou & Ketsetsidis (2023), Choi (2023), Ciani & Stiebale (2024) and Marvasti (2024).

On the other hand, some businesses argue that antidumping, countervailing, or safeguarding duties are similar to import tariffs and more harmful due to economic inefficiencies. Prusa (2020); Prusa et al. (2022); Rose et al. (2020); Chang and Farrukh (2021); Huang et al. (2021).

These restrictive measures also focus on protecting domestic industries to compete with cheaper or competitive imported goods and services. Before the WTO, Pakistan’s industrial policy was based on the Import-Substitution-Industrialization (ISI) strategy. However, after the WTO and Pakistan’s policy shift from this ISI strategy, the country has adopted the trade defense measures permissible under the WTO regulations. The philosophy behind the IS policy was to replace imported commodities with domestically produced goods to achieve economic independence, diversification, and stability, by which employment and welfare would be enhanced. Subsequently, the goal of a self-sustain and self-reliance economy would be achieved. However, the policy shift from IS to export promotion indicates that the IS policy was unsuccessful. However, in other developing countries, the results of these policies were mixed. Adewale (2017), Nassyrova et al., (2020); Akçay & Türel (2022) found this policy helpful for industrialization, while Rodrigues (2010); Irwin (2021) found the opposite result.

With the implementation of WTO Rules by its members, which constitute over 90% of global trade, the Antidumping and Countervailing measures are widely and constantly used to control imports. This clause in Article VI of the GATT 1994 was introduced to benefit the developing countries, but the developed countries mostly use it. Pakistani textile made-up companies are among the greatest victims of so-called antidumping measures. It should be noted that antidumping duties or measures are imposed only on companies.

According to the WTO Committee on Antidumping report, the member states have implemented 4553 Antidumping measures from January 1995 till December 2023. A summary of the number of cases, by the countries and against the countries, is given in table-1. The table shows India has imposed the largest antidumping measures, followed by the USA and the European Union. Pakistan is at rank 13, having implemented 110 measures during the last 29 years.

Table 1 Antidumping measures 01/01/1995 - 31/12/2023

| Measures by Countries | | | Measures against Countries | | |
|-----------------------|----------------|-----|----------------------------|--------------------|------|
| 1 | India | 790 | 1 | China | 1198 |
| 2 | United States | 634 | 2 | Korea, Republic of | 329 |
| 3 | European Union | 364 | 3 | Chinese Taipei | 232 |
| 4 | Argentina | 304 | 4 | United States | 203 |
| 5 | Brazil | 280 | 5 | Thailand | 181 |
| 6 | China | 266 | 6 | India | 175 |

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| | | | | | |
|--------------|--------------------|-----|----|--------------------|--------------|
| 7 | Türkiye | 210 | 7 | Japan | 174 |
| 8 | Canada | 190 | 8 | Indonesia | 166 |
| 9 | Australia | 177 | 9 | Russian Federation | 148 |
| 10 | South Africa | 161 | 10 | Malaysia | 123 |
| 11 | Mexico | 154 | 11 | Brazil | 121 |
| 12 | Korea, Republic of | 115 | 12 | European Union | 101 |
| 13 | Pakistan | 110 | 44 | Pakistan | 14 |
| 14 | Others | 798 | 14 | Others | 1388 |
| TOTAL | | | | | 4,553 |

Source: https://www.wto.org/english/tratop_e/adp_e/adp_e.htm

On the other hand, China is the country against which the largest number of AD measures have been taken during the last 29 years, followed by Korea and Chinese Taipei. This figure shows that over 26% of the world's antidumping measures were against Chinese companies. In other words, China emerged as the primary target for global importers. India, the USA, and the EU have imposed 498 out of 1198 measures. The report shows that there were only 14 cases against Pakistan, where India imposed three measures, the European Union, South Africa, and Egypt imposed two each, and the USA, Japan, and Canada implemented one each AD measure on Pakistani exporters.

Table–1.1 shows the problem statement that Pakistan has imposed 110 AD cases, while 14 measures were taken against them. This shows a significant difference and, therefore, is taken as an experiential case study as to the factors derived from taking measures to protect the domestic industry, which is hurt by dumped imports.

The State of Pakistan established the National Tariff Commission in 1990, making the organization autonomous in 2015. The commission's main function is administering trade remedial laws, including antidumping, safeguarding, and countervailing measures.

Based on the above discussion, we are motivated to investigate the factors that play a major role in implementing AD proceedings. Therefore, this study aims to find the factors that have a greater probability of influencing the decision of filing AD cases by the domestic companies in Pakistan for selected products. The study would comprise five sections. After the introduction, the next section will review past empirical studies; Section 3 will discuss the selection of variables, data estimation, and the model; Section 4 will discuss the estimation results; and Section 5 will conclude the study.

2. Literature Review

The empirical investigation of the relationship between antidumping duties and import demand substitution elasticity is limited. In a thorough investigation, Hansen et al. (2014); Forrest et al. (2020) find the determinants of antidumping proceedings by the USA against the companies of 19 foreign countries during 1992-2014. They proposed a few variables, including import substitution elasticity. This elasticity was estimated using Armington substitution elasticity. The results showed a negative relationship between AD duties and import substitution elasticity.

Clements et al. (2021) estimated import substitution elasticity with two different methodologies of all 20 sectors of the Australian economy. One of the elasticities was based on Armington elasticities, and both were used in the General Equilibrium Trade Model. They find that the CGE results provide an overestimated effect when using Armington elasticity.

In their comprehensive investigation, Kee et al. (2004) calculated the welfare effect (the deadweight loss) due to the tariff regime. They systematically estimated import demand elasticity and tariff restrictiveness index for 90 countries and analyzed the quantum tariff-induced tariff distortions. The study concluded that companies facing more competition in importing goods or higher import demands lobby for higher tariffs.

All studies by Nizovtsev and Skiba (2016) established that AD duties were influenced by import demand elasticity for the USA from 1980 to 1995. They concluded that AD duties are a special trade barrier due to the dependence on import prices. Kinnucan et al. (2017) investigated the relationship differently. They argue that AD duties improve domestic producer welfare, provided that the supply by the known sources has higher elasticity.

Marvasti and Carter (2016) conducted an economic analysis of the US shrimp market regarding domestic and import supply. For this purpose, they estimated total Shrimp production affected by domestic and import price elasticity and antidumping duty. The result showed that antidumping was ineffective in controlling imports, and a bidirectional causality analysis showed a bidirectional causality between the domestic and imported shrimp prices.

Various empirical investigations focus on economic variables that affect antidumping duties; some are discussed here to understand the gap in the literature. Choi and Kim (2014) examined macroeconomic factors like trade balance, import penetration ratio, unemployment, and real GDP, which influence the imposition of antidumping measures in India and China. All these variables were found to be induced by antidumping duties. Sudsawasd (2011) concluded that the number of antidumping cases by the developed countries is decreasing against those developing nations whose trade regimes are being liberalized; however, the developing countries' action for AD is continued irrespective of liberal trade regimes. Moore and Zanardi (2009) considered 23 countries' AD measures and found that AD measures do not support trade liberalization. They concluded that such measures belong to political economy and need to be researched in that direction. Issabekov and Suchecki (2017) investigated the targeted industry or product against which the European Union often initiates AD measures. They used two different proxies to reveal comparative advantage and found that the EU has a comparative advantage in approximately 70% of products against which AD measures were taken. The study concluded that the EU usually takes AD measures against the import of those products in which they have a comparative advantage.

Khan (2016) analyzed Pakistan's legislation on promulgating antidumping laws and its impact on Pakistan's economy. He found that in Pakistan, the concerned authority, the National Tariff Commission, only considered the injury to the domestic production of the final product. At the same time, its raw material supply through imports is neglected; therefore, more stringent measures should be taken to implement antidumping measures effectively.

The above analysis shows that most of the research has focused on macroeconomic variables, which induced the decision to initiate antidumping investigations. Very few studies have focused on the role of import substitution elasticity as one of the major determinants of AD measures. There is also almost no research on Pakistan's antidumping measures. The above review reveals a big research gap in Pakistan's antidumping measures and their determinants.

3. Methodology

In light of our objective, defined in the Introduction section, we intend to carry out this study by estimating a model in which the dependent variable is binary; therefore, a bivariate probit model will be used. Inspiring Hansen et al., (2014), we will use the following model. Here, AD is a dependent binary variable representing whether or not the AD is imposed upon.

$$AD_{it} = \beta_0 + \beta_1 SE_{it} + \beta_2 LI_{it} + \beta_3 \ln CIPS_{it} + \beta_4 KOFGI_{it} + \beta_5 \ln PQ_{it} + \beta_6 GnDPG_{it} + \beta_7 REER_{it} + u_i \dots\dots\dots (3.1)$$

Where i= Pakistan

t = time (years)

AD_{it} is an antidumping duty, equal to “1” if dumping occurs; otherwise, it equals “0” in different periods.

SE is the elasticity of substitution for i imported products.

LI is an index for the legal structure.

lnCIPS stands for competitive industrial performance score.

KOFGI is a globalization index for Pakistan.

lnPQ is the quantity of production.

GDPG is the annual GDP growth.

REER is the annual real effective exchange rate.

U_i is an error term

It is already explained that the dependent variable AD_{it} of the model is a dummy variable. If AD duty is imposed on any product in that particular year, the value is 1;

otherwise, it is zero. This information is procured from the Global Antidumping Database (GAD).

Independent variables:

3.1 Elasticity of Substitution

This variable will be estimated using the Armington formula for import substitution elasticity. We expect the same inverse relationship since we follow the Hansen et al. (2014) model, where their study establishes a negative relationship between the antidumping measure and import substitution elasticity.

3.2 Rule of Law Index

This measure is widely used for a strong legal structure. The index value ranges from -2.5 to +2.5. A higher value reflects a strong legal system, where corruption and regulatory flexibility are lower. This data is taken from “TheGlobalEconomy.com.”

3.3 Competitive Industrial Performance

This index is a proxy for industrial competitiveness developed by the World Economic Forum. This is a sub-index of the Global Competitiveness Index.

3.4 KOF Global Index

This is a comprehensive globalization index, which scores from 1 to 100. A higher value indicates a greater level of openness. This index is a proxy to measure the competitive economic environment.

3.5 Production Quantity

This is production data in tons. The domestic production by the local firms is very important in determining AD duty. As per regulations, the affected parties, including the local manufacturers, file a case against dumping by the importers.

3.6 GDP Growth

This is a proxy of economic progress and an increase in disposable income. Choi and Kim (2014) find that the higher a nation's income, the higher the chance of trade adjustment costs, including antidumping.

3.7 Real Effective Exchange Rate

The exchange rate is widely used in international trade issues. This is a very important variable in determining the dumping margin. Sudsawasd's (2011) findings include that devaluation may cause an increase in export prices. And if foreign firms' prices are higher to relative competitors in the same market, the probability of AD measure declines. The data of REER is taken from the State Bank of Pakistan.

The expected sign of the coefficients for SE is negative, as shown by Hansen et al., (2014); Kee et al., (2009), while other variables are expected to be negative or positive.

This study will use six products on which Pakistan has imposed antidumping duties. Three products are related to the Steel Industry, and 3 are Chemicals. At most disaggregated 6-digit HS level product descriptions are as follows.

Hot rolled coils

Cold rolled coils

Galvanized coils

Caustic Soda

Soda Ash

Sulphuric Acid

Although Pakistan has imposed AD duties on several products, the domestic production and price data are available for only the above six products. The import substitution elasticity cannot be estimated using the price and domestic production quantity data. As mentioned earlier, we have selected six products, and to calculate the import elasticity of substitution, the date of the quantity of local production, the quantity of import, and the local and imported price of the product are required. The measure units for quantity are kilograms, while the kilograms are priced at Pak rupees per kg.

According to the information available in the antidumping database, Pakistan has initiated antidumping proceedings on various products in the chemical and metal industry, such as sorbitol solution, printing ink, hydrogen peroxide, glacial acetic acid, etc. However, this study has chosen sulfuric acid, soda ash, and caustic soda due to the availability of complete data required to calculate import substitution elasticity.

The Global Antidumping database has shown various metal products, including aluminum beverage cases, color-coated steel, certain electrical capacitors, CC Billets, tinplate of all kinds, steel rolled coils, galvanized sheets, etc., against which Pakistani companies have lodged applications of imposing dumping duty to safeguard the domestic industry. Among all, only Hot rolled steel, cold-rolled steel, and galvanized sheets are the products for which domestic production and price data are available. Therefore, the import elasticity of the substitution can be calculated. So, this study has no option but to select these three products for estimation.

The local production quantity and price data are taken from the Census of Manufacturing Industries (CMI), and international production and price data are taken from the Indes Mundi. A panel of data is used from 2006 to 2022.

3.8 Estimation of Armington Elasticity

The substitution elasticity is computed using the following formula developed by Armington.

$$SE = \frac{\Delta\left(\frac{X}{Y}\right)}{\Delta\left(\frac{P_x}{P_y}\right)} \dots\dots\dots (3.2)$$

Where:

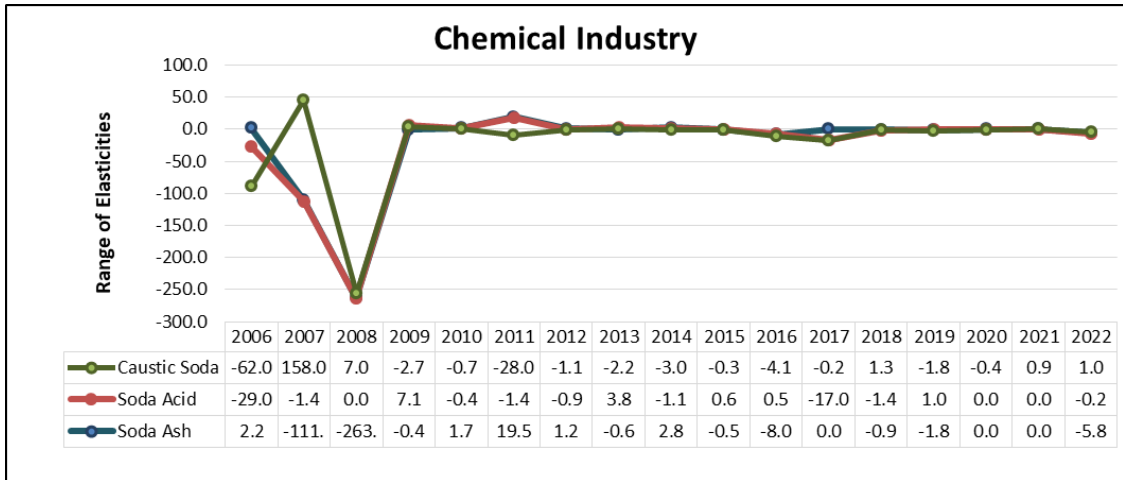
SE is the substitution elasticity; X is the imported quantity, Y is the domestic quantity, while P_x is the import price and P_y is the domestic price of the same commodity.

The above expression simply explains a ratio of the relative quantity and price ratios. A downward trend over time would indicate an import substitution. If X and Y are perfect

substitutes, the consumer will choose a lower price commodity. Therefore, SE will be negatively infinite; otherwise, it will be zero.

We have computed the substitution elasticity of 3 chemical products. Their trend and SE value are shown in Figure 1, and three metal products in Figure 2

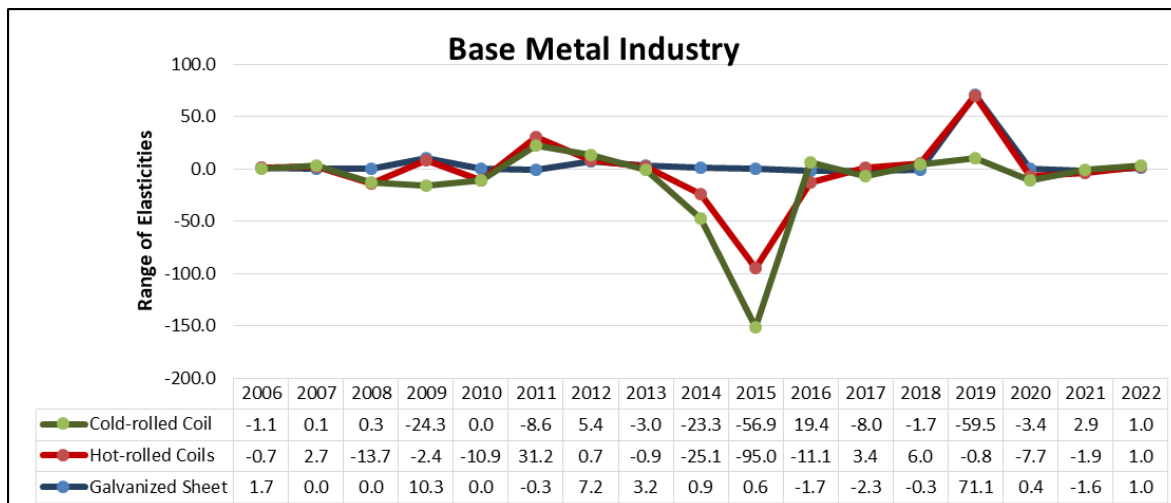
Figure 1



Source: Author's Estimates

Trends, negative SE index values, and low variation show import substitution for soda ash and sulphuric acid. The negative values indicate that import prices are above the local prices while domestic prices are relatively constant over time, contributing to import substitution.

Figure 2



Source: Author's Estimations

Similar to the chemical products, the trend, negative SE index values, and low variation are also evident in import substitution in hot-rolled and cold-rolled coils. On the contrary, the SE values for galvanized rolled coil signify a lack of import substitution, as most SE values are positive. This implies that the domestic price of galvanized rolled is higher than the imported price.

3.1 Econometric Methodology

As mentioned above, this study uses a bivariate probit model, where the dependent variable is binary. Suppose that X_1 is a binary variable (Antidumping duty). The general form of the model is as follows:

$$X_1 = 1[Y_1\delta_1 + u_1 > 0]$$

Or

$$X^*_1 = Y_1\delta_1 + u_1$$

Where

X^*_1 is a latent variable and allows to choose one of the two options (0 and 1), which is

$$X_1 = \begin{cases} 1 & \text{if } X^*_1 > 0 \\ 0 & \text{if } X^*_1 < 0 \end{cases}$$

Furthermore, the generalized expression of the binary model is

$$P = F(Y_1\delta_1)$$

F is the standard normal cumulative distribution function, and P is the probability, $P = \text{pr}(X_1=1)$. If u_1 is $N(0,1)$, the model is a probit model $P = \Phi(Y_1\delta_1)$. For a probit model, the log-likelihood has to be minimized to get probit maximum likelihood estimates (ML) is

$$l(X, \delta_1 | Y_1) = \sum_{i=1}^n (Y_i \log \Phi(Y_1 i \delta_1) + (1 - Y_i) \log(1 - \Phi(Y_1 i \delta_1)))$$

It should be noted that each estimated parameter cannot be considered a change in the probability of option quantified as $X_1=1$. It is obtained as a derivative $\partial P / \partial Y_{1j}$ if the regressor is continuous.

Additionally, the above-identified derivatives are Marginal effects, which are used to find the rate of change in a dependent binary variable concerning the change in an independent variable. Previous empirical studies considered signs of the coefficient to interpret the results. A positive sign of the coefficient implies more likely, and a negative implies less likely or even no probability, such as Arbues & Villanua (2016); Ahmad & Battese (2022).

4. Estimations of Marginal Effects

We choose to use the marginal effect technique to estimate our probit model. The marginal effects are a derivative used to measure the change. The result of the estimation is shown in the table-4.1.

Table 4.1 Marginal Effects (estimation results)

| AD | Marginal Effects (dy/dx) | StandardError | z-value | p-value | Sig |
|----|--------------------------|---------------|---------|---------|-----|
| SE | 0.003 | 0.00 | 5.04 | 0.00 | * |
| LI | -5.951 | 1.14 | -5.2 | 0.00 | * |

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| | | | | | | |
|------------------------|--------|-------|-----------------|-------|--------|---|
| lnCIPS | 15.643 | | 3.50 | 4.47 | 0.00 | * |
| REER | 0.251 | | 0.05 | 4.61 | 0.00 | * |
| KOFGI | 0.595 | | 0.15 | 4.1 | 0.00 | * |
| GDPG | -0.291 | | 0.07 | -4.34 | 0.00 | * |
| lnPQ | -0.469 | | 0.10 | -4.52 | 0.00 | * |
| Number of observations | 102 | | Prob>Chi-square | | 0.000 | |
| Wald Chi-square | 12 | 37.77 | Pseudo R-square | | 0.7448 | |

*Author estimates: Note; *p<0.01 shows significant at 1% level*

The results in the above table show that all variables are highly significant and affect the decision to perform antidumping duties. The elasticity of substitution, GDP growth, and production of the aforementioned six products show a negative relationship, while the rest of the four variables have a positive relationship.

As mentioned above, the positive sign of the parameters implies a greater chance of occurring of the dependent variable. The positive sign for Import Elasticity of Substitution shows that there are greater chances to file an Antidumping case against importing these products. This result is inconsistent with the findings of a negative relationship between import substitution elasticity and AD proceeding, established by Hansen et al., (2014). It is also inconsistent with the findings of Nzovitst & Sabika (2016), which say that where import substitution elasticity is higher, the importers cannot increase the price; rather, they reduce the price to compete with the local product. Our result establishes that domestic products with a greater ability to substitute imported goods would have a greater chance of being protected from imported goods penetrating the market with unfair means. This implies that the importers of the above-mentioned three steel products and three chemical products are dumping the goods. Higher elasticity in import substitution attracts to protect domestic producers.

The results show three more variables that have a positive association. The positive sign with CIPS implies that the more competitive the industry, the greater the chance of getting protection through AD cases. So, as the competitiveness of Pakistani Industries increases, they would ask for greater shelter. The large number of antidumping measures by the industrialized countries is evidence of such a trend.

The higher value of REER shows an appreciation and, vice versa, a depreciation of the local currency against the foreign currency. In the above result, a positive association

explains that an appreciation of the local currency would have a higher probability of filing AD cases. Appreciation of the Currency would make the imported material cheaper and force the local companies to seek shelter from the government. Similarly, a positive relationship between openness and imposition of AD implies that trade liberalization would increase the probability of filing AD cases. A more open economy means lower tariff barriers and a higher import level. The main issue domestic businesses face is competition from foreign supply. Domestic producers would ask for more shelter through AD measures.

Three variables show a negative association with the probability of local companies filing AD cases, which implies a negligible chance of filing AD cases. The result shows a negative relationship with legal structure. This implies that improvement in the quality of legal structure would induce a lesser probability of filing AD cases. A strong legal system discourages private businesses from filing cases against foreign suppliers, provided they have concrete evidence of dumping and accurate dumping margin calculation. The real GDP growth and production of the six products against which AD measures were taken also showed a negative relationship. As the GDP grows, the nation's national income grows, and demand for imported goods increases. Similarly, when the production of the above particular goods increases, the possibility of initiating AD cases decreases.

Like Pakistan, most countries have observed metal and chemicals as the target industries for antidumping measures. The data shows that 32 and 21 percent of the total antidumping complaints were from the metal and chemical sectors. Miranda et al., (1998), Aggarwal (2003); Grüber et al., (2021) believe that due to seasonal shifts, international companies reduce prices during the recession, and domestic companies, in retaliation, file antidumping complaints to get shelter from these reduced price strategies of the big exporting companies. Our study has found that the same pattern and that metal and chemical products are the main targets of antidumping in Pakistan may have the same reason as stated in the above studies.

5 Conclusion

During the last decade, Pakistani companies have been very active in filing cases against foreign imported goods for antidumping duty on the allegation of dumping the product in the local market. This research aims to assess and determine the factors that influence AD actions by Pakistani authorities.

The study followed a model wherein the elasticity of substitution was the major factor focusing as a potential factor influencing the AD measures. For this purpose, six products facing AD duty were chosen, and all related data are available.

The relationship was analyzed through a probit regression model, where a dependent variable, the antidumping duty, was taken as binary. In contrast, independent variables included Elasticity of Substitution, Quality of Legal institution, level of industrial competitiveness, Real effective exchange rate, trade openness, GDP, and domestic production of selected commodities. The data was collected from the year 2006 to 2022.

The elasticity of substitution was calculated using the Argmington formula, which shows that all six products have substantial import substitution elasticities. Probit regression shows that elasticity of substitution, Industrial competitiveness, real effective exchange rate, and trade openness have a positive relationship with AD duty and implies that a higher value of these four factors makes the probability of filing AD cases higher. However, the other three factors, quality of the legal system, GDP, and national production level of the selected products, are the factors that lower the probability of Pakistani companies filing AD cases.

It is, therefore, recommended that the Authority (National Tariff Commission) also consider the backward and forward linkages when investigating antidumping applications because this study proves that companies are looking for maximum domestic protection and support against imported goods.

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